



BSI Standards Publication

Information technology — User interface accessibility

Part 1: User accessibility needs

National foreword

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Information technology — User interface accessibility —

Part 1: User accessibility needs

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utilisateur —*

Partie 1: Besoins d'accessibilité de l'utilisateur



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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 9241-394²⁾ 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.

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

EXAMPLE 2 Avoiding auditory patterns that cause seizures.

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;