INTERNATIONAL STANDARD

**ISO/IEC 29138-1**

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# Information technology — User interface accessibility —

## Part 1: User accessibility needs

*Technologies de l'information — Accessibilité de l'interface utilisateur —*

*Partie 1: Besoins d'accessibilité de l'usager*



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# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

This first edition cancels and replaces the Technical Report ISO/IEC TR 29138-1:2009, which has been technically revised.

Compared to the previous edition, all clauses in the document have been technically revised. Annex C provides a full comparison of the content with the first edition.

A list of all parts in the ISO/IEC 29138 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

# Introduction

It is important for the whole of society that all people, regardless of their age, size or ability, have access to the broadest range of systems. Issues of accessibility to, and usability of, systems have become more critical as recognition of the number of people (such as older persons, children, persons with reduced abilities and persons with disabilities) with diverse user accessibility needs has increased, technology has diversified and it has become increasingly necessary to use technology to participate fully in life.

The number of people using information and communications technology (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 all people with whatever user accessibility needs can have access to ICT products and services, leading to an inclusive e-society.

This document identifies a set of user accessibility needs that can be used to understand and improve the accessibility of ICT and other systems for diverse users in diverse contexts of use. It recognizes that different users will have different combinations of needs including different combinations of user accessibility needs. By being as comprehensive as possible (at the time of publication), it aims to identify a diverse set of user accessibility needs that, if met, can lead to accessibility for these diverse users. It also recognizes that, as technologies evolve along with increases in our understanding of accessibility, further user accessibility needs might be uncovered. However, this document will still provide the major portion of the total set of all user accessibility needs.

This set of user accessibility needs has evolved from the Technical Report ISO/IEC TR 29138-1:2009 and from the accessibility goals and high-level user accessibility needs of ISO/IEC Guide 71:2014. ISO/IEC TR 29138-1 was developed from the original user needs summary submitted to ISO/IEC JTC1/SWG-Accessibility by the Trace R&D Center of the University of Wisconsin-Madison, developed under funding from the National Institute on Disability Independent Living and Rehabilitation Research (NIDILRR), under grant # H133E030012. This set of user accessibility needs also takes into account accessibility guidance from a number of other ISO and ISO/IEC standards as well as from additional sources.

This document is intended for a wider audience than the previous Technical Report (which was only addressed to standards developers). This expanded audience includes system and service developers and other persons responsible for accessibility.

The set of user accessibility needs contained in this document can be especially useful in identifying needs that might be missing in the requirements of existing accessibility regulations and standards. Consideration of this set of user accessibility needs can lead to greater accessibility in the systems to which they are applied in every domain.

# Information technology — User interface accessibility —

# Part 1:
# User accessibility needs

## 1 Scope

This document identifies a collection of user accessibility needs that diverse users have of ICT systems to make these systems accessible to them. Each user accessibility need might be required of a system by an individual. Different users can have different sets of user accessibility needs in different contexts.

While this set of user accessibility needs was developed for the domain of ICT, many of the user accessibility needs in this set also apply in other domains.

This document does not provide requirements or specific processes and methods for the application and evaluation of user accessibility needs. However, it could inform the development of such requirements (see 5.4).

This document is not designed for certification purposes or regulatory or contractual use.

The user accessibility needs in this document are intended to inform and encourage those responsible for accessibility to go beyond the minimum provisions of accessibility legislation and regulations.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

**3.1**
**accessibility**
extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of user needs, characteristics and capabilities to achieve identified goals in identified contexts of use

Note 1 to entry: Context of use includes direct use or use supported by assistive technologies.

[SOURCE: ISO 9241-112:2017, 3.15]

**3.2**
**assistive technology**
hardware or software that is added to or incorporated within an ICT system that increases accessibility for an individual

[SOURCE: ISO 9241-171:2008, 3.5 — modified to reference the ICT domain.]

**3.3**
**information/communication technology**
**ICT**
technology for gathering, storing, retrieving, processing, analysing and transmitting information

[SOURCE: ISO 9241-20:2008, 3.4]

**3.4**
**system**
product, service, or built environment or any combination of them with which the user interacts

[SOURCE: ISO/IEC Guide 71:2014, 2.1]

**3.5**
**user**
individual who accesses or interacts with a system

[SOURCE: ISO/IEC Guide 71:2014, 2.2]

**3.6**
**diverse users**
individuals with differing abilities and characteristics or accessibility needs

[SOURCE: ISO/IEC Guide 71:2014, 2.3]

**3.7**
**context of use**
physical and social environments in which a system is used, including users, tasks, equipment and materials

[SOURCE: ISO/IEC Guide 71:2014, 2.7]

**3.8**
**diverse contexts**
differing contexts of use and differing economic, cultural and organizational conditions

[SOURCE: ISO/IEC Guide 71:2014, 2.8]

**3.9**
**user need**
prerequisite identified as necessary for a user, or a set of users, to achieve an intended outcome, implied or stated within a specific context of use

EXAMPLE 1 A presenter (user) needs to know how much time is left (prerequisite) in order to complete the presentation in time (intended outcome) during a presentation with a fixed time limit (context of use).

EXAMPLE 2 An account manager (user) needs to know the number of invoices received and their amounts (prerequisite), in order to complete the daily accounting log (intended outcome) as part of monitoring the cash flow (context of use).

Note 1 to entry: A user need is independent of any proposed solution for that need.

Note 2 to entry: User needs are identified based on various approaches including interviews with users, observations, surveys, evaluations, expert analysis, etc.

Note 3 to entry: User needs often represent gaps (or discrepancies) between what should be and what is.

Note 4 to entry: User needs are transformed into user requirements considering the context of use, user priorities, trade-offs with other system requirements and constraints.

[SOURCE: ISO/IEC 25064:2013, 4.19]

**3.10**
**user accessibility need**
user need related to features or attributes that are necessary for a system to be accessible

Note 1 to entry: User accessibility needs vary over time and across contexts of use.

[SOURCE: ISO/IEC Guide 71:2014, 2.4]

Note 2 to entry: User accessibility needs are transformed into user requirements considering the context of use, user priorities, trade-offs with other system requirements and constraints.

**3.11**
**user interface component**
features or attributes of a system with which a user can interact

**3.12**
**actionable user interface component**
**actionable component**
user interface component that can receive input from a user

Note 1 to entry: All actionable components are intended to do something with the input that they receive, whether it is to process it, pass it on to some other component of the system, and/or provide it back to the user.

**3.13**
**non-actionable user interface component**
**non-actionable component**
user interface component that only provides output to the user and that cannot receive input from the user

**3.14**
**multiple means of presentation**
different ways of presenting information

Note 1 to entry: Presenting information in different ways can improve the accessibility of systems.

[SOURCE: ISO/IEC Guide 71:2014, 2.13]

**3.15**
**perceive**
recognize the existence of something

**3.16**
**understand**
recognize the meaning of something

## 4 Accessibility goals

ISO/IEC Guide 71 identifies the following accessibility goals:

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;

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;

3) **support for individualization:** A system supports individualization if its components, functions or operations can be tailored to meet the needs of individual users;

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;

5) **perceivability:** A system is perceivable if diverse users in diverse contexts can sense the information and functionalities it presents;

6) **understandability:** A system is understandable if its information and functionalities are interpretable by diverse users;

7) **controllability:** A system is controllable if the user is able to initiate and complete the interaction(s) required to accomplish the task;

8) **usability:** A system is usable if it supports diverse users in their diverse contexts to accomplish their tasks with effectiveness, efficiency and satisfaction;

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;

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;

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.

These goals are not mutually exclusive, but used together they can identify a broad set of user accessibility needs. ISO/IEC Guide 71 also identifies a number of typical user accessibility needs that correspond to individual usability goals that can be used as a starting point for the identification of a more comprehensive set of user accessibility needs.



# 5 User accessibility needs and related information

## 5.1 General

### 5.1.1 Needs

A user need is something an individual requires of a system. User needs focus on the internal and external functionality of a system, without prescribing how this functionality will be implemented. Identifying user needs is an important component of developing designs intended to support accessibility. Needs for internal functionality of a system are typically specified in terms of the tasks that the system is intended to assist the user with. Needs for external functionality of a system typically include needs for: accessibility, usability, security, privacy, and similar aspects of using the system.

NOTE 1 User accessibility needs are just some of the total set of user needs that a system might be intended to meet.

NOTE 2 For ease of readability, user accessibility needs will be referred to throughout this document as "needs" without always being qualified as "user accessibility needs". The complete term "user accessibility need" will be reserved for situations where extra emphasis is important. Whenever the more general case of all user needs is discussed, the term "user needs" will be explicitly used.

The user accessibility needs identified in this document are generic and are not tied to any particular system or context of use. They are a collection of the various user accessibility needs that apply to most ICT systems in most contexts of use. It is up to individuals using these user accessibility needs to determine any system and context of use where they do not apply.

NOTE 3 The user accessibility needs are described in a more general format than the user needs considered in ISO/IEC 25064, which are specific to a particular system and a particular context of use.

The user accessibility needs in this document do not specify how to meet them. However, examples or instances are provided for many of them illustrating how they can be met.

 

While the expectation is that user accessibility needs must be met for the system to be accessible to individuals, the user accessibility needs in this document are not expressed as user requirements. User requirements go beyond user needs to also identify criteria (how much is needed) and contexts (where the need is needed). However, the user accessibility needs in this document can form an important input to identifying and creating user requirements (see 5.4.4).

### 5.1.2 Some users need

The needs in this document are user accessibility needs because "Some users need" them for a system to be accessible to them.

These needs are not necessarily shared among all users. Diverse users can have a large number of differing needs. The user accessibility needs of some users in some contexts might not be needed for different users or for the same users in different circumstances.

The needs of some individual users might appear to conflict with the needs of other individual users. Thus while some users need "5-1-3 to have information presented auditorially", some other users need "5-1-4 to have audio information available in other modalities". However, these two needs are parts of a higher level need "5-1 to use a specific sensory modality (or a set of specific modalities) to perceive information" that does not conflict with other needs.

Rather than only focusing on commonly held needs, it is important to ensure that the user accessibility needs of diverse users are accommodated in diverse ways.

## 5.2 The organization of this set of user accessibility needs

### 5.2.1 Organization based on accessibility goals

The user accessibility needs in this document are organized in categories that correspond to the accessibility goal (from ISO/IEC Guide 71) to which they appear to be most relevant. However, it is recognized that since the goals can overlap, individual needs might relate to more than one goal. In general, each user accessibility need is presented under only a single accessibility goal, since understanding and using the needs is more important than categorizing them. However, in some cases similar or overlapping needs are presented in different categories.

Where a large number of user accessibility needs are associated with an accessibility goal (i.e. with needs relating to perceivability, understandability, and controllability), those needs are also further organized under high level needs. The emphasis of this organization of needs remains on recognizing the various needs of individuals and not on the categorization of those needs.

Annex C provides the mapping between the previous Technical Report (ISO/IEC TR 29138-1:2009) and this document.

### 5.2.2 Heuristics for the organization of this set of user accessibility needs

While there are many potential user accessibility needs, this document recognizes the importance of identifying a limited set of needs that can be widely applied.

a) Needs can be differentiated from instances and examples (of a need) based on the following general heuristics:

   1) a need is not dependent on a particular technology or context unless the technology is essential to the need;

   2) an instance (of a need) identifies implementation refinement of a need in some particular context;

3) an example (of a need) identifies one way in which instances or needs are met. Examples are singular — that is each example cannot be implemented in more than one way.

b) Due to the large number of needs associated with the goals of perceivability, understandability and controllability:

1) needs related to those goals are organized at two levels, with the higher level serving as a category of needs for items at the lower level;

2) both high level needs and the lower level needs they categorise are expressed and treated as needs;

3) only the lower level needs have instances and examples presented with them.

c) Further heuristics were used to determine the information to be provided with each of these:

1) because of their general nature, most needs (except some needs that are used to categorize more detailed needs) benefit from being described;

2) a need might have associated instances;

3) a need might have associated examples;

4) an instance might have associated examples;

5) an instance might have associated instances.

## 5.3 Detailed information on needs

### 5.3.1 The statement of the need

User accessibility needs have been worded to focus on what is needed, without prescribing in detail how the need is to be met. Clauses are named with a statement of the user accessibility need that can be prefixed with the qualifier, "some users need".

User accessibility needs are focused on needs that individual users have of a system rather than solutions imposed upon the individual user by the system or environment. However, whether or not a particular user has a particular need at a particular time can be influenced by the context of use, which includes the current condition of the environment.

NOTE The terms "user need" and "user accessibility need" are based on identifying something that "**some users need**" as discussed in 5.1.2.

### 5.3.2 Need identifier

Each of the needs is provided with an identifier that is composed of a number that identifies both the accessibility goal and the location of the individual need within the accessibility goal.

### 5.3.3 Description of the need

While the wording of individual needs has been made as clear as possible, most needs are provided with a further discussion (labelled “Description”) to help clarify their intent and scope.

The description of each need can include up to three functional parts, respectively:

a) the focus of the need: more detail than the simple one line description but still fairly high level to aid understanding;

b) an elaboration that explains the need in more detail;

c) the consequences for the user if the need is not met in the context of use.



 

NOTE Sometimes these different parts are combined into one or two parts.

### 5.3.4 Instances of the need

An instance is a refinement of a need. Typically a need can have several instances. In some cases those instances will identify contexts in which the need might apply. The set of instances associated with a need is not necessarily all of the instances that could be associated with that need. Instances of a need are worded as needs, because they are specific variations of a more general need. Thus, instances do not proscribe specific implementations of a need.

Instances are identified by a letter that can be added to the identifier of the need to which they apply (e.g. instance "a" of need "1-1" can be fully identified as "1-1-a").

### 5.3.5 Examples of the need

In this document examples of some needs are used to make those needs clearer by showing how a system might implement functions or attributes to meet them. It is recognized that a single function or attribute might implement more than one need.

These examples are not recommendations of the preferred way of addressing the need.

### 5.3.6 Examples of an instance

In this document examples of instances are provided to further illustrate implementations of the need of which they are instances. Such an example might typically illustrate an implementation in a particular context.

These examples are not recommendations of the preferred way to implement those instances.

### 5.3.7 Short versions of the needs and their instances

Annex A provides a short list of just the needs and their identifiers.

Annex B provides a short list of the needs and instances and their identifiers.

## 5.4 Applying the needs

### 5.4.1 Users and uses of the set of needs

This set of user accessibility needs can be used by many different stakeholders including:

— developers of information and communications technology products and services;

— procurers of information and communications technology products and services;

— organizations providing accessibility both internally and externally;

— users and organizations that represent them;

— accessibility advocates and researchers;

— standards developers working on standards for systems that will interact with human users.

### 5.4.2 General activities involving user needs

The needs presented in this document are broadly applicable to ICT systems and have been worded as generic rather than system specific needs. These user accessibility needs could be one starting point towards achieving accessibility in ICT systems. Another possible starting point is user involvement. The identification of specific needs, the development of system requirements based on needs, and the

evaluation of systems in terms of their meeting needs are general activities that can be carried out to meet a variety of specific purposes (see Annex D).

ISO 9241-210 provides guidance on human-centred design, including the following principles:

a) the design is based upon an explicit understanding of users, tasks and environments;

b) users are involved throughout design and development;

c) the design is driven and refined by user-centred evaluation;

d) the process is iterative;

e) the design addresses the whole user experience;

f) the design team includes multidisciplinary skills and perspectives.

The needs presented in this document are intended to combine the needs of diverse users and are not intended to be used to exclude individuals who have any of these needs.

While the needs presented in this document represent a large proportion of ICT-related potential user accessibility needs, it is possible that additional ICT-related user accessibility needs exist. Participatory design with user involvement can aid both in the application of these user accessibility needs and in the identifying of any additional user accessibility needs.

### 5.4.3 Identifying system and context specific user needs

The needs presented in this document identify what is generally needed across all types of systems and services to provide accessibility for diverse users. To apply these needs to a specific system, it is important to relate these needs to specific characteristics of the particular system and its intended contexts of use. This typically involves identifying a number of system and context specific instances of the need.

### 5.4.4 Developing system requirements

The needs presented in this document identify what is generally needed, without identifying qualifications on the need, such as: where it is needed or how the achievement of this need can be verified. User accessibility needs can inform but are not intended to be requirements or used as checklist.

Needs can be transformed into system requirements by specifying further information that will ensure that the requirement is fully specified (according to the expectations of whatever development methodology is being used) and that the requirement is specific enough to be used in design and evaluation activities.

NOTE ISO/FDIS 9241-220:—[1)], 7.3.3 discusses deriving user requirements from user needs, the context of use, and human-centred quality objectives.

### 5.4.5 Evaluating systems

The needs presented in this document can be used to identify accessibility issues where one or more needs are present but not met by a system (e.g. in a gap analysis). These accessibility issues can be used either in the procurement of systems or in identifying possible improvements to a system.

System requirements developed from these needs can be evaluated to identify whether or not a system meets the full set of needs and is thus acceptable.

1) Under preparation. Stage at the time of publication: ISO/FDIS 9241-220.

# 6 Details of the user accessibility needs

## 6.1 Details of the needs related to suitability for the widest range of users

### 6.1.1 To recognize that they are included as a system user within diverse contexts

**User need:** 1-1

**Description**: This need focuses on users being able to recognize whether or not the system is accessible to them in diverse contexts of use.

Information on the accessibility of a system is important in helping users to decide whether or not to attempt to use a system and/or how to use it. If the users do not know that the system is accessible to them, then they might be discouraged from using it.

**Instances include:**

a) to know that a system is accessible to an individual user;

b) to know how to set the system up to work within a particular context;

c) to access information on any limitations on a system that might preclude an individual's access;

d) to have technologies that are accessible on release;

e) to have new releases of a system not diminish the accessibility provided by previous releases.

f) to have access to an epub document where a system provides meta-data on functionality of content and interoperability with assistive technology.

EXAMPLE A user is alerted to an accessibility knowledgebase regarding the device and specific media interoperability (formats) that will work on the device.

### 6.1.2 To have accessible support for using the system

**User need:** 1-2

**Description:** This need focuses on ensuring that both the main system and any support for the system are accessible.

If any components of the support provided are not accessible, then those components cannot help users with accessibility needs, even if the rest of the system would be accessible if the user understood how to access it.

**Instances include:**

a) to have electronic access to copyrighted and otherwise protected support material;

b) to have a means to provide feedback to the support/development organization about improvements to accessibility to meet an individual's particular needs;

c) to obtain a response to feedback submitted (that answers questions or explains what is being done about the problems that have been reported);

d) to have product information available in an accessible format to organizations supporting the individual.

EXAMPLE 1 To have product information disseminated in an accessible format to distributors, retailers, system integrators, customer organizations and individuals providing support.

e) to be able to interact with encrypted media.

EXAMPLE 2 A system provides access to encrypted media to a user depending on assistive technology using techniques described in W3C Encrypted Media Extensions Recommendation https://www.w3.org/TR/encrypted-media/.

### 6.1.3 To have the system accessible to an individual with combinations of needs

**User need:** 1-3

**Description:** This need focuses on ensuring that the system is accessible to users with combinations of accessibility needs in diverse contexts.

People are not defined by a single need or characteristic. They typically have a large number of needs that interact with each other. Only systems that meet all of an individual's user accessibility needs for a particular context will be fully accessible for that individual in that context.

**Instances include:**

a) to have the system accessible by an individual with multiple physical needs;

b) to have the system accessible by an individual with multiple cognitive needs;

c) to have the system accessible to an individual in multiple environmental conditions;

EXAMPLE In office, home and public environments.

d) to have the system accessible by an individual with multiple physical, sensory or cognitive needs or any combination of these.

## 6.2 Details of the needs related to conformity with user expectations

### 6.2.1 To not be surprised by the results of interactions with the system

**User need:** 2-1

**Description**: This need focuses on the importance of familiarity and predictability when interacting with the system.

The need for predictability applies when using a system multiple times (it is important for its behaviour to be consistent each time) and when using components of the system (which are important to behave consistently throughout the system).

If this need is not met, a user might not know what to do, might make errors in operation or might be discouraged from using the system.

**Instances include:**

a) to have consistent and predictable user interfaces;

b) to have content appear and behave in predictable ways;

c) to have options presented be meaningful and appropriate;

d) to have the form of feedback be predictable;

e) to have keyboard navigation that follows a meaningful sequence through form controls;

f) to have location and layout of controls be consistent;

g) to have each function on its own key rather than having keys change their functions but look/feel the same;

h) to have systems use standard conventions, words and symbols for the user's culture.



 

### 6.2.2 To apply personal knowledge and experience to interact successfully with the system

**User need:** 2-2

**Description**: This need focuses on the desirability for similar systems to behave similarly.

Satisfying the need enables users to predict how a system is likely to behave and therefore how to interact with it to achieve a task. This can greatly reduce the time and stress involved in interacting with systems or components of systems.

If the need is not met, a user might not know what to do, might make errors in operation or might be discouraged from using the system.

**Instances include:**

a) to have content and interactions consistent with similar systems and experiences;

b) to have controls in similar systems be located in similar places.

EXAMPLE 1 A computer uses a standard QWERTY keyboard layout.

EXAMPLE 2 A computer application utilizes a consistent look and feel.

EXAMPLE 3 An airline opts for the same or similar cockpit layouts for different aircraft models within its fleet.

### 6.2.3 To receive instruction or training directed at preparing users for new knowledge needed to interact successfully with the system

**User need:** 2-3

**Description**: This need focuses on the importance of users being provided with materials to enable them to learn how to interact with a system.

The need is particularly relevant when a system is new (outside a user's previous experience) or has components or aspects which have changed or are new.

If such materials are not provided, a user might not know what to do, might make errors in operation or might be discouraged from using the system.

**Instances include:**

a) to have accessible training and support materials;

b) to have operating manuals updated in line with changes to products or procedures.

EXAMPLE A video found on the internet shows how to use a particular electronic device.

### 6.2.4 To obtain immediate and easily accessible help or further instructions, where such help can be provided by the system

**User need:** 2-4

**Description**: This need focuses on providing help as opposed to learning.

The need is relevant to dynamic situations in which immediate access to resources or support is important. It commonly applies when users are interacting with systems or with aspects of systems with which they are not familiar.

If help is not provided in a timely fashion accessible to the user, they might not know what to do, might make errors in operation or might be discouraged from using the system.

**Instances include:**

a) to have timely access to trained customer service personnel (e.g. helpdesk);

b) to have information describing the layout of the operational parts;

c) to have a recognised mechanism (e.g. a help key or a phone menu using "0") that provides detailed help on the interaction in the context the user is in (what to press next)

d) to have a means to find out more information about the current state of the system (e.g. context sensitive help or tooltips);

e) to have a means to easily get human help;

f) to use symbolism that helps the user to understand the interface and possible interactions;

g) to have mechanisms (e.g. graphs and pictures) that summarize and supplement text so a user can understand the point without a lot of reading;

h) to have speech support with synchronized highlighting so a user can follow with rapid feedback;

i) to have reminders of appointments to be able to know when to do thing.

## 6.3 Details of the needs related to support for individualization

### 6.3.1 To be provided with (and to choose) the way of interacting with a system that best works for them (including activating and deactivating built-in accessibility features)

**User need:** 3-1

**Description**: This need focuses on providing a range of mechanisms to meet the interaction needs of an individual user optimally.

If a system does not provide for the mode of interaction that works best for a user, then that user will not have an optimal experience. One solution that might suit many users will often not meet the needs of an individual in using that system or might not provide the most accessible experience for that user.

**Instances include:**

a) to choose modalities to be used for inputs to the system;

b) to choose modalities to be used for system outputs;

c) to have applications not override or defeat built-in accessibility features;

d) to have accessibility functions that can be returned to an initial state individually or together;

e) to activate or deactivate individualization features;

f) to perform, undo, and redo individualization actions.

### 6.3.2 To choose between the available input/output modalities and their configuration without requiring restart of the system

**User need:** 3-2

**Description**: This need focuses on the desirability of a system remaining in use and stable whilst accessibility features are configured or activated.

Commonly, systems have required a complete restart to configure or activate accessibility or interaction features thus exposing the user to disruption and unnecessary risks (such as: losing context, losing work, losing navigation, interruption of tasks, need to re-login).



 

**Instances include:**

a) not having to restart the system to activate an accessibility modality;

b) not being required to close or save operations before activating an accessibility modality;

c) to have the system support choosing between simultaneous modalities without disruption of the task in progress.

### 6.3.3 To have simultaneous use of alternate interaction modalities

**User need:** 3-3

**Description**: This need focuses on the optimisation of a system for an individual with the provision of simultaneous alternate modalities.

Alternate interaction modalities that are available simultaneously can enable a user to switch easily from one to another or use more than one at the same time. This can enable the user to use two or more sources to perceive the information. In the context of this need, interaction modalities involve a broader set than purely sensory modalities, for example captions accompanying a video. Limiting an individual to one modality might mean they are unable to gain full access to the output of a system.

**Instances include:**

a) to have the system to support the user in choosing between simultaneous modalities;

b) to be provided with audio descriptions for visual content and captioning simultaneously;

c) to be provided with transcripts for audio and video which support synchronised highlighted text sections or words.

### 6.3.4 To be provided with information on available options for interacting with a system on which to base a choice of interaction methods

**User need:** 3-4

**Description**: This need focuses on providing users with information about what methods of interaction are available.

Commonly, accessibility features are not identified in obvious ways.

Users or their agent will not be able to use a specific feature unless they know exists and how to activate it.

**Instances include:**

a) to have information on the availability of individualization capabilities;

b) to have information on individualization actions taken by the system;

c) to have default settings that can be used as is;

d) to be able to find a specific accessibility setting and activate it;

e) to be provided with a summary of accessibility features available;

f) to operate vocal commands with an impaired voice simultaneously to imprecise gestural command, to benefit from the mixing of both.

### 6.3.5 To be provided an accessible means to choose individualization features

**User need:** 3-5

**Description**: This need focuses on the provision of accessibility options in an accessible way.

If accessibility options are not themselves accessible, then individuals will be unable to choose the options that suit them best, particularly when initially attempting to use a system.

**Instances include:**

a) to control whether or not specific system-initiated actions can occur automatically;

b) to have a first step of interaction that enables user to choose between individualization features.

EXAMPLE A first step is provided which presents the options in several ways, including spoken text (vocalised) and sequential browsing, in large and contrasted characters associated with clear simplified icons.

### 6.3.6 To have individualization features maintained for future uses of the system, until changed by the user

**User need:** 3-6

**Description**: This need focuses on the persistence of accessibility choices a user has made across uses of the system.

Ideally, the choices a user makes when using the system one time can be saved to be the initial state the user is provided with when using the system again.

If this is not provided, a user might experience considerable difficulty in re-establishing a good accessibility experience.

**Instances include:**

a) to have system level accessibility preference settings that apply across applications;

b) to have accessibility preference settings preserved unless explicitly changed;

c) to have preference settings change immediately preferably without requiring system reboot;

d) to save and restore individual preference settings;

e) to revert to default settings.

### 6.3.7 To have the system use complete standardized sets of needs or preferences from specific standards

**User need:** 3-7

**Description**: This need is concerned with individual user expectations and international interoperability of systems using one or more standard sets of preferences.

By using a standard set of preferences, a user might know what accessibility features can be requested and used. If this is not done users might experience difficulty when moving between different systems and different versions of similar systems. It is also important for a user to be able to request options known to be outside of the recognised set or sets of preferences used by the system. This need is also highly relevant to interoperability across systems, particularly where assistive technology (AT) is involved.

If this need is not satisfied, a user may be unable to use the system because an expected and needed adaptation is not provided.

**Instances include:**

a) to have the system provide individualization options based on one or more sets of needs or preferences from a recognized set of preference definitions;

b) to have the system provide additional individualization options beyond those corresponding to sets of needs or preferences that it also supports.



 

#### 6.3.8 To take or give up control of functions that could be performed by either the user or the system

**User need:** 3-8

**Description**: This need focuses on the importance of individual users being able to have control over the use or otherwise of particular elements or functions of a system.

This is particularly significant where a need or context of a need may be changing rapidly and the user needs to select or deselect the use of particular components as the need changes.

If this capability is not enabled, a user may feel disempowered and not be able to get the maximum usefulness or range of functions from the system.

**Instances include:**

a) to have a text entry system with built-in word prediction that sometimes incorrectly guesses and be easily enabled or disabled;

b) to have a speech recognition system adapt to a user's changing speech capabilities over time;

c) to have a system be able to adapt to speed of text entry in a web form.

#### 6.3.9 To have the option to use the system with a minimum of setup or configuration

**User need:** 3-9

**Description**: This need focuses on the importance to individual users of having a choice as how they interact initially with a system.

While some users might need to configure particular methods of interaction, others might need not to go through any setup or configuration.

If this need is not addressed some users will be presented with unhelpful options thus limiting their use of or experience with a system.

**Instances include:**

a) to have a system maximise the number of automatic processes on initial set with a user;

b) to have a system store configuration settings for a specific user in a specific context so that they do not have to be revisited on system restart.

### 6.4 Details of the needs related to approachability

#### 6.4.1 To have the system free from any physical barriers

**User need:** 4-1

**Description**: This need focuses on ensuring that those wishing to have access to the system are able to do so.

Users who need to complete their tasks need to be able to gain access to systems. Often the use of a system can be confounded by factors that some might not consider part of the system in focus. It is important to consider all of the factors that might impact on the approachability of a system. This might involve consideration of the approachability of related systems.

If there are significant physical barriers to the approachability of the system, some users will not be able to use it.

EXAMPLE Sufficient room is provided for users and their assistive products or assistive technology to enable users to access with the system

**Instances include:**

a) to have adequate room to fit themselves and their assistive products or assistive technology;

b) to have an accessible path and a means to position oneself within reach of installed products;

c) to have system controls located within close reach;

d) to have information displayed within an individual's viewing range;

e) to have controls displayed within an individual's viewing range;

f) to be able to adjust the location and position of devices and controls.

### 6.4.2 To have the system free from any psychological barriers

**User need:** 4-2

**Description**: This need focuses on ensuring that those wishing to have access to the system are able to do so.

Users who need to complete their tasks need to be able to gain access to systems. Often the use of a system can be confounded by factors that some might not consider part of the system in focus. It is important to consider all of the factors that might impact on the approachability of a system. This might involve consideration of the approachability of related systems.

If there are significant psychological barriers to the approachability of the system, some users will not be able to use it. For example, if an interface does not provide sufficient prompts, instructions and confirmation messages, some users will find it too intimidating to consider using.

**Instances include:**

a) to use products without the fear of negative consequences if mistakes are made.

### 6.4.3 To have the system maintain the user's attention

**User need:** 4-3

**Description**: This need emphasises the importance of keeping users positively engaged and encouraged while completing their task.

Some users need continual reinforcement in order to avoid creating their own psychological barriers (e.g. fearing that they are attempting to do something that will be too difficult for them to succeed).

If this is not the case, users might make give up using the system before completing the task.

**Instances include:**

a) to have even small successes acknowledged to increase self-esteem;

b) to receive information regarding the progress of completing a task;

c) to receive encouragement that the user is progressing with a task;

d) to receive prompts identifying the appropriate next step to perform for a task;

e) to receive periodic reminders of the goal being worked on and its value;

f) to have the complexity or difficulty set at a level which is challenging and motivating but not discouraging;

g) to have assistance in coping with their emotional reactions to using the system.



 

### 6.4.4 To have interaction options clearly presented

**User need:** 4-4

**Description**: This need emphasises the importance of plain, understandable presentation of available interaction options.

For users to be able to make appropriate choices as to how to interact with the system their options need to be clearly and obviously apparent.

If this is not the case, users might make errors or wrong decisions which could affect their ability to complete the task.

**Instances include:**

a) to have keyboard and dictation symbols clearly displayed.

### 6.4.5 To have appropriate levels of privacy and security

**User need:** 4-5

**Description**: This need focuses on the importance for users to feel safe and secure when considering or using systems.

It is important for systems to ensure that users' sensitivities regarding their personal comfort and safety, and the security of their data are respected and assured. This is not related only to their physical security of the data but also to the circumstances or context in which the system is being used. Users do not like to feel publicly exposed when conducting private or confidential interactions. Such considerations are as much a matter of perception as physical security.

If the user does not feel safe and secure, they might be prevented from using the system.

**Instances include:**

a) to have products that maintain the user's privacy;

b) to have appropriate levels of safety;

c) to have systems in which hazards are obvious, easy to avoid, and difficult to trigger;

d) to have systems that do not rely on specific senses to avoid injury;

e) to have systems that do not rely on fine movement to avoid injury;

f) to have systems which do not cause fatigue or discomfort in use;

g) to have systems which do not give off inappropriate electromagnetic radiation;

h) to have systems that do not give off chemicals which are allergenic to an individual;

i) to use system safely without needing or experiencing hazards warnings;

j) to use systems safely without seeing hazard warnings;

k) to use systems safely without hearing hazard warnings.

### 6.4.6 To avoid patterns that cause psychological or physical discomfort or disturbance

**User need:** 4-6

**Description**: This need focuses on preventing adverse effects due to visual and audible variations in levels and intensity. These adverse effects can cause damaging psychological and physical distress and

disturbances. If this need is not addressed, access to the system could be disrupted and tasks might not be completed.

NOTE ISO 9241-391 provides information on "requirements, analysis and compliance test methods for the reduction of photosensitive seizures". ISO 9241-394[2)] provides information on the reduction of visual fatigue from stereoscopic images.

**Instances include:**

a) to avoid visual patterns that cause seizures;

b) to avoid auditory patterns that cause seizures.

### 6.4.7 To use the system remotely as well as directly

**User need:** 4-7

**Description**: This need focuses on the importance of providing alternative methods of access when direct access is frustrated or impossible.

It is not always possible for a system to provide direct access to all users. In such cases, remote methods can ensure that such users are able to gain access to the system. If remote access is not provided, some users will not be able to gain access to the system to accomplish their task.

For example, a user wishing to attend a meeting in an environment containing environmental components which have negative on that user is able to access the meeting by teleconferencing.

**Instances include:**

a) to use software to control hardware operations, wherever possible.

### 6.4.8 To have the system free from environmental barriers

**User need:** 4-8

**Description**: This need focuses on the requirement for systems to ensure that those wishing to have access to the system are able to do so.

Users who need to complete their tasks need to be able to gain access to systems. Often the use of a system can be confounded by environmental factors. It is important to consider all of the factors that might impact on the approachability of a system. When considering the approachability of a system it is important that broad environmental considerations are taken into account. This might require consideration of the approachability of related systems.

If there are significant environmental barriers to the approachability of the system some users will not be able to use it.

**Instances include:**

a) to avoid patterns that cause seizures.

EXAMPLE 1 Avoiding visual patterns that cause seizures.

NOTE See WCAG 2.0 https://www.w3.org/TR/UNDERSTANDING-WCAG20/seizure-three-times.html for information on avoiding visual patterns that cause seizures.

EXAMPLE 2 Avoiding auditory patterns that cause seizures.

2) Under preparation. Stage at the time of publication: ISO/CD 9241-394:—.

## 6.5 Details of the needs related to perceivability

### 6.5.1 To use a specific sensory modality (or a set of specific modalities) to perceive information

**User need:** 5-1

**Description**: This need focuses on the importance of recognising that some users might need to use specific modalities or combination of modalities to perceive the information needed to interact with the system at specific times.

For physical, environmental or psychological reasons, some users may need to use a single modality or a combination of modalities. The system might generate information in different modalities. The modalities that users need to perceive information may change during their interaction with the system.

If specific and multiple modalities are not available, then some users will be unable to perceive the information necessary while interacting with the system and therefore be unable to use the system.

This need is further clarified by its sub-needs.

### 6.5.2 To have information presented visually

**User need:** 5-1-1

**Description**: This need focuses on allowing some users to perceive information visually.

For users for whom auditory and tactile modalities are not appropriate or optimal, visual modality may be the only or preferred method of perceiving relevant information.

If information cannot be provided specifically in visual modality, some users will not be able to perceive relevant information optimally or at all.

**Instances include:**

a) to have all information presented visually.

EXAMPLE 1 All the contents, the commands, and the interaction cues are visually displayed to user.

b) to have some information presented visually.

EXAMPLE 2 Contents are displayed visually, some interaction cues are presented in auditory and tactile modalities.

### 6.5.3 To have visual information available in other modalities

**User need:** 5-1-2

**Description**: This need focuses on the importance of ensuring that users for whom the visual modality is not appropriate or optimal are able to perceive relevant information provided by the system.

Users might have to access information in different modalities (e.g. audio (sounds, vocals), tactile (vibration, heat, pressure, electric), kinaesthetic, smell or taste).

If this is not the case, users for whom the visual modality is not appropriate or optimal will not be able to perceive the information they need when interacting with system.

EXAMPLE 1 A partially visually impaired user uses redundancy of visual cues in other modalities such as tactile or audio.

EXAMPLE 2 A totally visually impaired user uses to access information about available commands and contents through tactile and audio information.

EXAMPLE 3 A dyslexic user accesses visual information through audio.

EXAMPLE 4 A user with a hearing impairment mainly uses visual perception, but if distracted or additionally occupied switches to tactile perception.

EXAMPLE 5 A user who is both hearing and visually impaired has no access to visual information and thus uses tactile perception.

**Instances include:**

a) to have visual content also available in audio form;

EXAMPLE 6 Visual content (such as text, illustrations and diagrams) is also available to be presented using audio descriptions.

b) to have visual interaction cues also available in audio form;

EXAMPLE 7 Visual interaction cues (such as visual feedbacks of "file saved") are also available to be presented using audio sound of "bip", vocalization of "file saved").

c) to have visual content also available in tactile form;

EXAMPLE 8 Visual content (such as text, illustrations and diagrams) is also available to be presented using a Braille display to have visual interaction cues also available in tactile form.

EXAMPLE 9 The user is provided with illustrations and diagrams available in embossed form with accompanying braille text.

d) to have visual controls, such as buttons, also available in tactile form;

EXAMPLE 10 A device has specified raised symbols, or haptograms or braille displays are provided.

e) to have visual interaction cues also available in tactile form.

EXAMPLE 11 Visual interaction cues (such as visual feedbacks of "file saved") are also available to be presented using vibrations.

EXAMPLE 12 A system provides visual feedbacks of "file saved", light indicator or power lights in tactile forms such as vibration, braille display, pressed status.

### 6.5.4 To have information presented in auditory form

**User need:** 5-1-3

**Description**: This need focuses on allowing some users to perceive information in auditory form.

For users for whom visual and tactile modalities are not appropriate or optimal, the auditory modality may be the only or preferred method of perceiving relevant information.

If information cannot be provided specifically in auditory modality, some users will not be able to perceive relevant information optimally or at all.

**Instances include:**

a) to have all information presented in auditory form;

EXAMPLE 1 All the contents, commands, and interaction cues are presented in auditory form to the user.

b) to have some information presented in auditory form;

EXAMPLE 2 Only some contents is presented in auditory form (as alerts, or textual content), some vocalized commands are presented in auditory form and other in tactile form. Some interaction cues are presented only visually and tactilely.

c) to have any textual information presented in auditory form.



 

### 6.5.5 To have audio information available in other modalities

**User need:** 5-1-4

**Description**: This need focuses on the importance of ensuring that users for whom the audio modality is not appropriate or optimal are able to perceive relevant information provided by the system.

Users might have to access information in different modalities, for example, visual (text, diagram, images, video), tactile (vibration, heat, pressure, electric), kinesthetic or even smell or taste.

If this is not the case, users for whom the audio modality is not appropriate or optimal will not be able to perceive the information they need when interacting with system.

EXAMPLE 1 A partially hearing-impaired user uses redundancy of audio cues in other modalities such as tactile or visual.

EXAMPLE 2 A totally hearing-impaired user uses to access audio information about available commands and contents through tactile and visual information.

EXAMPLE 3 A dyslexic user additionally accesses audio information through the visual modality (pictures), simplified schema).

EXAMPLE 4 A visually impaired user mainly uses audio perception, but if in a noisy environment or if distracted switches to tactile perception.

EXAMPLE 5 A user with a hearing and visual impairment uses tactile perception instead of audio and visual perception or uses a combination of visual or audio and tactile perception.

**Instances include:**

a) to have audio content also available in visual form;

EXAMPLE 6 Audio information in a movie is also available as captions.

b) to have audio interaction cues also available in visual form;

EXAMPLE 7 Alarms are provided both in audio and visual form.

NOTE Providing the user with cues before an action is also known as feedforward, to contrast it with feedback that is provided after an action.

c) to have audio content also available in tactile form;

EXAMPLE 8 Captions for audio content are also available via Braille.

d) to have audio interaction cues also available in tactile form.

EXAMPLE 9 Alarms are provided both by audio messages and tactile vibrations.

### 6.5.6 To have information in tactile form

**User need:** 5-1-5

**Description**: This need focuses on allowing some users to perceive information in tactile form.

For users for whom auditory and visual modalities are not appropriate or optimal, the tactile modality may be the only or preferred method of perceiving relevant information.

If information cannot be provided specifically in the tactile modality, some users will not be able to perceive relevant information optimally or at all.

**Instances include:**

a) to have all information presented tactilely;

b) to have some information presented tactilely;

c) to have information presented in tactile form;

d) to have feedback and cues be tactile.

### 6.5.7 To have tactile information available in other modalities

**User need:** 5-1-6

**Description**: This need focuses on the importance of information in tactile form being available in other modalities.

Other modalities might be provided where tactile information cannot be used or might for some users in some contexts supplement information tactile form.

Where tactile information is not provided in other modalities, some users may not be able to access the information at all or may have a poorer experience of using the system than others.

**Instances include:**

a) to have tactile information also available in visual form;

b) to have tactile information also available in audio form.

### 6.5.8 To experience information via multiple simultaneous modalities

**User need:** 5-1-7

**Description**: This need focuses on the importance of providing users with information in different modalities simultaneously.

The provision of multiple simultaneous modalities might mean two, three or more modalities. This is particularly important in circumstances where information is normally only provided in one modality at a time.

If this is not done, some users will not be able to perceive the information they need either comfortably or at all.

EXAMPLE 1 Some users use a combination of visual and textual perception of icons combined with tactile, and audio perception of content.

EXAMPLE 2 Some users read text but also use some perceivable sounds, and compare and adjust visual information to partial audio information or combined partial visual or audio and tactile perception.

**Instances include:**

a) to have simultaneous visual and audio information;

b) to have simultaneous tactile and audio information;

c) to have simultaneous visual and tactile information;

d) to have simultaneous visual, audio, and tactile information.

### 6.5.9 To have presentation attributes of a modality that match an individual's needs

**User need:** 5-2

**Description**: This need focuses on ensuring that attributes of a visual, audio, or tactile modality can be adapted to suit a user's needs.



 

Each modality has a wide spectrum of attributes. Visual attributes include: luminance, colour, size, type of content (text or image), and visual presentations can be dynamic or static. Audio attributes include: frequency, loudness, speed, type of content (sounds, speech, signals, alarms). Tactile attributes include: strength, frequency, shape, type of content (alert, feedback, vibration).

If attributes that suit a user's needs are not available, use of the system might not be optimal or possible for particular users, even if they can usually access the modality that is being used.

This need is further clarified by its sub-needs.

### 6.5.10 To have presentation attributes specific to the visual modality that match an individual's needs

**User need:** 5-2-1

**Description**: This need focuses on ensuring that attributes of the visual modality can be adapted to suit a user's needs in particular contexts.

The visual modality has a wide spectrum of attributes, for example luminance, colour, size, type of content (text, images, video, diagrams). If attributes are not customisable to meet a user's needs some users might be prevented from using the visual modality.

EXAMPLE 1 A user cannot distinguish between red and green lines and has problems recognizing when they represent different visual objects.

EXAMPLE 2 A user might require visually-adapted information, such as large text, highlighted text, inversed contrast, or adapted colours.

EXAMPLE 3 A user might require colour reinforcement to distinguish categories.

EXAMPLE 4 A user might require visual highlights for alerts.

EXAMPLE 5 A user might require coloured text to distinguish between several types of related sound.

**Instances include:**

a) to have all visual information presented visually in text form;

b) to have sufficient brightness for visually presented information;

c) to have information that is presented through colour also be presented in a way that does not rely on colour;

d) to have foreground colours sufficiently contrast with background colours;

e) to have sufficient contrast between colours;

f) to have the magnification of objects or visible content that match an individual's needs;

g) to have dynamic images presented at a speed sufficient to be perceived;

h) to have visual information presented in an alternative to text;

i) to have feedback and cues using pictures or symbols;

j) to have enhanced focus and pointing indicators;

k) to have enhanced visual feedback;

l) to have enhanced visual indicators.

### 6.5.11 To have manageable textual material

**User need:** 5-2-2

NOTE This need is very strongly related to 5-2-1, but is currently presented separately due to the heavy use of visual text.

**Description**: This need focuses on ensuring that attributes of displayed text can be adapted to suit a user's needs in particular contexts.

There are many different ways of customising or enhancing text. These include display style attributes and structural content attributes

If these attributes are not customisable, a user's experience of the system may be less than optimal.

These include changing fonts, font-sizes and styles and structural text content (such as simplifying text). Many text enhancements involve re-rendering to fit the visual space available, re-wrapping where appropriate and changing paging where appropriate. If attributes are not customisable to meet a user's needs, some users might be prevented from reading the text.

EXAMPLE A user can only read text if it is magnified and presented on a non-white background.

**Instances include:**

a) to have text that can be resized;

b) to have text presented in a font and style that matches an individual's needs;

c) to have text contrasted with background;

d) to have coherent word-wrap and paging, even with magnified text;

e) to have simplified text.

### 6.5.12 To have sign language perceivable

**User need:** 5-2-3

**Description**: This need focuses on the quality of sign language display.

This need focuses on the requirement for auditory streams to be presented with visual attributes that meet a user's needs and in a sign language the user can understand. "Display qualities include magnification, resolution, background, contrast and speed. In addition, users with difficulties seeing might need enhanced sign language visualization (enhanced contrast, tiny space signing, and lower speed).

If attributes are not customisable to meet a user's needs, some users might be prevented from receiving the sign language.

**Instances include:**

a) to have auditory content presented in a sign language a user can understand;

b) to have sign language presented with sufficient magnification;

c) to have sign language presented with sufficient resolution;

d) to have sign language presented with sufficient contrast;

e) to have sign language presented with sufficient speed.

### 6.5.13 To have 3-dimensional visual information presented using only two dimensions

**User need:** 5-2-4



 

**Description**: This need focuses on the importance of providing two-dimensional information representing information otherwise provided in a three-dimensional form.

Where depth perception is not possible, the system needs to be able to deliver information in two-dimensional form.

If this is not possible, some users might be excluded from using the system.

**Instances include:**

NOTE This is a very specific need and no more detailed instances have been identified. This need will become more important as 3-D technology advances.

### 6.5.14 To have presentation attributes specific to the auditory modality that match an individual's needs

**User need:** 5-2-5

**Description**: This need focuses on ensuring that attributes of the auditory modality can be adapted to suit a user's needs in particular contexts.

The auditory modality has a wide spectrum of attributes, for example: frequency, loudness, speed, type of content (sounds, speech, signals, alarms).

If attributes are not customisable to meet a user's needs, some users might be prevented from using the auditory modality.

**Instances include:**

a) to adjust the volume to a suitable level;

b) to adjust the audio characteristics;

c) to have auditory events be multi-frequency (i.e. involve high, mid and low frequencies);

d) to have multi-channel auditory information available in monaural form;

e) to have audio information of sufficient clarity;

f) to silence audio output;

g) to have the characteristics of audio cues match the individual's needs;

h) to have the characteristics of audio feedback match the individual's needs;

i) to have audio feedback independent of tone differentiation;

j) to have directional information presented via monaural audio;

k) to turn off visual output;

l) to turn off tactile output.

### 6.5.15 To select/deselect different audio streams

**User need:** 5-2-6

**Description**: This need is self-explanatory when considered with its instances.

**Instances include:**

a) turn on or off audio-description in video presentation;

b) to choose between different audio languages.

### 6.5.16 To have presentation attributes specific to the tactile modality that match an individual's needs

**User need:** 5-2-7

**Description**: This need focuses on ensuring that attributes of the tactile modality can be adapted to suit a user's needs in particular contexts.

The tactile modality has a wide spectrum of attributes, for example: strength, frequency, shape, type of content (alert, feedback, vibration).

If attributes are not customisable to meet a user's needs, some users might be prevented from using the tactile modality.

**Instances include:**

a) to have suitable tactile vibration amplitude;

b) to have appropriate speed of presentation of tactilely presented text;

c) to have tactile symbols presented with appropriate clarity;

d) to have different vibration patterns (rather than vibration frequency or strength).

### 6.5.17 To have visual or tactile feedback occur at the same location as the control

**User need:** 5-2-8

**Description**: While controls are dealt with in controllability, this need is about receiving feedback in the same location to help ensure that the user is aware of the feedback and relates the feedback to the control causing it.

**Instances include:**

NOTE This is a very specific need and no more detailed instances have been identified.

### 6.5.18 To distinguish among the different components of information that are being presented

**User need:** 5-3

**Description**: This need focuses on allowing users to be able to distinguish between components and controls and their functions.

It is essential for users to be able to distinguish clearly between elements of a system, and whether or not they are actionable to determine how to prepare and carry out actions to take to complete a task.

If this is not done, users are likely to take unintended actions.

This need is further clarified by its sub-needs.

### 6.5.19 To distinguish between different components without them interfering with one another

**User need:** 5-3-1

**Description**: This need recognizes that when different components are located or perceived too close to one another, users might have difficulties in identifying and utilising a particular component.

This includes the placement of components next to one another and the layering of components over the top of one another.

**Instances include:**

a) to distinguish among the individual visual components being presented;



 

EXAMPLE 1 Captions are placed on a screen where they will not interfere with important visual information in a video.

b) to distinguish among the individual auditory components being presented;

EXAMPLE 2 Audio descriptions are presented in between the main dialogue in a video.

c) to distinguish among the individual tactile components being presented.

EXAMPLE 3 Significantly different vibration patterns are used so that the user can easily tell when a particular vibration pattern has been replaced by another vibration pattern.

### 6.5.20 To prevent actions which would decrease information perceivability

**User need:** 5-3-2

**Description**: This need focuses on protecting the user from both user-initiated and system-initiated actions that could adversely affect information perceivability for the user.

**Instances include:**

a) to be protected from changing the foreground colour to one that cannot be distinguished from the background colour;

b) to be able to prevent browser pop-ups;

c) to be able to eliminate unnecessary interruptions.

### 6.5.21 To locate and identify all actionable components without activating them

**User need:** 5-3-3

**Description**: This need focuses on protecting the user from accidentally activating controls when exploring the user interface.

EXAMPLE 1 A user using a screen-reader in a touch screen context is able to identify controls and what they do without activating them.

EXAMPLE 2 Tool-tips are activated by moving the mouse over a software control without activating the actual control.

**Instances include:**

a) to have separate means of selecting and activating controls;

b) to have a separate means of identifying and activating controls

c) to perceive which interface component currently has focus.

### 6.5.22 To be able to distinguish between actionable and non- actionable components in any modality

**User need:** 5-3-4

**Description**: This need focuses on helping the user to determine what can be done when interacting with a user interface.

**Instances include:**

NOTE While there are various ways, by using different design attributes to distinguish between actionable and non-actionable components, these different ways are not sufficiently distinct from one another to constitute different instances.

EXAMPLE 1 Different coloured LED lights identify actionable and non-actionable controls.

EXAMPLE 2 Different shaped-symbols identify actionable and non-actionable controls.

EXAMPLE 3 Controls are placed in actionable and non-actionable groups.

EXAMPLE 4 Single and double tones distinguish actionable and non-actionable controls.

EXAMPLE 5 Non-selectable controls are greyed out.

### 6.5.23 To have sufficient landmarks and cues to quickly navigate to the necessary locations, functionalities or controls to carry out a task

**User need:** 5-3-5

**Description**: This need focuses on systems providing mechanisms a user can navigate with to get to locations or activate controls necessary to perform a task.

Navigation involves providing recognised cues and landmarks usable by the user or the user's agent to locate the desired target, which might be a control to activate a functionality or a location where that activation can be carried out.

If this need is not met, users will not know how to achieve their objectives.

**Instances include:**

a) to be able to find necessary interface components during use of the system

b) to have components located so that an individual can easily find them;

EXAMPLE General-purpose controls are located to one side of a display so that they can easily be found.

c) to have components labelled so that their function is easily perceivable;

d) to have clear signposting indicating directions to specified locations where functionalities can be found.

### 6.5.24 To have distinct recognisable signals for different alerts or other messages that use signals

**User need:** 5-3-6

**Description**: This need focuses on the user being provided alerts that are distinguishable according to their different purpose.

Alarms, alerts and other signals often have the purpose of drawing attention to the need for critical action by a user. This need highlights the importance of systems generating signals which allow a user to identify what action they need to take.

If a system does not generate clearly distinguishable alerts users might be confused about they are expected to do.

EXAMPLE 1 Alarms that relate to specific functions have distinct visual, audio or haptic content.

**Instances include:**

a) to have distinct recognisable feedback;

b) to have distinct recognisable cues.

EXAMPLE 2 In an ICT system, alerts requiring immediate action such as plugging in a power supply before battery failure are distinguishable from reminders of tasks that don't require immediate action.



 

### 6.5.25 To perceive information regardless of environmental or other conditions that might interfere

**User need:** 5-4

**Description**: This need focuses on the problem of perception being inhibited by extraneous factors.

When attempting to perceive information or interact with a system, many environmental and other factors can interfere with easy perception.

If this is not prevented, users might not be able to interact with the system.

This need is further clarified by its sub-needs.

### 6.5.26 To perceive foreground information in the presence of background information

**User need:** 5-4-1

**Description**: This is a need that every user has but is commonly not met for some access contexts and environmental conditions (e.g. where an individual is not able to distinguish foreground and background conversations).

If means to meet an individual's requirements in terms of distinguishing foreground and background information is not provided the individual might not be able to perceive the foreground information at all or might need to expend greater effort in doing so.

**Instances include:**

a) to perceive foreground visual information in the presence of background information;

b) to have controls that visually contrast with their surroundings;

c) to perceive foreground audio information in the presence of background information;

d) to perceive foreground tactile information in the presence of background haptic information.

### 6.5.27 To avoid distractions that prevent focusing on a task

**User need:** 5-4-2

**Description**: This need focuses on the importance of users being able to focus on the task at hand.

It is common for users to encounter a variety of distractions, for example, distracting environmental interference. In contexts which are critical for a user this can prevent or render more difficult completion of a task.

If this need is not satisfied the user's ability to complete the task might be impaired.

**Instances include:**

a) to avoid visual distractions that prevent focusing on a task;

b) to avoid reflective glare;

c) to avoid glare from excessive brightness (of material or surrounding);

d) to avoid auditory distractions that prevent focusing on a task;

e) to avoid audio effects that overload perception;

f) to avoid tactile distractions that prevent focusing on a task;

g) to avoid haptic effects that prevent executing a tactile task;

h) to avoid olfactory distractions that prevent focusing on a task.

### 6.5.28 To have accessibility features not interfere with perception of standard information

**User need:** 5-4-3

**Description**: This need focuses on the perception of displayed content and required interactions not being hindered by accessibility features.

Where accessibility features are not built in to the way that a system displays its content, it is much harder for users to manipulate the interface between the display content and the accessibility features. This can result in interference between the two, seriously degrading the user experience.

**Instances include:**

a) to have visual accessibility features (such as captions) not interfere with perception of standard information;

b) to have audio accessibility features (such as audio description/audio vision) not interfere with perception of standard information;

c) to prevent interference from other devices.

### 6.5.29 To have only the content necessary for the current task presented

**User need:** 5-4-4

**Description**: This need focuses on the importance of users being presented only with content relevant to the task in hand.

It is common for users to be presented with a variety of distractions, for example, prompts or other content competing for the attention of the user. In contexts which are critical for a user this can prevent or render more difficult completion of a task.

If this need is not satisfied the user's ability to complete the task might be impaired.

EXAMPLE A user is able to prevent unexpected pop-ups.

**Instances include:**

a) to remove or prevent content not related to a particular task;

b) to prevent interruption of a task by other tasks.

### 6.5.30 To have haptic input and output from devices not interfere with the perception of information

**User need:** 5-4-5

**Description**: This need focuses on the importance of users being able to focus on the task at hand.

It is common for users to encounter distracting or potentially harmful effects from interacting in a tactile modality with devices. In contexts which are critical for a user this can prevent or render more difficult the completion of a task.

If this need is not satisfied the user's ability to complete the task might be impaired.

**Instances include:**

a) to limit heat from devices to avoid interfering with perception of tactile information;

b) to limit vibration to avoid interfering with perception of tactile information;



 

c) to limit heat (and other forms of radiation) from devices to avoid injury/discomfort to the user.

#### 6.5.31 To not have one's senses overloaded

**User need:** 5-5

**Description**: This need focuses on the importance of information being presented at a level of complexity and intensity appropriate to individual users.

Users frequently encounter information, in the form of content, instructions or navigation which is difficult or impossible for them to deconstruct and use. This can happen within a single source of information or because of extraneous distracting events. It is the sum total of experienced sensory input and its complexity that needs to be considered in meeting this need.

If this need is not met a user might be overwhelmed and withdraw from completing the task.

**Instances include:**

a) to avoid visual overloads;

b) to avoid auditory overloads;

c) to avoid tactile overloads;

d) to avoid cognitive overloads.

#### 6.5.32 To have attention drawn to critically important information in the appropriate modality, form, and language

**User need:** 5-6

**Description**: This need focuses on the importance of individual users being able to receive critical information, for example alerts, in a modality, form and language which suits their needs.

Systems often choose to deliver critical information in a single modality or form, frequently via sound announcements or visual displays and in a particular language. Sometimes the user needs fore-knowledge of how alerts are delivered as they might need to seek out the information or actively enquire how alerts are delivered in order to be aware of them.

If critical information is not delivered in a modality, language and form that suits the individual user then the user might not be aware of it and might experience severe negative consequences as a result.

**Instances include:**

a) to receive auditory alerts regarding the existence of critically important information (regardless of the modality of the information itself);

b) to receive visual alerts regarding the existence of critically important information (regardless of the modality of the information itself);

c) to receive tactile alerts regarding the existence of critically important information (regardless of the modality of the information itself).

### 6.6 Details of the needs related to understandability

#### 6.6.1 To obtain information on the system and its components and functionalities

**User need:** 6-1

**Description**: This need focuses on the importance of users having adequate and correct information about a system to understand what it can do and how to successfully complete a task.

Users need to be able to identify the components of a system and their functions in ways which are appropriate to their cognitive and cultural needs and contexts.

If this is not the case, users will not be able to identify appropriate systems for successfully achieving their objectives or completing their tasks.

This need is further clarified by its sub-needs.

### 6.6.2 To get an overview and to orient themselves to the system and its functions/components (independent of actual use)

**User need:** 6-1-1

**Description**: This need focuses on providing users with an understanding of what the system can do for them and how they can use it, prior to actually using it. This can occur before first use or before some particular use (even if that use has been performed before).

**Instances include:**

a) to get an introduction to the system before using it;

b) to get an overview of the structure of the system;

c) to get an overview of the system functions/components;

d) to obtain information about any conventions that the system uses (e.g. for coding of information);

e) to get information on underlying concepts and ideas.

### 6.6.3 To obtain and use unique names for every user interface component

**User need:** 6-1-2

**Description**: This need focuses on providing users with unique names to allow them to address and query each individual user interface component.

Providing unique names allows the user to directly access components without having to do so either physically by having to select it from a list of similar components.

Unique names are especially important in situations where a user interface contains multiple instances of the same type of interface component.

**Instances include:**

a) to be able to obtain the unique name of individual user interface components;

b) to be able to access individual user interface components via their unique name.

### 6.6.4 To receive training that supports an individual's cognitive needs

**User need:** 6-1-3

**Description**: This need focuses on matching the type of training to an individual's cognitive needs.

It recognizes that different users might only learn from certain types of training.

Training that is not matched to a user's cognitive needs might not be affective enough to prepare a user to properly use a system.

**Instances include:**

a) to receive training that explains the concepts as well as the functioning of the system;



 

b) to receive training that focuses on procedures for accomplishing individual tasks;

c) to receive training that includes detailed examples of how individual tasks can be accomplished.

### 6.6.5 To receive help that supports an individual's cognitive needs

**User need:** 6-1-4

**Description**: This need focuses on matching the type of support to an individual's cognitive needs.

It recognizes that different users might only be able or willing to interact with certain types of support.

Support that is not matched to a user's cognitive needs might not be effective enough to assist a user to properly use a system.

**Instances include:**

a) to receive personalized support from another individual;

b) to receive general automated support;

c) to receive support that focuses on accomplishing a particular task;

d) to receive support that answers general questions about a system;

e) to receive support in finding information

f) to receive support in comparing information;

g) to receive support in comparing relationships;

h) to understand the position of oneself and/or user interface components.

### 6.6.6 To receive recommendations that aid a user's understanding

**User need:** 6-1-5

**Description**: This need focuses on providing proactive help to a user. It recognizes that the system can often identify opportunities where recommendations could improve a user's interactions.

It is important that any recommendations be tailored to the cognitive needs and abilities of a user.

It is also important that a user can control when to receive recommendations.

**Instances include:**

a) to receive recommendations on improving the way in which a user is using the system;

b) to receive recommendations about system features that have not been used (recently);

c) to be able to control the provision of recommendations.

EXAMPLE A system provides the user with the ability to turn off and turn on the provision of recommendations and to select the types of recommendations to be provided.

### 6.6.7 To understand information presented by the system

**User need:** 6-2

**Description**: This need focuses on the importance of the provision of clear and appropriately-presented information to users by the system or its agents.

Unclear or over complex information can be an enormous barrier to the users of a system, particularly in the case of new users.

If information is not presented appropriately, users will not be able to access or use systems or their components.

This need is further clarified by its sub-needs.

### 6.6.8 To have presented information as easy to understand as possible

**User need:** 6-2-1

**Description**: This need focuses on the importance of having a system display all of its functions and elements, as clearly as possible, including ensuring that alternative methods of display are equally understandable.

Uses need to have information presented as intuitively as possible in all modalities, modes and method they use to access the system.

If this is not the case, some users will be excluded from optimal use of the system.

NOTE It is important that information and feedback be "salient," and "specific" rather than subtle or abstract to understand it.

**Instances include:**

a) to have textual material be worded as clearly and simply as possible;

b) to have textual information presented using figures of speech also presented in a way that does not require understanding of those figures of speech;

c) to have information be available regarding the meaning associated with colours and symbols;

d) to have sign language understandable;

e) to have information presented via indicators clearly understandable.

### 6.6.9 To have individual linguistic requirements supported by the system

**User need:** 6-2-2

**Description**: This need focuses on the importance that a system be understandable in terms of some specific language or languages for a user interacting with it.

To interact with a system might require understanding specific written, spoken or signed languages and might involve producing written, spoken, or signed language or operating controls in a particular language.

Not providing appropriate linguistic support will render that system inaccessible to that user.

**Instances include:**

a) to have an accurate translation of systems produced for other languages or forms of using the languages;

b) to have the vocabulary used to explain ICT use expressions that can be understood by users with different cultures and languages;

c) to have icons and symbols that are recognizable across cultures;

d) to have an accurate translation of content produced for other languages or forms of using the languages.

### 6.6.10 To have individual cultural requirements supported by the system

**User need:** 6-2-3



 

**Description**: This need focuses on presenting content and interactions to a user in a style that is culturally acceptable to that user.

This means delivering content that does not offend cultural values the user holds dear or address topics that are not acceptable to address in the user's culture.

If the system offends the user's culture, then the user might be bound by that culture not to use the system.

**Instances include:**

a) to avoid being presented with offensive material;

EXAMPLE 1 A system allows a user to avoid seeing or dealing with material dealing with content that is deemed immoral within the user's culture or religion.

EXAMPLE 2 A system avoids presenting material that is religiously, culturally, or politically biased.

b) to avoid being expected to perform improper actions.

EXAMPLE 3 A system does not force a user to provide answers to personal or offensive questions.

### 6.6.11 To have text alternatives be provided for all non-textual information

**User need:** 6-2-4

**Description**: This need focuses on presenting all content via text so that it can be rendered in whatever modality and method that the user is able to make use of.

**Instances include:**

a) to have text alternatives for images;

b) to have an explanation of the purpose and meaning of illustrations;

c) to have captions for auditory information;

d) to have audio descriptions for visual content.

### 6.6.12 To have information provided pictorially as well as via text

**User need:** 6-2-5

**Description**: This need focuses on providing alternatives to linguistically presented information.

**Instances include:**

a) to have all interface elements presented via pictograms rather than text;

b) to have realistic picture alternatives to abstract or random symbols.

EXAMPLE A system presents a photograph of a chair as an alternative to a stick figure of a chair.

### 6.6.13 To customize abstract symbols with alternative representations

**User need:** 6-2-6

**Description**: This need focuses on the requirement to be able to replace abstract symbols with alternative representations that meet the user's need better.

**Instances include:**

a) to be able to replace the symbol used on various user interface elements (including icons).

### 6.6.14 To have language presented in a particular modality and format

**User need:** 6-2-7

**Description**: This need focuses on the importance of users having communication presented in the particular modality and format they can use in a particular context.

**Instances include:**

a) to have visual language presented using written characters;

b) to have visual language presented using symbols/pictograms;

c) to have visual language presented using written Braille;

d) to have visual language presented using sign language;

e) to have oral language spoken;

f) to have oral language sung;

g) to have tactile language presented via Braille;

h) to have tactile language presented via finger spelling;

i) to have tactile language presented via pulses (e.g. Morse code).

### 6.6.15 To have information that supports an individual's cognitive needs

**User need:** 6-3

**Description**: This need focuses on the importance of systems and their agents recognising that users vary very widely in the ways in which they understand and absorb information.

If the system cannot deliver information to users in ways they can understand, then users will be unable and/or unwilling to use the system.

NOTE This applies to all information presented by the system, including help information, and not just the main task related information involved in the system.

This need is further clarified by its sub-needs.

### 6.6.16 To have information presented in a manner that supports an individual's styles of reasoning

**User need:** 6-3-1

**Description**: This need recognizes that there are many different types of reasoning and that different users will use different types or sorts of reasoning.

NOTE Some types of reasoning include: recognition, reduction, deduction, induction, abduction, prediction, analogies, and model building.

**Instances include:**

a) to operate a system in ways which match an individual's thinking styles;

b) to have information grouped according to the user's thinking style;

c) to have information ordered according to the user's thinking style.



 

### 6.6.17 To avoid unnecessary high cognitive demands

**User need:** 6-3-2

**Description**: This need focuses on the importance of considering the cognitive load involved in using the system.

It is important that the system is able to deliver an experience at the level of complexity that best suits that user's needs.

**Instances include:**

a) to have information and capabilities presented at the appropriate level of abstraction;

b) to have content presented in a simplified format without losing information;

c) to have clear and easy activation mechanisms for any access features;

d) to have mechanisms for excluding advertisements and other distractions from content;

e) to avoid the need to deal with multiple different sources of information at one time.

EXAMPLE The system allows the user to limit all interactions to a single window, to avoid having to move between windows.

### 6.6.18 To have navigation that supports an individual's thinking style

**User need:** 6-3-3

**Description**: This recognizes that different users will navigate through complex systems and complex content items in different ways.

It is important to support various means of navigation to match with the thinking styles of individual users.

**Instances include:**

a) to be able to easily search for and go directly to a particular location in content;

EXAMPLE This system makes use of structuring of long content items, to allow the user to navigate to particular locations within the structure.

b) to be able to easily follow a linear path through large amounts of content;

c) to be able to easily follow a linear path when performing a task;

d) to be able to recognize and utilize hierarchical structures for navigating through a system;

e) to be able to utilize inter-linked structures of information without getting lost;

f) to be able to follow a modeless path through content where a system can support it and the user prefers it (i.e. do tasks in any order).

### 6.6.19 To have assistance with remembering and recalling information

**User Need:** 6-3-4

**Description:** This need focuses on availability of provision of support for memorisation and recall in the completion of a user's current task.

Some systems provide note-taking and prompting tools to help users recall information on a short or long term basis. Other systems might provide reminders or alarms to prompt the user to take some action.

If this need is not addressed some users might have difficulty in completing tasks.

**Instances include:**

a) to have a logical and consistent structure to the information and the system to aid in recall and remembering;

b) to have background information available for recall so that it does not have to be remembered.

EXAMPLE 1 An electronic calendaring system reminds the user about a birthday in order that the user can send a greeting.

EXAMPLE 2 A medicine dispensing system reminds a user to take a particular medication at a particular time.

EXAMPLE 3 An electronic shopping list enables a user to remember and recall items to buy while shopping.

### 6.6.20 To have the steps for completing tasks optimized to match an individual's needs and clearly explained

**User need:** 6-4

**Description**: This need focuses on the size, structuring and content of the steps of a task to optimally meet a user's needs in performing that task.

It recognizes that some users will need to be able to do a task as simply as possible (without being distracted by unnecessary details) while other users might need to go through all the details to be certain that they have accomplished the task correctly.

**Instances include:**

a) to have steps for operations that are minimized and clearly described;

b) to use small steps to complete a task;

c) to have simple interfaces supporting control of the level of detail expressed;

d) to have interfaces that limit the memorization required of the user to operate them successfully;

e) to reduce or expand the content in the system.

### 6.6.21 To have cues to support the individual in completing tasks

**User need:** 6-5

**Description**: This need focuses on providing users with sufficient cues to draw their attention to important processes or content during the use of a system.

NOTE Cues are sometimes referred to as feed-forward information.

**Instances include:**

a) to have cues to support multi-step operations;

b) to have cues to support focusing on important information;

c) to have cues to support navigation;

EXAMPLE 1 A system allows users to navigate using audible cues, visual cues and/or tactile cues.

d) to have cues to support shortcuts;

EXAMPLE 2 A system provides users with a choice of visual, audio and/or tactile cues of keyboard shortcuts.

EXAMPLE 3 A system provides users with a choice of visual, audio and/or tactile cues of gestural shortcuts.



 

EXAMPLE 4 A system provides users with a choice of visual, audio and/or tactile cues of vocal command shortcuts.

e) to have cues that provide an orientation to their current position within the system.

### 6.6.22 To have feedback showing the results of actions

**User need:** 6-6

**Description**: This need focuses on providing users with information both that an action has occurred and information on whether or not the action was successful.

If feedback is not provided, users might be uncertain as to whether or how to proceed from one step to another which may result in error. A common consequence is for a user to repeat a task that should not be repeated.

**Instances include:**

a) to have feedback on the completion of tasks;

EXAMPLE 1 A system informs the user that a new account has been successfully created.

EXAMPLE 2 A system provides both tactile and auditory feedback of connector engagement and the ability for the user to use software to confirm connector engagement.

b) to have feedback on the occurrence of errors.

EXAMPLE 3 A system provides an explanatory error message which describes the error and what action can be taken to correct it.

### 6.6.23 To have sufficient time to interact with the system

**User need:** 6-7

**Description**: This need focuses on the importance of enabling users sufficient opportunity to prepare and complete tasks to interact successfully with the system.

This need is further clarified by its sub-needs.

### 6.6.24 To have sufficient time to understand displayed or presented information

**User need:** 6-7-1

**Description**: This need focuses on the importance of users having enough time to ensure that they fully understand all the information presented to them in the appropriate modality before it is removed.

If this need is not met users might fail to understand important information, for example instructions, and thus might make serious errors or be left not understanding what actions to take.

**Instances include:**

a) to have sufficient time to consider presented information;

EXAMPLE 1 A system provides users sufficient time to consider displayed information.

EXAMPLE 2 A system provides users sufficient time to consider tactilely presented information.

EXAMPLE 3 A system provides users to have sufficient time to consider auditorially presented information.

b) to request more time to consider presented information.

#### 6.6.25 To have information necessary to plan actions available in advance

**User need:** 6-7-2

**Description**: This need focuses on the importance of providing users with suitable guidance to assist them in completing their task.

**Instances include:**

a) to have information about what actions are possible at the current time;

b) to have information about what actions will complete the current task;

c) to have information about any timing limitations or other constraints on actions.

#### 6.6.26 To plan a series of actions in advance

**User need:** 6-7-3

**Description**: This need focuses on the importance of allowing users sufficient time to plan what to do next. This can also take into account that the users might be interrupted during this planning.

If sufficient time for planning is not provided, the user might be rushed into taking an inappropriate action.

**Instances include:**

a) to avoid the system timing-out while the use is planning the next actions to take;

b) to pause the system while considering what do;

c) to restart the system once actions are planned.

#### 6.6.27 To access support when needed

**User need:** 6-8

**Description**: This need focuses on providing support mechanisms in relation to any or all of system functions and capabilities.

**Instances include:**

a) to access the system help section;

b) to have access to an organization's help system;

c) to have access to a personal support assistant.

### 6.7 Details of the needs related to controllability

#### 6.7.1 To use a specific sensory modality (or a set of specific sensory modalities) for inputs to the system

**User need:** 7-1

**Description**: This need focuses on the importance of using specific modalities or combination of modalities to interact with the system at specific times.

For physical, environmental or psychological reasons, some users might need to use a single modality or a combination of modalities. There also can be physical, environmental or psychological reasons why some modalities might not be suitable for interactions.



 

The modalities that users need to interact with the system might change during the course of their interaction.

If specific and multiple modalities are not available, then some users will be unable to interact with the system and therefore be unable to use it.

This need is further clarified by its sub-needs.

### 6.7.2 To have alternate modalities of input to the system

**User need:** 7-1-1

**Description**: This need focuses on the importance of resolving a context where an individual user cannot use the primary interaction modality provided by the system.

Systems are often designed with a single primary interaction modality. Sometimes a user might be unable to use that modality and it is important to provide a modality that can be used. The more interaction modalities a system provides the more likely it is that a particular user in a particular context will be able to use it.

If alternative interaction modalities are not provided some users will not be able to access the system.

EXAMPLE The system allows a user to use voice recognition as an alternative to touch to provide inputs.

**Instances include:**

a) to access all functionality without having to use touch;

b) to have an alternative method to operate any tactile interactions;

c) to have an alternative method to operate any auditory controlled functions;

d) to have an alternative gesture free operation of all functionality;

e) to have alternative modalities for text input.

### 6.7.3 To use the tactile modality as a source of inputs to the system

**User need:** 7-1-2

**Description**: This need focuses on the importance of supporting the tactile modality for users and environments where other modalities are not appropriate.

**Instances include:**

a) to use the tactile modality alone as a source of inputs to the system;

b) to use the tactile modality with other modalities as a source of inputs to the system;

c) to operate all functionality using only tactile controls.

### 6.7.4 To use sound as a source of inputs

**User need:** 7-1-3

**Description**: This need focuses on the importance of supporting the auditory modality for users and environments where other modalities are not appropriate.

**Instances include:**

a) to use the auditory modality alone as a source of inputs to the system;

b) to use the auditory modality with other modalities as a source of inputs to the system;

c) to operate all functionality using only auditory controls.

### 6.7.5 To use visual recognition as a source of inputs

**User need:** 7-1-4

**Description**: This need focuses on the importance of supporting the visual modality for users and environments where other modalities are not appropriate.

NOTE Visual recognition includes: head or eye tracking and visual input of gestures.

**Instances include:**

a) to use visual recognition alone as a source of inputs to the system;

b) to use visual recognition with other modalities as a source of inputs to the system;

c) to operate all functionality using only visual recognition.

### 6.7.6 To control attributes of an input or interaction modality to match an individual's needs

**User need:** 7-2

**Description**: This need focuses on the importance of ensuring that methods of interacting with the system are available which match the particular needs of specific individuals.

Users differ in the methods they use to make inputs. Users can also experience environmental or other contextual barriers that limit the form of input they can use.

If this need is not met some users will not be able to access the system.

This need is further clarified by its sub-needs.

### 6.7.7 To have acceptable input or interaction attributes specific to the tactile modality

**User need:** 7-2-1

**Description**: This need recognizes that for the tactile modality to be accessible to some users, they need specific attribute settings to make it accessible.

**Instances include:**

a) to have a method to fully operate the system that requires minimal force;

b) to have a method to fully operate the system that requires minimal continuous force;

c) to have a method to fully operate the system without tight grasping;

d) to have a method to fully operate the system without pinching;

e) to have a method to fully operate the system without twisting;

f) to perform the task with minimal movements.

### 6.7.8 To have acceptable input or interaction attributes specific to the auditory modality

**User need:** 7-2-2

**Description**: This need recognizes that for the auditory modality to be accessible to some users, they need specific attribute settings to make it accessible.



 

**Instances include:**

a) to have a method to adjust the length of voice input timeouts;

b) to have a method of training the system to recognize the user's individual voice;

c) to have a method to filter out background noises within the speech recognition.

### 6.7.9 To have acceptable input or interaction attributes specific to the visual modality

**User need:** 7-2-3

**Description**: This need recognizes that for the visual modality to be accessible to some users, they need specific attribute settings to make it accessible.

**Instances include:**

a) to have a method to adjust the speed of interaction and timing when using visual recognition to indicate the selection action;

b) to have a method to adjust the size of a visual presentation (e.g. font size).

### 6.7.10 To position system components and devices in suitable locations for their use

**User need:** 7-2-4

**Description**: This need is self-explanatory when considered with its instances.

**Instances include:**

a) to position displays for optimal viewing;

b) to position input devices to be reachable.

### 6.7.11 To use a specific interaction method to provide inputs to the system

**User need:** 7-3

**Description**: This need focuses on particular methods within a modality to interact with the system at specific times.

**Instances include:**

a) to access all software controlled functionality from a keyboard;

b) to fully operate the system without requiring the use of a pointing device;

c) to access all software controlled functionality using gestures;

NOTE Gestures can be used both in the tactile and the visual modalities.

d) to have gestures consistent regardless of the technology used to interact with the system;

e) to have a method to control the system using speech.

### 6.7.12 To perform the task using specific types of action

**User need:** 7-4

**Description**: This need and its sub-needs focus on the different methods available to users to interact with input devices in order to complete a task.

The needs here aim to support the maximum number of methods of interaction to enable the maximum number of diverse users to interact with a system to be able to complete a task whilst making minimal assumptions about the user's physical capabilities or medical characteristics.

The sub-needs are less general than some of the needs in this standard and usually apply only in specific contexts.

NOTE This need and its sub-needs do not cover the full range of available means of interacting. Implementation of these needs will require access to further technical documentation, for example ISO/IEC Guide 71 and, ISO TR 22411.

This need is further clarified by its sub-needs.

### 6.7.13 To have a means of shifting the input focus from one interface component to another interface component

**User need:** 7-4-1

**Description**: This need recognizes the need for providing users with the ability to control where their inputs are received in an interface.

"Input focus" identifies the interface component that currently will receive inputs. Users need to be able to shift focus between various interface components on the various interfaces that they are currently working with.

If users are not provided with this capability in an accessible manner, their inputs might be misinterpreted or ignored.

### 6.7.14 To perform the task using various parts of the body

**User need:** 7-4-2

**Description:** This need focuses on avoiding limiting interactions to only expected parts of the body (which are usually expected to be two hands with each having four fingers and a thumb). It recognizes that tactile interactions can take place using various parts of the body.

EXAMPLE A system allows users to operate a switch mechanism using the tongue or use eye movements as sources of inputs in addition to a traditional keyboard.

**Instances include:**

a) to have a method to fully operate the system requiring minimal reach;

b) to operate the system without use of hands;

c) to operate the system with only a left or only a right hand;

d) to have a method to fully operate the system that does not require direct body contact;

e) to have alternatives to biometric means of identification.

### 6.7.15 To have a method to fully operate the system that does not require simultaneous actions

**User need:** 7-4-3



 

**Description**: This need recognizes that some users might need to make a single input action at a time. This can be due to physical, cognitive, or environmental limitations.

EXAMPLE A system provides StickyKeys™, SlowKeys™, BounceKeys™, FilterKeys™, MouseKeys™, RepeatKeys™, and ToggleKeys™ to allow users with physical limitations to use a keyboard.[3)]

**Instances include:**

a) to separately identify, select, and activate functions/controls;

b) to have a means of serializing actions that are typically performed simultaneously.

NOTE StickyKeys™ allow a user to combine multiple serial key-presses into a single input.

### 6.7.16 To interact with the system at one's own pace

**User need:** 7-4-4

**Description**: This need focuses on the requirement that the system be flexible enough in the pace it requires of users completing tasks to meet the needs of its users.

Users can be hampered in the completion of tasks by features such as timing out and fixed period displays that disappear rapidly (pop-ups). Giving users control over the timing and speed of displays and input processes is vital in allowing users to complete tasks efficiently and comfortably.

If user control is not present, tasks may not be completed or may be rushed with resultant errors.

**Instances include:**

a) to have sufficient time to complete actions;

b) to be aware that there is sufficient time to complete actions;

c) to control the presentation of dynamically presented information;

d) to pause dynamically presented (visual, auditory or tactile) information;

e) to control the speed of dynamically presented (visual, auditory or tactile) information;

f) to replay dynamically presented (visual, auditory or tactile) information;

g) to adjust the speed and acceleration of input devices;

h) to control the rate of audio alternatives;

i) to take a break from interacting with the system and to be able to return to interacting at a later point in time with a minimum of additional work.

### 6.7.17 To have a method to fully operate the system that does not require direct body contact

**User need:** 7-4-5

**Description**: This need focuses on the necessity of some users to access systems with little or no use of parts of the body.

There are many ways of operating components of a system which need not require direct human contact. These may be appropriate for reasons of physical restriction, operational convenience or human dignity.

If this need is not addressed some users might find it difficult or impossible to perform a task.

3) StickyKeys™, SlowKeys™, BounceKeys™, FilterKeys™, MouseKeys™, RepeatKeys™, and ToggleKeys™ are examples of suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO or IEC of these products.

**Instances include:**

a) to have the option of operating a computer programme by the use of voice recognition;

b) to have the option of operating a system by gesture control;

c) to have the option of controlling a system by iris tracking;

d) To have a system respond remotely using sensor beams.

EXAMPLE A door opens automatically when approached by a user.

### 6.7.18 To perform supporting and maintenance tasks related to the use of the system that other users are expected to undertake

**User need:** 7-5

**Description**: This need recognizes that in addition to the main tasks of a user, it is essential that supporting and maintenance tasks are also accessible.

It recognizes that these tasks can often present barriers for some users.

**Instances include:**

a) to replace consumable items used by the system;

b) to install, set-up, and connect the system on their own;

c) to switch off, disconnect, and store the system on their own;

d) to reset the system to a known state;

e) to position system components and devices in suitable locations for their use.

### 6.7.19 To control the environment (to the extent possible) to prevent interference with performing the task

**User need:** 7-6

**Description**: This need focuses on the possibility that variations of the environment in which a user access a system can create barriers to its accessibility. It recognizes that the environment might change during use causing sudden changes in the accessibility of a system. Some environmental factors in the environment might be controllable in some circumstances and sometimes they might not. Where environmental factors are not controllable adaptation of delivery modality might make the system accessible to the user in those conditions.

While users might not be able to control many environmental factors (especially those in the out of doors), it recognizes the importance of providing accessible controls where such control is possible.

**Instances include:**

a) to control environmental lighting;

EXAMPLE 1 The system provides users the ability to control the intensity of lighting within the room using Internet-of-Things technology.

b) to control environmental temperature;

c) to control environmental sounds.

EXAMPLE 2 The system provides the user the ability to control various audio and audio-visual devices within the room using Internet-of-Things technology.



 

#### 6.7.20 To access the controls that allow them to turn on and adjust the built-in accessibility features

**User need:** 7-7

**Description**: This need focuses on providing a user the ability to easily and directly switch on the features they require and adjust the parameters of those features to suit their access needs.

Systems sometimes incorporate features, including accessibility features, which are difficult or impossible for users with specific access requirements to control directly. This difficulty can be particularly pronounced when a system processes are being initiated for a particular user since accessibility features supporting the needs of that user might be required to be available at that point.

If direct control is not possible, these users might be unable proceed with a task without getting external assistance to change the accessibility setting features.

**Instances include:**

a) to have a system load accessibility software in advance of any security protection (e.g. passwords);

b) to have a system have the user confirm any changes to the settings of accessibility features;

c) to import accessibility settings from an external system or device.

#### 6.7.21 To have a suitable level of autonomy

**User need:** 7-8

**Description**: This need focuses on providing users with the level of controllability suitable to their needs and capabilities.

While some people always need support from either humans or the system to achieve the desired outcome, it is important that the system optimize their level of autonomy. This provides respect and motivation for these users.

If users are not given a suitable level of control they might not be able to accomplish their tasks on their own or they might make serious errors in situations where they required assistance that was not mandated.

### 6.8 Details of the needs related to usability

#### 6.8.1 To be provided a means to successfully accomplish tasks

**User need:** 8-1

**Description**: This need focuses on ensuring that the user is able to accomplish all tasks to achieve their accurate and complete intended outcomes.

While usability is defined in terms of goals (intended outcomes), users think and act on tasks (activities undertaken to achieve a specific goal). For a system to be accessible to a user, that user needs to be enabled to successfully perform all tasks related to the system in an accessible manner. This involves using the system to accurately and completely perform these tasks.

**Instances include:**

a) to be able to accomplish a task accurately;

b) to be able to completely accomplish a task.

### 6.8.2 To avoid making mistakes in completing tasks or in using the outcomes of tasks

**User need:** 8-2

**Description**: This need focuses on avoiding unintended negative outcomes.

While a user might be able to accessibly use a system to complete tasks and produce a complete set of accurate intended outcomes, it is possible that this use might also include a number of unintended negative outcomes. These unintended negative outcomes can include: errors or difficulties encountered before the accurate intended outcomes were obtained; additional outcomes that can interfere with the user's goals for using the system, harmful side effects to the user and/or the system; or the user taking inappropriate actions based on the user's understanding (or lack thereof) of the outcomes produced by the system. The presence of unintended negative outcomes can limit the accessibility of the system for those users unable to identify and easily deal with unintended negative outcomes. Thus, in addition to achieving the intended outcomes, it is important for accessibility to help the users to avoid making mistakes in completing tasks or in using the outcomes of tasks.

**Instances include:**

a) a method to fully operate the system that does not require much accuracy of movement.

### 6.8.3 To complete tasks in an efficient manner relative to one's own abilities

**User need:** 8-3

**Description**: This need focuses on ensuring that tasks can be accomplished in manners that are considered efficient for themselves (rather than for others) by diverse users.

What is efficient for one user will not necessarily be equally efficient for other users. Efficiency is always relative to the users and to their context of use. However, it is possible to compare the efficiency of similar tasks for a particular user and context of use. For a system to be accessible for a particular user in a particular context of use, that user needs to be provided with similar efficiency to other similar tasks. It is not suitable to provide access to a system that makes significantly higher demands on a user than are reasonable for that user in the particular context of use.

**Instances include:**

a) to complete a task within one's budgeted resources.

### 6.8.4 To perform tasks with a minimum of physical exertion

**User need:** 8-4

**Description**: This need focuses on protecting users from excessive physical demands.

Rather than matching the amount of physical exertion to the particular user, it is easier and more appropriate to minimize the amount of physical exertion needed by all users, it is sometimes more effective to minimize the amount of physical exertion needed to use the system.

**Instances include:**

a) to perform tasks with a minimum of physical force;

b) to perform tasks without having to excessively reach.

### 6.8.5 To perform tasks with a minimum of cognitive exertion

**User need:** 8-5

**Description**: This need focuses on protecting users from excessive mental demands.



 

Rather than matching the amount of cognitive exertion to the particular user, it is sometimes more effective to minimize the amount of cognitive exertion needed to use the system.

**Instances include:**

a) to have similar patterns of activation for similar actions;

b) to have assistance available for cognitively complex tasks;

c) to have available a simplified version of the task.

### 6.8.6 To operate the system without becoming fatigued

**User need:** 8-6

**Description**: This need focuses on protecting users from excessive demands over time.

While the physical and mental demands of a system can be appropriate for limited periods of use, they can build up to fatigue users who need to use a system for extended periods of time. In addition to minimizing the physical and cognitive exertion involved, it is important to recognize the potential harm of long periods of exertion. Typically, a user will attempt to complete a task at a single session if possible. Thus, the anticipated time for diverse users to complete a single task is the minimum period over which it is important to avoid fatiguing diverse users.

Fatigue can be reduced by minimizing the time necessary to complete tasks. It can also be reduced by allowing users to interrupt their use of the system when they need to take a break to reduce their fatigue.

**Instances include:**

a) to have a method to fully operate the system that does not require much stamina;

b) to operate the product system without physical fatigue;

c) to operate the product system without cognitive fatigue.

### 6.8.7 To complete tasks within the available time

**User need:** 8-7

**Description**: This need focuses on providing sufficient assistance to users to minimize time related pressures and to help them to succeed with their tasks in a reasonable amount of time.

This involves matching the time needed for diverse users to complete a task with the time that they will have, either due to external expectations placed on the users or due to the time needed to interact with the system to perform the task.

**Instances include:**

a) to avoid having to rush to complete tasks;

b) to be able to work on tasks at one's own speed.

### 6.8.8 To be satisfied with the outcome of interacting with the system

**User need:** 8-8

**Description**: This need focuses on the user recognizing the value of using the system.

If a user does not recognize a net benefit (that is greater than the cost of use) in using a system, then only users who are forced to use a system will do so. This value goes beyond the value of achieving

intended outcomes/outputs and also includes the value to the user of all of the outcomes of interacting with the system (including the accessibility of the individual interactions).

**Instances include:**

a) to believe that the system is worth using;

b) to trust the system and its outputs.

#### 6.8.9 To have comparable satisfaction that the system is worth using to that of other users

**User need:** 8-9

**Description**: This need focuses on the user achieving satisfaction comparable to that experienced by other users.

This recognizes that satisfaction not only focuses on the system, but also on the context of use. One important aspect of the context of use is being satisfied that you are treated as a valued user whose satisfaction is as important as any other user.

**Instances include:**

a) to have similar emotions regarding a system to other users;

b) to have similar beliefs about a system to other users;

c) to have similar physical experiences of using a system to similar users.

### 6.9 Details of the needs related to error tolerance

#### 6.9.1 To have confidence that using the system will be free from negative consequences or unacceptable risks

**User need:** 9-1

**Description**: This need focuses on providing sufficient information and reassurance to a user at all stages of their interaction with it.

When users want to interact with a system, they need to be confident that they will not be exposed to the risk of failing to complete their task or the risk of personal harm or inconvenience. Therefore a system needs to provide appropriate confirmatory information and reassurance at all stages of their interaction.

If the user does not have confidence that using the system is free of negative consequences or risks, they are unlikely to use the system or to have a good experience of using it.

**Instances include:**

a) to be confident that using a system will not endanger oneself;

b) to be confident that using a system will not harm other people;

c) to be confident that using a system will not harm the environment;

d) to be confident that using a system will not unintentionally trigger inappropriate reactions.

#### 6.9.2 to explore a system without unintentionally activating components or their functionality

**User need:** 9-2

**Description**: This need focuses on allowing users to interact with the system without unintentionally activating or de-activating any of its components or functions.



 

When users plan to interact with a system it is often useful for them to explore what functionalities it has and how to activate those functionalities without doing so.

If this is not the case then users may be unprepared to use the system, because they don't know how it works and they are likely to initiate an operation that they did not intend to with possibly damaging consequences.

**Instances include:**

a) to have systems and controls designed so they can be explored without activation, either tactilely or through keyboard navigation;

b) to have systems (and their components) that can be positioned so that they are stable during use that they remain reachable and usable in their position;

c) to successfully operate a system with limited body control;

EXAMPLE 1 The system can be operated by a user with tremor or spasmodic movements without inadvertent entries.

EXAMPLE 2 The system controls are not activated by a slight touch or when they receive keyboard focus.

d) to avoid damaging the system when additional force is used to perform some action;

e) to have controls that are not activated by a slight touch or when they receive keyboard focus;

f) to avoid inappropriate changes in focus.

### 6.9.3 To accomplish tasks in spite of the occurrence of errors

**User need:** 9-3

**Description**: This need focuses on the system correcting errors automatically or alerting the user of the need to do so and providing the necessary information and a mechanism for correction to enable the user to complete the task.

It is not always possible to completely eliminate errors from the completion of a task. When errors occur, a system needs to be able to either survive the error by having alternative methods for completing the task or to provide the user with the means of correcting the error with minimum inconvenience. In some cases minor input errors can be automatically corrected and in others user input will be involved to correct an error.

If this is not the case, users may be at least confused and at worst will be unable to complete the task.

**Instances include:**

a) to have the system provide automatic error correction;

b) to be able to disable and enable automatic error correction;

c) to be able to proceed with a task without correcting minor errors.

### 6.9.4 To detect when errors have been made

**User need:** 9-4

**Description**: This need focuses on the availability and quality of feedback on errors that is presented when the system detects an error.

Notifications of errors need to be presented using the appropriate modality so to the user will be sure to perceive it as soon as the error occurs.

**Instances include:**

a) to have notification when the system detects errors made by the user.

### 6.9.5 To recover from errors made from interacting with the system (whenever possible)

**User need:** 9-5

**Description**: This need focuses on the availability of information and functions that help the user to recover from errors.

**Instances include:**

a) to have unambiguous guidance on what to do in the event of a reported error;

b) to receive an explanation of the error, and where possible, why it was an error.

### 6.9.6 To reset a system to an earlier or original condition as a means of responding to errors

**User need:** 9-6

**Description**: This need focuses on the ability to reset the system to a state prior to when the error occurred. This is especially important in situations where many actions have happened since the occurrence of an error.

**Instances include:**

a) to have a means to go back and undo the last thing(s) accomplished;

b) to reset (to initial condition).

### 6.9.7 To avoid errors by having negative consequences be obvious, easy to avoid, and difficult to trigger

**User need:** 9-7

**Description**: This need focuses on the system being designed in a manner that helps the user use it correctly and helps the user to avoid the occurrence of errors.

It also recognizes that where a system can detect that a user action might result in an error, it is important for the system to warn the user of the potential error, its consequences, and possible ways of avoiding the error and ask for confirmation before proceeding.

**Instances include:**

a) to have the system provide immediate detection and warning of possible input errors before processing inputs that could have negative consequences;

b) to be able to disable and enable immediate detection of possible input errors;

c) to have the system ask for confirmation before doing potentially harmful processing;

d) to be able to disable and enable system confirmation capabilities.

## 6.10 Details of the needs related to equitable use

### 6.10.1 To use a system in a manner that is as similar as possible to other users

**User need:** 10-1

**Description**: This need focuses on ensuring that ways of using a system for people with different user needs are as similar as possible and are non-discriminatory.

Some users will necessarily have to use a system differently from other users to accommodate their interaction needs. However, it is important to minimise system differences experienced by the user.

If this is not done, it might impact on the ability of one set of users to familiarise other users with the way the system works. It might also impact on the cost of producing the system to achieve maximum accessibility.

**Instances include:**

a) to have access to using the features that other users have access to;

EXAMPLE 1 A system does not limit the use features intended to improve accessibility to users with specific known accessibility needs.

b) to have private listening capability, when using audio alternatives to visual information in public places;

EXAMPLE 2 Mobile devices are fitted with headphone connectivity, which allows private access to voice output from screen reader software.

c) to have protection of the privacy of information, even if they can not to do the “expected” things to protect it;

EXAMPLE 3 Automatic Teller Machines (ATMs) are fitted with headphone sockets to allow access to banking services, without the need to use personal assistants.

d) to have security of information, even if they cannot do the “expected” things to protect it.

EXAMPLE 4 When a screen reader user is entering a password, the password is not voiced.

### 6.10.2 To use a system in a manner that is equivalent to that of other users, even if the manner of use is different

**User need:** 10-2

**Description**: This need focuses on ensuring that users do not experience detriment by having to use a system in a manner different from other users.

Some users will necessarily have to use a system differently from other users to accommodate their interactions needs. However, it is important to minimise any detrimental effects of having to do so on a user. In particular, it is important to respect the privacy, dignity and security of the user in adaptations that are made.

If this is not the case a user might be able technically to use a system but might not have a secure or positive experience in doing so.

**Instances include:**

a) to have equivalent functionality that is fully accessible;

b) to have equivalent content that is fully accessible.

### 6.10.3 To have available alternate ways of interacting with a system that match a user’s needs

**User need:** 10-3

**Description**: This need focuses on providing multiple methods of access. A system is most likely to be able to provide an equitable experience for different users if it has many ways for users to interact with it so that individuals can choose the way that suits them best.

If this is not the case some users are likely to have a poorer experience than others.

This goes beyond doing the minimum to meet identified needs, to provide the user greater flexibility in dealing with unforeseen circumstances and needs, without the need to perform individualization.

**Instances include:**

a) to have alternate modes of operation;

EXAMPLE 1 The system allows the user to use any of the available input modalities.

b) to have alternate ways of accessing content.

EXAMPLE 2 Hardcopy documents are usable with one hand or mouth-stick.

## 6.11 Details of the needs related to compatibility with other systems

### 6.11.1 to use their own assistive products or assistive technology to interact with all the functionalities of the system

**User need:** 11-1

**Description**: This need focuses on the importance of the user being able to rely on the most complete match of assistive technologies to the full functionalities of the systems they interact with.

Users with specific user needs requiring assistive technologies can be severely disadvantaged if systems do not support interoperability to all of their functions.

If this is not the case, there might be interactions which are not possible which could lead to the task being unachievable by the user.

**Instances include:**

a) to have standard types of hardware and software connections/interfaces on systems to interact with assistive technology;

b) to have full and efficient functional control of a product using assistive technology, including pass-through of user feedback and notifications such as error messages;

c) to have an assistive technology available that will work with new technologies, at the time of release of the new technology;

d) to discover information about all user-interface components using assistive technology;

e) to monitor output operations using assistive technology.

### 6.11.2 To have the interaction between the system and assistive technology be without interference

**User need:** 11-2

**Description**: This need focuses on components of systems (including accessibility components) co-existing without interference between the components. This applies whether the accessibility components were produced as part of the system or as an external product.

If this is not the case, in specific circumstances, users of assistive technologies will not be able to fully access the system.

**Instances include:**

a) to have the system or product not interfere with assistive technology;



 

b) to use multiple systems that do not interfere with one another;

c) to use multiple assistive technologies that do not interfere with one another.

### 6.11.3 To have specific accessibility functions available at all times, without disruption

**User need:** 11-3

**Description**: This need focuses the accessibility functions that a user relies on being available at all times to the user without disruption.

It is often the case that for reasons of business, security or lack of interoperability across contexts use of the accessibility functions a user relies on are denied or not readily available.

If this is not the case, a user's access to a system might be reduced.

**Instances include:**

a) to be able to easily find specific accessibility functions;

b) to be able to designate specific accessibility functions to be available directly;

c) to be able to temporarily hide specific accessibility functions.

# Annex A
(informative)

# List of user accessibility needs

Users may freely copy this annex and use it independently of the standard as long as they acknowledge that its source is "ISO/IEC 29138-1:2018, Annex A".

The following is the set of user accessibility needs preceded by their identifiers.

NOTE The numbers in square brackets after the statement of the need provide references to the subclauses where the need is described.

**1 Suitability for the widest range of users needs**

1-1 to recognize that they are included as a system user within diverse contexts [6.1.1]

1-2 to have accessible support for using the system [6.1.2]

1-3 to have the system accessible to an individual with combinations of needs [6.1.3]

**2 Conformity with user expectations needs**

2-1 to not be surprised by the results of interactions with the system [6.2.1]

2-2 to apply personal knowledge and experience to interact successfully with the system [6.2.2]

2-3 to receive instruction or training directed at preparing users for new knowledge needed to interact successfully with the system [6.2.3]

2-4 to obtain immediate and easily accessible help or further instructions, where such help can be provided by the system [6.2.4]

**3 Support for individualization needs**

3-1 to be provided with (and to choose) the way of interacting with a system that best works for them (including activating and deactivating built-in accessibility features) [6.3.1]

3-2 to choose between the available input/output modalities and their configuration without requiring restart of the system [6.3.2]

3-3 to have simultaneous use of alternate interaction modalities [6.3.3]

3-4 to be provided with information on available options for interacting with a system on which to base a choice of interaction methods [6.3.4]

3-5 to be provided an accessible means to choose individualization features [6.3.5]

3-6 to have individualization features maintained for future uses of the system, until changed by the user [6.3.6]

3-7 to have the system use complete standardized sets of needs or preferences from specific standards [6.3.7]

3-8 to take or give up control of functions that could be performed by either the user or the system [6.3.8]

3-9 to have the option to use the system with a minimum of setup or configuration [6.3.9]

**4 Approachability needs**

4-1 to have the system freee from any physical barriers [6.4.1]

4-2 to have the system free from any psychological barriers [6.4.2]

4-3 to have the system maintain the user's attention

4-4 to have interaction options clearly presented [6.4.3]

4-5 to have appropriate levels of privacy and security [6.4.4]

4-6 to avoid patterns that cause psychological or physical discomfort or disturbance [6.4.5]

4-7 to use the system remotely as well as directly [6.4.6]

4-8 to have the system free from environmental barriers [6.4.7]

**5 Perceivability needs**

5-1 to use a specific sensory modality (or a set of specific modalities) to perceive information [6.5.1]

5-1-1 to have information presented visually [6.5.2]

5-1-2 to have visual information available in other modalities [6.5.3]

5-1-3 to have information presented in auditory form [6.5.4]

5-1-4 to have audio information available in other modalities [6.5.5]

5-1-5 to have information in tactile form [6.5.6]

5-1-6 to have tactile information available in other modalities [6.5.7]

5-1-7 to experience information via multiple simultaneous modalities [6.5.8]

5-2 to have presentation attributes of a modality that match an individual's needs [6.5.9]

5-2-1 to have presentation attributes specific to the visual modality that match an individual's needs [6.5.10]

5-2-2 to have manageable textual material [6.5.11]

5-2-3 to have sign language perceivable [6.5.12]

5-2-4 to have 3-dimensional visual information presented using only two dimensions [6.5.13]

5-2-5 to have presentation attributes specific to the auditory modality that match an individual's needs [6.5.14]

5-2-6 to select/deselect different audio streams [6.5.15]

5-2-7 to have presentation attributes specific to the tactile modality that match an individual's needs [6.5.16]

5-2-8 to have visual or tactile feedback occur at the same location as the control [6.5.17]

5-3 to distinguish among the different components of information that are being presented [6.5.18]

5-3-1 to distinguish between different components without them interfering with one another [6.5.19]

5-3-2 to prevent actions which would decrease information perceivability [6.5.20]

5-3-3 to locate and identify all actionable components without activating them [6.5.21]

5-3-4 to have actionable components look, sound or feel distinctive from non-actionable components [6.5.22]

5-3-5 to have sufficient landmarks and cues to navigate to the necessary locations, functionalities or controls to carry out a task [6.5.23]

5-3-6 to have distinct recognisable signals for different alerts or other messages that use signals [6.5.24]

5-4 to perceive information regardless of environmental or other conditions that might interfere [6.5.25]

5-4-1 to perceive foreground information in the presence of background information [6.5.26]

5-4-2 to avoid distractions that prevent focusing on a task [6.5.27]

5-4-3 to have accessibility features not interfere with perception of standard information [6.5.28]

5-4-4 to have only the content necessary for the current task presented [6.5.29]

5-4-5 to have haptic input and output from devices not interfere with the perception of information [6.5.30]

5-5 to not have one's senses overloaded [6.5.31]

5-6 to have attention drawn to critically important information in the appropriate modality, form, and language [6.5.32]

**6 Understandability needs**

6-1 to obtain information on the system and its components and functionalities [6.6.1]

6-1-1 to get an overview and to orient themselves to the system and its functions/components (independent of actual use) [6.6.2]

6-1-2 to obtain and use unique names for every user interface component [6.6.3]

6-1-3 to receive training that supports an individual's cognitive needs [6.6.4]

6-1-4 to receive help that supports an individual's cognitive needs [6.6.5]

6-1-5 to receive recommendations that aid a user's understanding [6.6.6]

6-2 to understand information presented by the system [6.6.7]

6-2-1 to have presented information as easy to understand as possible [6.6.8]

6-2-2 to have individual linguistic requirements supported by the system [6.6.9]

6-2-3 to have individual cultural requirements supported by the system [6.6.10]

6-2-4 to have text alternatives be provided for all non-textual information [6.6.11]

6-2-5 to have information provided pictorially as well as via text [6.6.12]

6-2-6 to customize abstract symbols with alternative representations [6.6.13]

6-2-7 to have language presented in a particular modality and format [6.6.14]

6-3 to have information that supports an individual's cognitive needs [6.6.15]

6-3-1 to have information presented in a manner that supports an individual's styles of reasoning [6.6.16]

6-3-2 to avoid unnecessary high cognitive demands [6.6.17]

6-3-3 to have navigation that supports an individual's thinking style [6.6.18]

6-3-4 to have assistance with remembering and recalling information [6.6.19]

6-4 to have the steps for completing tasks optimized to match an individual's needs and clearly explained [6.6.20]

6-5 to have cues to support the individual in completing tasks [6.6.21]

6-6 to have feedback showing the results of actions [6.6.22]

6-7 to have sufficient time to interact with the system [6.6.23]

6-7-1 to have sufficient time to understand displayed or presented information [6.6.24]

6-7-2 to have information necessary to plan actions available in advance [6.6.25]

6-7-3 to plan a series of actions in advance [6.6.26]

6-8 to access support when needed [6.6.27]

**7 Controllability needs**

7-1 to use a specific sensory modality (or a set of specific sensory modalities) for inputs to the system [6.7.1]

7-1-1 to have alternate modalities of input to the system [6.7.2]

7-1-2 to use the tactile modality as a source of inputs to the system [6.7.3]

7-1-3 to use sound as a source of inputs [6.7.4]

7-1-4 to use visual recognition as a source of inputs [6.7.5]

7-2 to control attributes of an input or interaction modality to match an individual's needs [6.7.6]

7-2-1 to have acceptable input or interaction attributes specific to the tactile modality [6.7.7]

7-2-2 to have acceptable input or interaction attributes specific to the auditory modality [6.7.8]

7-2-3 to have acceptable input or interaction attributes specific to the visual modality [6.7.9]

7-2-4 to position system components and devices in suitable locations for their use [6.7.10]

7-3 to use a specific interaction method to provide inputs to the system [6.7.3]

7-4 to perform the task using specific types of action [6.7.4]

7-4-1 to have a means of shifting the input focus from one interface component to another interface component [6.7.5]

7-4-2 to perform the task using various parts of the body [6.7.6]

7-4-3 to have a method to fully operate the system that does not require simultaneous actions [6.7.7]

7-4-4 to interact with the system at one's own pace [6.7.8]

7-4-5 to have a method to fully operate the system that does not require direct body contact [6.7.9]

7-5 to perform supporting and maintenance tasks related to the use of the system that other users are expected to undertake [6.7.10]

7-6 to control the environment (to the extent possible) to prevent interference with performing the task [6.7.10]

7-7 to access the controls that allow them to turn on and adjust the built-in accessibility features [6.7.12]

7-8 to have a suitable level of autonomy [6.7.13]

**8 Usability**

8-1 to be provided a means to successfully accomplish tasks [6.8.1]

8-2 to avoid making mistakes in completing tasks [6.8.2]

8-3 to complete tasks in an efficient manner relative to one's own abilities [6.8.3]

8-4 to perform tasks with a minimum of physical exertion [6.8.4]

8-5 to perform tasks with a minimum of cognitive exertion [6.8.5]

8-6 to operate the system without becoming fatigued [6.8.6]

8-7 to complete tasks within the available time [6.8.7]

8-8 to be satisfied with the outcome of interacting with the system [6.8.8]

8-9 to have comparable satisfaction that the system is worth using to that of other users [6.8.9]

**9 Error tolerance**

9-1 to have confidence that using the system will be free from negative consequences or unacceptable risks [6.9.1]

9-2 to explore a system without unintentionally activating components or their functionality [6.9.2]

9-3 to accomplish tasks in spite of the occurrence of errors [6.9.3]

9-4 to detect when errors have been made [6.9.4]

9-5 to recover from errors made from interacting with the system (whenever possible) [6.9.5]

9-6 to reset a system to an earlier or original condition as a means of responding to errors [6.9.6]

9-7 to avoid errors by having negative consequences be obvious, easy to avoid, and difficult to trigger [6.9.7]

**10 Equitable use**

10-1 to use a system in a manner that is as similar as possible to other users [6.10.1]

10-2 to use a system in a manner that is equivalent to that of other users, even if the manner of use is different [6.10.2]

10-3 to have available alternate ways of interacting with a system that match a user's needs [6.10.3]

**11 Compatibility with other systems**

11-1 to use their own assistive products or assistive technology to interact with all the functionalities of the system [6.11.1]

11-2 to have the interaction between the system and assistive technology be without interference [6.11.2]

11-3 to have specific accessibility functions available at all times, without disruption [6.11.3]

# Annex B
(informative)

# List of user needs and instances

Users may freely copy this annex and use it independently of the standard as long as they acknowledge that its source is "ISO/IEC 29138-1:2018, Annex B".

The following is the set of user accessibility needs and instances preceded by their identifiers.

NOTE To fully identify an instance, it is necessary to combine the need identification number with the alphabetic identifier of the instance beneath the need (e.g. the full identification of "to know that a system is usable by an individual user: is "1-1-a").

**1 Suitability for the widest range of users needs**

1-1 to recognize that they are included as a system user within diverse contexts

a) to know that a system is usable by an individual user

b) to know how to set the system up to work within a particular context

c) to access information on any limitations on a system that might preclude an individual's access

d) to have technologies that are accessible on release

e) to have new releases of a system not diminish the accessibility provided by previous releases

f) to have access to an epub document where a system provides meta-data on functionality of content and interoperability with assistive technology

1-2 to have accessible support for using the system

a) to have electronic access to copyrighted and otherwise protected support material

b) to have a means to provide feedback to the support/development organization about improvements to accessibility to meet an individual's particular needs

c) to obtain a response to feedback submitted (that answers questions or explains what is being done about the problems that have been reported)

d) to have product information be disseminated in an accessible format to agencies supporting the individual

e) to be able to interact with encrypted media

1-3 to have the system accessible to an individual with combinations of needs

a) to have the system accessible to an individual with multiple physical needs

b) to have the system accessible to an individual with multiple cognitive needs

c) to have the system accessible to an individual in multiple environmental conditions

d) to have the system accessible by an individual with multiple physical, sensory or cognitive needs or any combination of these

**2 Conformity with user expectations needs**

2-1 to not be surprised by the results of interactions with the system

a) to have consistent and predictable user interfaces

b) to have content appear and behave in predictable ways

c) to have options presented be meaningful and appropriate

d) to have the form of feedback be predictable

e) to have keyboard navigation that follows a meaningful sequence through form controls

f) to have location and layout of controls be consistent

g) to have each function on its own key rather than having keys change their functions but look/feel the same

h) to have systems use standard conventions, words and symbols for the user's culture

2-2 to apply personal knowledge and experience to interact successfully with the system

a) to have content and interactions consistent with similar systems and experiences

b) to have controls in similar systems be located in similar places

2-3 to receive instruction or training directed at preparing users for new knowledge needed to interact successfully with the system

a) to have accessible training and support materials

b) to have operating manuals updated in line with changes to products or procedures

2-4 to obtain immediate and easily accessible help or further instructions, where such help can be provided by the system

a) to have timely access to trained customer service personnel (e.g. helpdesk)

b) to have information describing the layout of the operational parts

c) to have a recognised mechanism (e.g. a help key or a phone menu using "0") that provides detailed help on the interaction in the context the user is in (what to press next)

d) to have a means to find out more information about the current state of the system (e.g. context sensitive help or tooltips)

e) to have a means to easily get human help

f) to use symbolism that helps the user to understand the interface and possible interactions

g) to have mechanisms (e.g. graphs and pictures) that summarize and supplement text so a user can understand the point without a lot of reading

h) to have speech support with synchronized highlighting so a user can follow with rapid feedback

i) to have reminders of appointments to be able to know when to do thing

**3 Support for individualization needs**

3-1 to be provided with (and to choose) the way of interacting with a system that best works for them (including activating and deactivating built-in accessibility features)

a) to choose modalities to be used for inputs to the system

b) to choose modalities to be used for system outputs

c) to have applications not override or defeat built-in accessibility features

d) to have accessibility functions that can be returned to an initial state individually or together

e) to activate or deactivate individualization features

f) to perform, undo, and redo individualization actions

3-2 to choose between the available input/output modalities and their configuration without requiring restart of the system

a) not having to restart the system to activate an accessibility modality

b) not being required to close or save operations before activating an accessibility modality

c) to have the system support choosing between simultaneous modalities without disruption of the task in progress

3-3 to have simultaneous use of alternate interaction modalities

a) to have the system to support the user in choosing between simultaneous modalities

b) to be provided with audio descriptions for visual content and captioning simultaneously

c) to be provided with transcripts for audio and video which support synchronised highlighted text sections or words

3-4 to be provided with information on available options for interacting with a system on which to base a choice of interaction methods

a) to have information on the availability of individualization capabilities

b) to have information on individualization actions taken by the system

c) to have default settings that can be used as is

d) to be able to find a specific accessibility setting and activate it

e) to be provided with a summary of accessibility features available

f) to operate vocal commands with an impaired voice simultaneously to imprecise gestural command, to benefit from the mixing of both

3-5 to be provided an accessible means to choose individualization features

a) to control whether or not specific system-initiated actions can occur automatically

b) to have a first step of interaction that enables user to choose between individualization features

3-6 to have individualization features maintained for future uses of the system, until changed by the user

a) to have system level accessibility preference settings that apply across applications

b) to have accessibility preference settings preserved unless explicitly changed

c) to have preference settings change immediately preferably without requiring system reboot

d) to save and restore individual preference settings

e) to revert to default settings

3-7 to have the system use complete standardized sets of needs or preferences from specific standards

a) to have the system provide individualization options based on one or more sets of needs or preferences from a recognized set of preference definitions

b) to have the system provide additional individualization options beyond those corresponding to sets of needs or preferences that it also supports

3-8 to take or give up control of functions that could be performed by either the user or the system

a) have a text entry system with built-in word prediction that sometimes incorrectly guesses and be easily enabled or disabled

b) to have a speech recognition system adapt to a user's changing speech capabilities over time

c) to have a speech recognition system adapt to a user's changing speech capabilities over time

d) to have a system be able to adapt to speed of text entry in a web form

3-9 to have the option to use the system with a minimum of setup or configuration

a) to have a system maximise the number of automatic processes on initial set with a user

b) to have a system store configuration settings for a specific user in a specific context so that they do not have to be revisited on system restart

**4 Approachability needs**

4-1 to have the system free from any physical barriers

a) to have adequate room to fit themselves and their assistive products or assistive technology

b) to have an accessible path and a means to position oneself within reach of installed products

c) to have system controls located within close reach

d) to have information displayed within an individual's viewing range

e) to have controls displayed within an individual's viewing range

f) to be able to adjust the location and position of devices and controls

4-2 to have the system free from any psychological barriers

a) to use products without the fear of negative consequences if mistakes are made

4-3 to have the system maintain the user's attention

a) to have even small successes acknowledged to increase self-esteem

b) to receive information regarding the progress of completing a task

c) to receive encouragement that the user is progressing with a task

d) to receive prompts identifying the appropriate next step to perform for a task

e) to receive periodic reminders of the goal being worked on and its value

f) to have the complexity or difficulty set at a level which is challenging and motivating but not discouraging

g) to have assistance in coping with their emotional reactions to using the system

4-4 to have interaction options clearly presented

a) to have keyboard and dictation symbols clearly displayed

4-5 to have appropriate levels of privacy and security

a) to have products that maintain the user's privacy

b) to have appropriate levels of safety

c) to have systems in which hazards are obvious, easy to avoid, and difficult to trigger

d) to have systems that do not rely on specific senses to avoid injury

e) to have systems that do not rely on fine movement to avoid injury

f) to have systems which do not cause fatigue or discomfort in use

g) to have systems which do not give off inappropriate electromagnetic radiation

h) to have systems that do not give off chemicals which are allergenic to an individual

i) to use system safely without needing or experiencing hazards warnings

j) to use systems safely without seeing hazard warnings

k) to use systems safely without hearing hazard warnings

4-6 to avoid patterns that cause psychological or physical discomfort or disturbance

a) to avoid visual patterns that cause seizures

b) to avoid auditory patterns that cause seizures

4-7 to use the system remotely as well as directly

a) to use software to control hardware operations, wherever possible

4-8 to have the system free from environmental barriers

b) to avoid patterns that cause seizures

**5 Perceivability needs**

5-1 to use a specific sensory modality (or a set of specific modalities) to perceive information

5-1-1 to have information presented visually

a) to have all information presented visually

b) to have some information presented visually

5-1-2 to have visual information available in other modalities

a) to have visual content also available in audio form

b) to have visual interaction cues also available in audio form

c) to have visual content also available in tactile form

d) to have visual controls, such as buttons, also available in tactile form

e) to have visual interaction cues also available in tactile form

5-1-3 to have information presented in auditory form

a) to have all information presented in auditory form

b) to have some information presented in auditory form

c) to have any textual information presented in auditory form

5-1-4 to have audio information available in other modalities

a) to have audio content also available in visual form

b) to have audio interaction cues also available in visual form

c) to have audio content also available in tactile form

d) to have audio interaction cues also available in tactile form

5-1-5 to have information presented in tactile form

a) to have all information presented tactilely

b) to have some information presented tactilely

c) to have information presented in tactile form

d) to have feedback and cues be tactile

5-1-6 to have tactile information available in other modalities

a) to have tactile information also available in visual form

b) to have tactile information also available in audio form

5-1-7 to experience information via multiple simultaneous modalities

a) to have simultaneous visual and audio information

b) to have simultaneous tactile and audio information

c) to have simultaneous visual and tactile information

d) to have simultaneous visual, audio, and tactile information

5-2 to have presentation attributes of a modality that match an individual's needs

5-2-1 to have presentation attributes specific to the visual modality that match an individual's needs

a) to have all visual information presented visually in text form

b) to have sufficient brightness for visually presented information

c) to have information that is presented through colour also be presented in a way that does not rely on colour

d) to have foreground colours sufficiently contrast with background colours

e) to have sufficient contrast between colours

f) to have the magnification of objects or visible content that match an individual's needs

g) to have dynamic images presented at a speed sufficient to be perceived

h) to have visual information presented in an alternative to text

i) to have feedback and cues using pictures or symbols

j) to have enhanced focus and pointing indicators

k) to have enhanced visual feedback

l) to have enhanced visual indicators

5-2-2 to have manageable textual material

a) to have text that can be resized

b) to have text presented in a font and style that matches an individual's needs

c) to have text contrasted with background

d) to have coherent word-wrap and paging, even with magnified text

e) to have simplified text

5-2-3 to have sign language perceivable

a) to have auditory content presented in a sign language a user can understand

b) to have sign language presented with sufficient magnification

c) to have sign language presented with sufficient resolution

d) to have sign language presented with sufficient contrast

e) to have sign language presented with sufficient speed

5-2-4 to have 3-dimensional visual information presented using only two dimensions

5-2-5 to have presentation attributes specific to the auditory modality that match an individual's needs

a) to adjust the volume to a suitable level

b) to adjust the audio characteristics

c) to have auditory events be multi-frequency (i.e. involve high, mid and low frequencies)

d) to have multi-channel auditory information available in monaural form

e) to have audio information of sufficient clarity

f) to silence audio output

g) to have the characteristics of audio cues match the individual's needs

h) to have the characteristics of audio feedback match the individual's needs

i) to have audio feedback independent of tone differentiation

j) to have directional information presented via monaural audio

k) to turn off visual output

l) to turn off tactile output

5-2-6 to select/deselect different audio streams

5-2-7 to have acceptable presentation attributes specific to the tactile modality

a) to have suitable tactile vibration amplitude

b) to have appropriate speed of presentation of tactilely presented text

c) to have tactile symbols presented with appropriate clarity

d) to have different vibration patterns (rather than vibration frequency or strength)

5-2-8 to have visual or tactile feedback occur at the same location as the control

5-3 to distinguish among the different components of information that are being presented

5-3-1 to distinguish between different components without them interfering with one another

a) to distinguish among the individual visual components being presented

b) to distinguish among the individual auditory components being presented

c) to distinguish among the individual tactile components being presented

5-3-2 to prevent actions which would decrease information perceivability

5-3-3 to locate and identify all actionable components without activating them

a) to have separate means of selecting and activating controls

b) to have a separate means of identifying and activating controls

c) to perceive which interface component currently has focus

5-3-4 to be able to distinguish between actionable and non-actionable components in any modality

5-3-5 to have sufficient landmarks and cues to navigate to the necessary locations, functionalities or controls to carry out a task

a) to be able to find necessary interface components during use of the system

b) to have components located so that an individual can easily find them

c) to have components labelled so that their function is easily perceivable

d) to have clear signposting indicating directions to specified locations where functionalities can be found

5-3-6 to have distinct recognisable signals for different alerts or other messages that use signals

a) to have distinct recognisable feedback

b) to have distinct recognisable cues

5-4 to perceive information regardless of environmental or other conditions that might interfere

5-4-1 to perceive foreground information in the presence of background information

a) to perceive foreground visual information in the presence of background information

b) to have controls that visually contrast with their surroundings

c) to perceive foreground audio information in the presence of background information

d) to perceive foreground tactile information in the presence of background haptic information

5-4-2 to avoid distractions that prevent focusing on a task

a) to avoid visual distractions that prevent focusing on a task

b) to avoid reflective glare

c) to avoid glare from excessive brightness (of material or surrounding)



 

d) to avoid auditory distractions that prevent focusing on a task

e) to avoid audio effects that overload perception

f) to avoid tactile distractions that prevent focusing on a task

g) to avoid haptic effects that prevent executing a tactile task

h) to avoid olfactory distractions that prevent focusing on a task

5-4-3 to have accessibility features not interfere with perception of standard information

a) to have visual accessibility features (such as captions) not interfere with perception of standard information

b) to have audio accessibility features (such as audio description/audio vision) not interfere with perception of standard information

c) to prevent interference from other devices

5-4-4 to have only the content necessary for the current task presented

5-4-5 to have haptic input and output from devices not interfere with the perception of information

a) to limit heat from devices to avoid interfering with perception of tactile information

b) to limit vibration to avoid interfering with perception of tactile information

c) to limit heat (and other forms of radiation) from devices to avoid injury/discomfort to the user

5-5 to not have one's senses overloaded

a) to avoid visual overloads

b) to avoid auditory overloads

c) to avoid tactile overloads

5-6 to have attention drawn to critically important information in the appropriate modality, form, and language

a) to receive auditory alerts regarding the existence of critically important information (regardless of the modality of the information itself)

b) to receive visual alerts regarding the existence of critically important information (regardless of the modality of the information itself)

c) to receive tactile alerts regarding the existence of critically important information (regardless of the modality of the information itself)

## 6 Understandability needs

6-1 to obtain information on the system and its components and functionalities

6-1-1 to get an overview and to orient themselves to the system and its functions/components (independent of actual use)

a) to get an introduction to the system before using it

b) to get an overview of the structure of the system

c) to get an overview of the system functions/components

d) to obtain information about any conventions that the system uses (e.g. for coding of information)

e) to get information on underlying concepts and ideas

6-1-2 to obtain and use unique names for every user interface component

a) to be able to obtain the unique name of individual user interface components

b) to be able to access individual user interface components via their unique name

6-1-3 to receive training that supports an individual's cognitive needs

a) to receive training that explains the concepts as well as the functioning of the system

b) to receive training that focuses on procedures for accomplishing individual tasks

c) to receive training that includes detailed examples of how individual tasks can be accomplished

6-1-4 to receive help that supports an individual's cognitive needs

a) to receive personalized support from another individual

b) to receive general automated support

c) to receive support that focuses on accomplishing a particular task

d) to receive support that answers general questions about a system

e) to receive support in finding information

f) to receive support in comparing information

g) to receive support in comparing relationships

h) to understand the position of oneself and/or user interface components

6-1-5 to receive recommendations that aid a user's understanding

a) to receive recommendations on improving the way in which a user is using the system

b) to receive recommendations about system features that have not been used (recently)

c) to be able to control the provision of recommendations

6-2 to understand information presented by the system

6-2-1 to have presented information as easy to understand as possible

a) to have textual material be worded as clearly and simply as possible

b) to have textual information presented using figures of speech also presented in a way that does not require understanding of those figures of speech

c) to have information be available regarding the meaning associated with colours and symbols

d) to have sign language understandable

e) to have information presented via indicators clearly understandable

6-2-2 to have individual linguistic requirements supported by the system

a) to have an accurate translation of systems produced for other languages or forms of using the languages

b) to have the vocabulary used to explain ICT use expressions that can be understood by users with different cultures and languages



 

c) to have icons and symbols that are recognizable across cultures

d) to have an accurate translation of content produced for other languages or forms of using the languages

6-2-3 to have individual cultural requirements supported by the system

a) to avoid being presented with offensive material

b) to avoid being expected to perform improper actions

6-2-4 to have text alternatives be provided for all non-textual information

a) to have text alternatives for images

b) to have an explanation of the purpose and meaning of illustrations

c) to have captions for auditory information

d) to have audio descriptions for visual content

6-2-5 to have information provided pictorially as well as via text

6-2-6 to customize abstract symbols with alternative representations

a) to be able to replace the symbol used on various user interface elements (including icons)

6-2-7 to have language presented in a particular modality and format

a) to have visual language presented using written characters

b) to have visual language presented using symbols/pictograms

c) to have visual language presented using written Braille

d) to have visual language presented using sign language

e) to have oral language spoken

f) to have oral language sung

g) to have tactile language presented via Braille

h) to have tactile language presented via finger spelling

i) to have tactile language presented via pulses (e.g. Morse code)

6-3 to have information that supports an individual's cognitive needs

6-3-1 to have information presented in a manner that supports an individual's styles of reasoning

a) to have information grouped according to the user's thinking style

b) to have information ordered according to the user's thinking style

6-3-2 to avoid unnecessary high cognitive demands

a) to have information and capabilities presented at the appropriate level of abstraction

b) to have content presented in a simplified format without losing information

c) to have clear and easy activation mechanisms for any access features

d) to have mechanisms for excluding advertisements and other distractions from content

e) to avoid the need to deal with multiple different sources of information at one time

6-3-3 to have navigation that supports an individual's thinking style

a) to be able to easily search for and go directly to a particular location in content

b) to be able to easily follow a linear path through large amounts of content

c) to be able to easily follow a linear path when performing a task

d) to be able to recognize and utilize hierarchical structures for navigating through a system

e) to be able to utilize inter-linked structures of information without getting lost

f) to be able to follow a modeless path through content where a system can support it and the user prefers it (i.e. do tasks in any order)

6-3-4 to have assistance with remembering and recalling information

a) to have a logical and consistent structure to the information and the system to aid in recall and remembering;

b) to have background information available for recall so that it does not have to be remembered.

6-4 to have the steps for completing tasks optimized to match an individual's needs and clearly explained

a) to have steps for operations that are minimized and clearly described

b) to use small steps to complete a task

c) to have simple interfaces supporting control of the level of detail expressed

d) to have interfaces that limit the memorization required of the user to operate them successfully

e) to reduce or expand the content in the system

6-5 to have cues to support the individual in completing tasks

a) to have cues to support multi-step operations

b) to have cues to support focusing on important information

c) to have cues to support navigation

d) to have cues to support shortcuts

e) to have cues that provide an orientation to their current position within the system

6-6 to have feedback showing the results of actions

a) to have feedback on the completion of tasks

b) to have feedback on the occurrence of errors

6-7 to have sufficient time to interact with the system

6-7-1 to have sufficient time to understand displayed or presented information

a) to have sufficient time to consider presented information

b) to request more time to consider presented information

6-7-2 to have information necessary to plan actions available in advance

a) to have information about what actions are possible at the current time