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**Ergonomics of human-system  
interaction —**

**Part 110:  
Interaction principles**

*Ergonomie de l'interaction homme-système —  
Partie 110: Principes d'interaction*

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Published in Switzerland

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## Foreword

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

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 ISO documents 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](http://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 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](http://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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

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](http://www.iso.org/members.html).

This second edition cancels and replaces the first edition (ISO 9241-110:2006), which has been substantially technically revised.

The main changes compared to the previous edition are as follows:

- the principle of individualization has been merged into the principle of controllability;
- a new principle on user engagement has been developed;
- existing principles and general design recommendations have been revised.

A list of all parts in the ISO 9241 series can be found on the ISO website.

## Introduction

This document describes interaction principles (formerly referred to as "dialogue principles") and general design recommendations which are independent of any specific interaction technique and which are applicable in the analysis, design and evaluation of interactive systems.

This document significantly revises and updates the first edition. It incorporates relevant guidance previously contained in ISO 14915-1. The general design recommendations in this document are derived from a combination of ergonomics research and various sources of general and heuristic guidance (including Bastien<sup>[16]</sup>, Dzida<sup>[19]</sup>, Molich<sup>[23]</sup>, Nielsen<sup>[24]</sup> and Tognazzini<sup>[29]</sup>).

These interaction principles and general design recommendations can guide the development and evaluation of user interfaces, leading to improved usability.

The priority with which each interaction principle or general design recommendation is applied depends on the purpose of the interactive system, the characteristics of the intended and foreseeable users of the system, the tasks, the environment, the specific interaction technique used and the consequences arising from use. Guidance on identifying relevant aspects of the users, tasks and environment of use is given in ISO 9241-11.

The ultimate beneficiary of this document will be the user of an interactive system. Although it is unlikely that the user will read this document or even know of its existence, its application by the developers of the interactive system will lead to user interfaces which are more usable, accessible, consistent and that enable greater productivity and a more positive user experience, and which avoid harm from use. The benefits for suppliers of interactive systems include increased sales, customer satisfaction and loyalty, decreased costs of providing service.

Applying these interaction principles and the associated general design recommendations also helps prevent users of those products from experiencing usability problems such as:

- additional unnecessary steps not required as part of the task;
- misleading information;
- insufficient and poor information on the user interface;
- unexpected responses of the interactive system (including those leading to harm from use);
- navigational limitations during use; and
- inefficient error recovery.

This document comprises the following:

- a) a framework for applying the interaction principles and general design recommendations;
- b) the interaction principles;
- c) general design recommendations corresponding to the interaction principles.

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# Ergonomics of human-system interaction —

## Part 110: Interaction principles

### 1 Scope

This document describes principles for interaction between a user and a system that are formulated in general terms (i.e. independent of situations of use, application, environment or technology). This document provides a framework for applying those interaction principles and the general design recommendations for interactive systems.

While this document is applicable to all types of interactive systems, it does not cover the specifics of every application domain (e.g. safety critical systems, collaborative work, artificial intelligence features).

It is intended for the following audiences:

- analysts of requirements (including market requirements, user requirements, and system requirements);
- designers of user interface development tools and style guides to be used by user interface designers and developers;
- designers of user interfaces who will apply the guidance during the design activities (either directly, based on training, or by using tools and style guides which incorporate the guidance);
- developers who will apply the guidance during the development process;
- evaluators who are responsible for ensuring that products meet the general design recommendations contained in this document;
- buyers who will reference this document in contracts during product procurement.

This document focuses on interaction principles related to the design of interactions between user and interactive system. ISO 9241-112 provides further guidance on the presentation of information.

This document does not consider any other aspect of design such as marketing, aesthetics and corporate identity.

### 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 <http://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  
context of use**

combination of users, goals and tasks, resources, and environment

Note 1 to entry: The “environment” in a context of use includes the technical, physical, social, cultural and organizational environments.

[SOURCE: ISO 9241-11:2018, 3.1.15]

**3.3  
goal**  
intended outcome

[SOURCE: ISO 9241-11:2018, 3.1.10]

**3.4  
interactive system**

combination of hardware and/or software and/or services and/or people that users interact with in order to achieve specific goals

Note 1 to entry: This includes, where appropriate, packaging, user documentation, online and human help, support and training.

Note 2 to entry: The term “system” is often used rather than “interactive system”.

[SOURCE: ISO 9241-11:2018, 3.1.5, modified — Note 2 to entry has been added.]

**3.5  
task**  
set of activities undertaken in order to achieve a specific goal

Note 1 to entry: These activities can be physical, perceptual and/or cognitive.

Note 2 to entry: While goals are independent of the means used to achieve them, tasks describe particular means of achieving goals.

Note 3 to entry: The term “task” is used here, as in ISO 9241-11, in its widest sense, rather than in reference to the specifics of use of the interactive system.

[SOURCE: ISO 9241-11:2018, 3.1.11, modified — Note 3 to entry has been added.]

**3.6  
usability**

extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

Note 1 to entry: The “specified” users, goals and context of use refer to the particular combination of users, goals and context of use for which usability is being considered.

Note 2 to entry: The word “usability” is also used as a qualifier to refer to the design knowledge, competencies, activities and design attributes that contribute to usability, such as usability expertise, usability professional, usability engineering, usability method, usability evaluation, usability heuristic.

[SOURCE: ISO 9241-11:2018, 3.1.1]

**3.7****use error**

user action or lack of user action while using the system, product or service that leads to a different result than that intended by the manufacturer or expected by the user

Note 1 to entry: Use error includes the inability of the user to complete a task.

Note 2 to entry: Use errors can result from a mismatch between the characteristics of the user, user interface, task, or use environment.

Note 3 to entry: Users might be aware or unaware that a use error has occurred.

Note 4 to entry: A malfunction of an interactive system that causes an unexpected result is not considered a use error.

Note 5 to entry: The term use error is used in preference to user error or human error in order to avoid the implied assignment of responsibility for the error to the user.

[SOURCE: ISO 9241-11:2018, 3.3.3]

**3.8****user**

person who interacts with the system, product or service

Note 1 to entry: Users of a system, product or service include people who operate the system, people who make use of the output of the system and people who support the system (including providing maintenance and training).

[SOURCE: ISO 9241-11:2018, 3.1.7]

**3.9****user experience**

combination of user's perceptions and responses that result from the use and/or anticipated use of a system, product or service

Note 1 to entry: Users' perceptions and responses include the users' emotions, beliefs, preferences, perceptions, comfort, behaviours, and accomplishments that occur before, during and after use.

Note 2 to entry: User experience is a consequence of brand image, presentation, functionality, system performance, interactive behaviour, and assistive capabilities of a system, product or service. It also results from the user's internal and physical state resulting from prior experiences, attitudes, skills, abilities and personality; and from the context of use.

Note 3 to entry: The term "user experience" can also be used to refer to competence or processes such as user experience professional, user experience design, user experience method, user experience evaluation, user experience research, user experience department.

Note 4 to entry: Human-centred design can only manage those aspects of user experience that result from designed aspects of the interactive system.

[SOURCE: ISO 9241-11:2018, 3.2.3]

**3.10****user interface**

set of all the components of an interactive system that provide information and controls for the user to accomplish specific tasks with the interactive system

### 3.11

#### **user-system interaction** **user interaction**

exchange of information between a user and an interactive system via the user interface to complete the intended task

Note 1 to entry: User-system interaction represents a subset of human-system interaction that only focusses on intended users and not other humans who can be affected by the interactive system.

[SOURCE: ISO/IEC 25060:2010, 2.22, modified — Note 1 to entry has been added.]

## 4 Interaction principles

### 4.1 Overview

This clause introduces the interaction principles. Seven principles have been identified as being important for the design and evaluation of interactive systems.

- **Suitability for the user's tasks:** An interactive system is suitable for the user's tasks when it supports the users in the completion of their tasks, i.e. when the operating functions and the user-system interactions are based on the task characteristics (rather than the technology chosen to perform the task).
- **Self-descriptiveness:** The interactive system presents appropriate information, where needed by the user, to make its capabilities and use immediately obvious to the user without unnecessary user-system interactions.
- **Conformity with user expectations:** The interactive system's behaviour is predictable based on the context of use and commonly accepted conventions in this context.
- **Learnability:** The interactive system supports discovery of its capabilities and how to use them, allows exploration of the interactive system, minimizes the need for learning and provides support when learning is needed.
- **Controllability:** The interactive system allows the user to maintain control of the user interface and the interactions, including the speed and sequence and individualization of the user-system interaction.
- **Use error robustness:** The interactive system assists the user in avoiding errors and in case of identifiable errors treats them tolerantly and assists the user when recovering from errors.
- **User engagement:** The interactive system presents functions and information in an inviting and motivating manner supporting continued interaction with the system.

NOTE The order in which the principles are presented here does not imply any priority.

For each of the principles, this document provides a list of general design recommendations. The application of a single recommendation does not mean that the application of a principle has been fully satisfied.

[Table 1](#) identifies the main categories used to structure recommendations for each of the principles. These recommendations help in the identification and specification of user requirements relevant to specific contexts of use (see ISO 25065).

**Table 1 — Interaction principles and their main categories of recommendations**

Interaction Principle	Categories of recommendations
Suitability for the user's tasks	<ul style="list-style-type: none"> <li>a) identifying suitability of the interactive system for a given task</li> <li>b) optimizing effort in task accomplishment</li> <li>c) defaults supporting the task</li> </ul>
Self-descriptiveness	<ul style="list-style-type: none"> <li>a) presence and obviousness of the information</li> <li>b) clear indication of processing status</li> </ul>
Conformity with user expectations	<ul style="list-style-type: none"> <li>a) appropriate system behaviour and responses</li> <li>b) consistency (internal and external)</li> <li>c) changes in the context of use</li> </ul>
Learnability	<ul style="list-style-type: none"> <li>a) discovery (of information and controls that users are looking for)</li> <li>b) exploration (of information and controls that users have discovered)</li> <li>c) retention (of information about the system)</li> </ul>
Controllability	<ul style="list-style-type: none"> <li>a) interruption by the user</li> <li>b) flexibility</li> <li>c) individualization</li> </ul>
Use error robustness	<ul style="list-style-type: none"> <li>a) use error avoidance</li> <li>b) use error tolerance</li> <li>c) use error recovery</li> </ul>
User engagement	<ul style="list-style-type: none"> <li>a) motivating the user</li> <li>b) trustworthiness of the system</li> <li>c) increasing user involvement with the system</li> </ul>

#### 4.2 Coverage of this set of interaction principles and general design recommendations

The principles and general design recommendations identified in this document are generic and are not tied to any particular system or context of use. General design recommendations are organized under the principles to which they appear to be most relevant. However, it is recognized that since the principles can overlap, recommendations can relate to more than one principle. Each recommendation is presented under only a single principle, since understanding and using the recommendations is more important than categorizing them.

While the recommendations presented in this document summarize important guidance obtained from current knowledge, it is possible that additional guidance will become important as technology and ergonomics develop.

This document applies to most interactive systems in most contexts of use. It is up to individuals using this document to determine any system and contexts of use where they do not apply. Not every recommendation within this document is applicable in every context of use.

#### 4.3 Use of the interaction principles in human-centred design

While this document describes product-related principles for interaction between users and interactive systems, ISO 9241-210:2019 provides principles and guidance on activities of human-centred design for interactive systems.

#### 4.4 Contribution of the interaction principles to usability

Usability is the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (see ISO 9241-11). This recognizes that usability results from a complex set of factors and can be different for different users, different goals and tasks, and different contexts of use.

Usability consists of effectiveness, efficiency and satisfaction, each of which is composed of more specific components:

- effectiveness: the accuracy and completeness with which users achieve specified goals;
- efficiency: the resources used in relation to the results achieved;
- satisfaction: the extent to which the user's physical, cognitive and emotional responses that result from the use of a system, product or service meet the user's needs and expectations.

User-system interactions can affect each component. While some principles and some general design recommendations appear to focus more on one component than the others, some principles and recommendations affect all three components.

NOTE Suitability for the task addresses both effectiveness "to complete the task" and efficiency avoiding "unnecessary steps and unnecessary information", while suitability for engagement primarily addresses satisfaction.

#### 4.5 Relationships between interaction principles

The interaction principles are not strictly independent and can semantically overlap. A usability problem or a general design recommendation can relate to one or more interaction principles.

NOTE 1 If users do not detect some information because it is placed at a location where users do not expect it, a usability problem occurs because the interactive system does not *conform with user expectations*. As a consequence, since the information is not present from the user's perspective, when needed, the *self-descriptiveness* of the interactive system is affected.

EXAMPLE 1 While creating a presentation, users use the undo function repeatedly to explore the look of different styles. In this context, the undo function is used as a tool to achieve *controllability*. However, if users in this situation use the undo function to explicitly correct an error, it is used to maintain *use error robustness*.

While the set of principles and general design recommendations are intended to optimize the usability of the system, constraints can make it necessary to make "trade-offs" between the application of principles in order to optimize usability. The applicability and the priority given to each principle varies with the specific field of application, user groups and the interaction technique chosen.

NOTE 2 Examples for fields of application can range from work equipment over entertainment systems to safety critical systems.

EXAMPLE 2 The limited display space on a smart watch leads to trade-offs between applying the interaction principles. Because the display space is not sufficient to provide the information necessary for *self-descriptiveness* a higher priority is assigned to achieving *conformity with user expectations*.

Each of the principles needs to be considered in analysis, design and evaluation. However, principles can vary in their relative importance depending on the context of use and any constraints on the design. In practice, within design situations for an interactive system, compromises are made.

#### 4.6 Framework for using this document

This document provides interaction principles and general design recommendations for the interaction between user and system that apply across application domains and particular technologies.

[Annex A](#) provides a checklist to aid in applying the general design recommendations in this document.

ISO 9241-112 provides principles and general recommendations for the presentation of information that apply across the three main modalities (visual, auditory, tactile/haptic) typically used in ICT. Those principles and recommendations also apply across application domains and across technologies. The principles of self-descriptiveness and conformity with user expectations are related to the presentation of information. Information, which is not self-descriptive, can mislead the user.

Other ISO standards contain recommendations and requirements with a specific thematic focus:

- requirements and recommendations specific to the visual presentation of information are provided in ISO 9241-125;
- requirements and recommendations specific to interaction techniques are provided in standards such as ISO 9241-143;
- requirements and recommendations specific to an application domain are provided in standards such as ISO 9241-154;
- requirements and recommendations specific to accessibility are provided in standards such as ISO 9241-171.

[Figure 1](#) illustrates the different levels of guidance contained in ISO standards for human-system interaction. ISO standards related to human-system interaction contain guidance at the levels of:

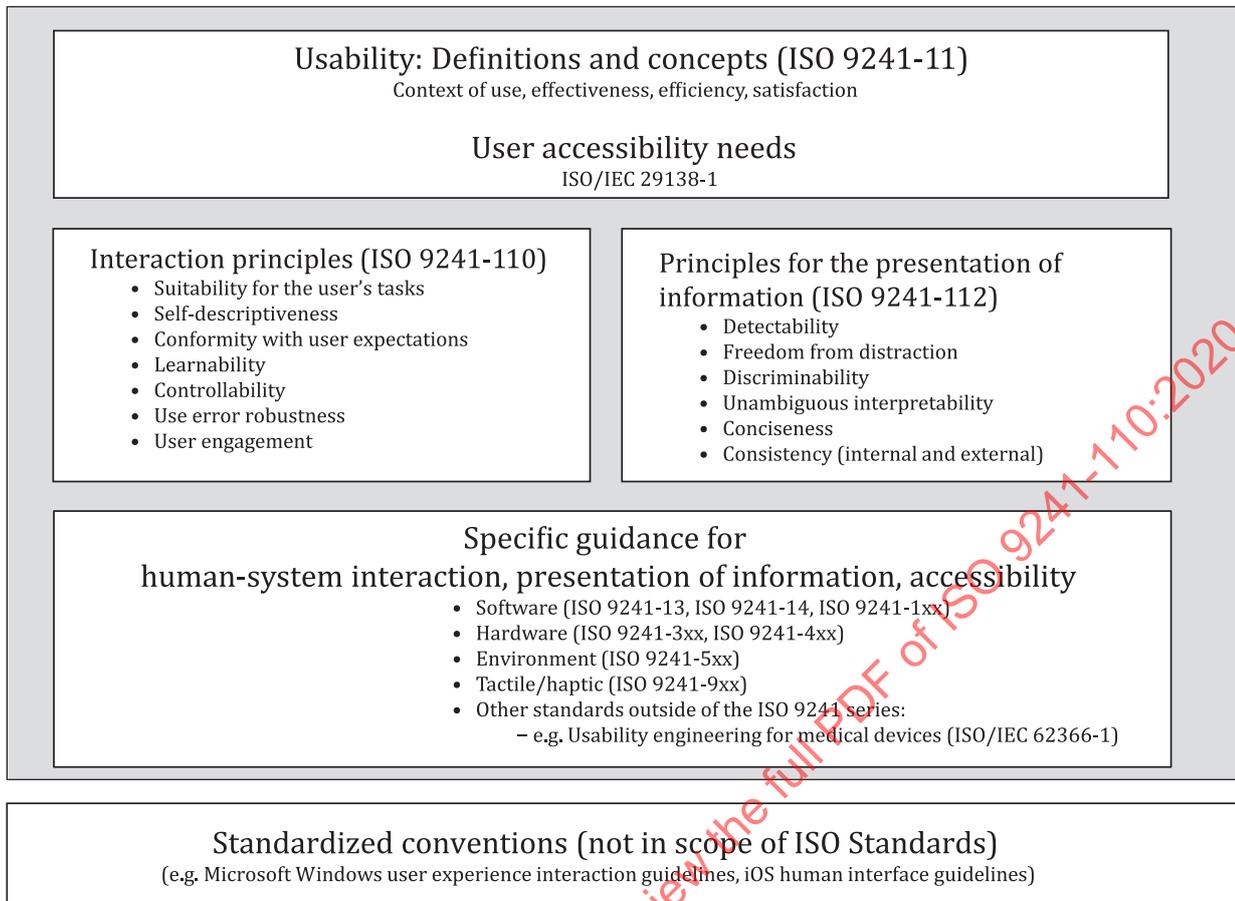
- principles;
- general design recommendations;
- requirements and recommendations specific to a thematic subject.

They do not prescribe “standardized solutions” in terms of conventions (e.g. “the title bar of a window in focus is coloured blue” or “the OK button is always placed left to the CANCEL button”). Such “standardized conventions” are published by industry sources, in organizational style guides and can be found in literature. However, the guidance relating to presented information in ISO standards related to human-system interaction is intended to be applied when establishing or assessing standardized conventions for user interfaces of interactive systems.

[The following serves as alternative text for Figure 1]

Figure 1 illustrates the relationship of major sources of guidance on user-system interaction. The figure focuses on guidance from international standards, but also recognizes standardized conventions not in scope of ISO standards. ISO 9241-11 introduces the concepts of usability, and its components effectiveness, efficiency, and satisfaction and the concept of context of use. ISO/IEC 29138-1 identifies the range of user accessibility needs. Two standards (this document, ISO 9241-110, Interaction principles, and ISO 9241-112, Principles for the presentation of information) provide high-level guidance for achieving usability. The interaction principles in this document include: suitability for the task, self-descriptiveness, conformity with user expectations, learnability, controllability, use error robustness, and user engagement. The ISO 9241-112 principles for the presentation of information include: detectability, freedom from distraction, discriminability, unambiguous interpretability, conciseness, and consistency (internal and external). Numerous other international standards (both within the ISO 9241 series and beyond) provide specific guidance for human-system interaction, the presentation of information, and accessibility. Some sources of specific guidance include: software standards ISO 9241-13 and ISO 9241-14 and standards in the ISO 9241-100 series, hardware standards in the ISO 9241-300 and ISO 9241-400 series, workplace and environmental standards in the ISO 9241-500 and ISO 9241-600 series, tactile/haptic standards in the ISO 9241-900 series, and other standards outside the ISO 9241 series (such as ISO/IEC 62366-1). Examples of standardized conventions (not in the scope of ISO standards) include: Microsoft Windows User Experience Guidelines and iOS Human Interface Guidelines.

[End of alternative text]



**Figure 1 — The relationship of major sources of guidance for user-system interaction**

## 5 Principles and recommendations

### 5.1 Suitability for the user's tasks

#### 5.1.1 Principle

An interactive system is suitable for the user's tasks when it supports the users in the completion of their tasks, i.e. when the operating functions and the user-system interactions are based on the task characteristics (rather than the technology chosen to perform the task).

**NOTE 1** A prerequisite for suitability for the user's tasks is that the tasks themselves have been based on user needs.

**NOTE 2** It is important that user-system interactions are based on the task characteristics, rather than the technology chosen to perform the task.

Suitability for the user's tasks involves guidance related to:

- a) identifying suitability of the interactive system for a given task;
- b) optimizing effort in task accomplishment;
- c) defaults supporting the task.

### 5.1.2 Recommendations related to identifying suitability of the interactive system for a given task

The interactive system should provide sufficient information to enable the users to determine whether the system is appropriate for their intended outcomes.

EXAMPLE 1 The start page of a navigation app concisely identifies the tasks that it supports.

EXAMPLE 2 A parking ticket machine clearly indicates which credit cards it accepts.

### 5.1.3 Recommendations related to optimizing effort in task accomplishment

5.1.3.1 The interactive system should provide the user with the controls and task-related information needed for each step of the task.

EXAMPLE 1 A check-in system for flights indicates that a seat can be chosen before the check in process is completed.

NOTE The user needs related to the task determine the required quality, quantity and type of information to be presented.

EXAMPLE 2 A ticket machine for train tickets offers a function for imputing the desired destination and displays the price based on the input.

5.1.3.2 The interactive system should avoid imposing steps on the user that are derived from the technology rather than from the needs of the task itself.

NOTE 1 Structuring interaction based on the system's internal data model or internal processing steps can cause unnecessary learning burdens on the user.

EXAMPLE 1 A software application for compressing the size of a file allows the user to first select one or more files to be compressed and then allows the user to compress the file size of all selected files instead of asking the user to first "create an archive" for the files to be compressed.

EXAMPLE 2 A car has an automatic transmission rather than a manual transmission.

NOTE 2 Unnecessary steps include actions assigned to the user that can be more appropriately done automatically by the system.

5.1.3.3 The interactive system should avoid offering functionality to the user and presenting information that interferes with completing current tasks.

EXAMPLE 1 A hotel booking system displays only hotels with available rooms for a specific date selected by the user. Information about other hotels in the area is not presented.

EXAMPLE 2 A traffic information display on the street only displays information, if relevant traffic information is present and does not display anything in case there is no traffic information, instead of stating "No traffic information available" which distracts the driver from driving.

NOTE The presentation of inappropriate information can lead to decreased task performance and unnecessary mental workload.

### 5.1.4 Recommendations related to defaults supporting the task

5.1.4.1 The interactive system should offer defaults, where appropriate.

NOTE Default values can include standard values, values based on the current context, and values that reflect previous use of the system by the current user.

EXAMPLE 1 A ticket machine at a railway station provides its location as the default station of departure.

**EXAMPLE 2** When a user returns to an e-commerce site, the system suggests the last product that user looked at without purchasing it as one of the items that it features.

**5.1.4.2** The interactive system should avoid defaults, where they can mislead the user.

**EXAMPLE 1** A reservation system for restaurants presents the country code of the user's mobile phone when booking a table, only if it can determine which country the person is coming from.

**EXAMPLE 2** A teleconferencing system does not automatically turn participant's microphones in order to avoid creating interferences on the speaker system.

## **5.2 Self-descriptiveness**

### **5.2.1 Principle**

The interactive system presents appropriate information, where needed by the user, to make its capabilities and use immediately obvious to the user without unnecessary user-system interactions.

**NOTE 1** Unnecessary user-system interactions include unnecessary exploration or the consultation of external information sources.

**NOTE 2** A interactive system is self-descriptive to the extent that, at any time, it is obvious to the users where they are within the interactive system, which actions can be taken and how they can be performed.

**NOTE 3** ISO 9241-112 provides guidance on the presentation of information that can be used to enhance self-descriptiveness.

Self-descriptiveness involves guidance related to:

- a) presence and obviousness of information;
- b) clear indication of processing status.

### **5.2.2 Recommendations related to presence and obviousness of the information**

**5.2.2.1** The interactive system should provide information that guides the user and minimizes the need for consulting online help, user manuals or other external information.

**EXAMPLE 1** An office phone with answering machine and call-forwarding facility offers clearly labelled buttons to initiate actions such as "recording a message" or "setting a forwarding number".

**EXAMPLE 2** In a railway station, electronic information displays present the time until the departure of trains, rather than the time of departure so that the user does not need to find the current time and calculate how long is available to get to the train.

**5.2.2.2** The interactive system should clearly indicate where the user is in its navigation structure, what actions can be taken by the user at this time and how they can be performed.

**EXAMPLE 1** A "breadcrumb trail" (such as: Home > Products > Lighting > Ceiling lamps) is used to indicate where the user is within the navigation structure of the online shop. All available ceiling lamps are listed with an image and the price. For each product listed, a link leading to a detailed product description is presented.

**EXAMPLE 2** An office telephone displays the list of recent calls to or from the user. For each call, a button for showing details of the call as well as a button "Redial" is available.

**5.2.2.3** The interactive system should enable users to locate the controls needed to complete the task.

**EXAMPLE 1** In an e-commerce application, the frequently used control "shopping cart" is always visible.

**EXAMPLE 2** On a ticket machine, the slot for entering the credit card is clearly visible and identifiable.

**5.2.2.4** The interactive system should present information in a way that clearly indicates which user interface elements are interactive and which user interface elements are non-interactive.

EXAMPLE 1 In a web-based application, hyperlinks are blue and underlined, while read-only text is black.

EXAMPLE 2 An office phone with answering machine and call-forwarding facility clearly indicates whether or not the answering machine or “call forwarding” is active.

**5.2.2.5** The interactive system should present information in a vocabulary that is familiar to the user.

NOTE 1 This recommendation is not intended to prohibit the use of topic-specific vocabulary that is suited for the task.

NOTE 2 Familiarity is increased when the vocabulary used to perform the task aligns with the user's general knowledge.

EXAMPLE 1 An online shop for lights and lamps for the home uses words like “ceiling lights” and “floor lamps” for navigation rather than brand names of the manufacturer of each light.

EXAMPLE 2 A self-service banking machine for customers uses terminology from the user's perspective such as “International money transfer” rather than from the bank's perspective such as “SWIFT transfer”.

### **5.2.3 Recommendations related to clear indication of processing status**

**5.2.3.1** The interactive system should indicate the progress in the completion of the task.

EXAMPLE 1 An online shop indicates the steps that have been completed as part of the payment and the remaining steps to be completed before the purchase is complete.

EXAMPLE 2 A network printer displays the number of pages remaining to be printed.

**5.2.3.2** The interactive system should keep the user informed about changes in the state of the system.

NOTE Changes in the state of a system typically change how the system interprets and reacts to one or more user inputs.

EXAMPLE 1 A navigation system indicates to the user that it is not connected to a satellite and that it cannot display valid location information.

EXAMPLE 2 A smartphone running low on battery displays a message when it goes into power saving mode.

**5.2.3.3** The interactive system should indicate when and where input is needed from the user.

EXAMPLE 1 A form provides a clear differentiation between the input fields and the labels for the fields.

EXAMPLE 2 A self-service checkout system prompts the customer to scan each item to be purchased.

## **5.3 Conformity with user expectations**

### **5.3.1 Principle**

The interactive system's behaviour is predictable based on the context of use and commonly accepted conventions in this context.

NOTE 1 Consistency generally increases the predictability of the interaction.

NOTE 2 The application of manufacturer standards, corporate style guides/standards and design patterns can enhance conformity with user expectations.

Conformity with user expectations involves guidance related to:

- a) appropriate system behaviour and responses;

b) consistency (internal and external);

NOTE 3 Internal consistency refers to consistency within the product, whereas external consistency refers to the product being consistent with other, similar products or with other products used by the audience of the product in its context of use.”

c) changes in the context of use.

NOTE 4 Recommendations related to changes in the context of use (based on context awareness) focus on the interactive system to adapt its responses to distinct contexts of use and/or changes in the context of use.

NOTE 5 Context awareness is no substitute for the capability of an interactive system to be individualizable by the user, where appropriate. See ISO 9241-129 for guidance on individualization.

### 5.3.2 Recommendations related to appropriate system behaviour and responses

**5.3.2.1** The interactive system should provide steps to accomplish the task that are consistent with the users' understanding of the task.

EXAMPLE 1 An online shop for buying stamps lets the user select the shipped destination country and displays the required amount for which stamps need to be purchased.

EXAMPLE 2 When purchasing a railway ticket from a vending machine, the user can select the destination rather than the required fare for the travel.

NOTE The interactive system can offer additional support to the user when performing recurrent tasks/steps in order to minimize task steps.

**5.3.2.2** The interactive system should respond according to the needs of the widest range of users and widest range of contexts of use.

EXAMPLE 1 An interactive system provides a screen reader to give users auditory information instead of visual information.

EXAMPLE 2 An elevator has two sets of controls at a different height to facilitate use by people of different stature as well as wheel chair users.

NOTE Supporting the needs of the widest range of users improves accessibility. Further information on accessibility is available from the following.

- ISO/IEC 29138-1 provides information about the user accessibility needs of the widest range of users.
- ISO 9241-171 provides guidance on software accessibility to meet the needs of the widest range of users.
- ISO 21801 provides guidance on cognitive accessibility to meet the needs of the widest range of users.
- ISO/IEC 29136 provides guidance on hardware accessibility to meet the needs of the widest range of users.

**5.3.2.3** The interactive system should provide feedback to user actions that is immediate and suitable for user needs.

NOTE The type and length of feedback can vary based on user needs.

EXAMPLE 1 The positioning of the map in a navigation system is changed instantly to correspond with changes in the user's direction of driving.

EXAMPLE 2 An elevator illuminates the button for selected floor immediately after pressing.

**5.3.2.4** The interactive system should inform the user about the progress, if a response time is expected to be significantly long.

EXAMPLE 1 An application that processes student information offers regularly updated feedback, such as “Now processing record 6 980 of 11 005”.

EXAMPLE 2 An information screen at a bus stop informs the bus passenger about the remaining time before the bus arrives.

### 5.3.3 Recommendations related to consistency (internal and external)

**5.3.3.1** The interactive system should use cultural and linguistic conventions for presentation, input and control that the users are familiar with.

NOTE It is important to use words, phrases and concepts familiar to the user, rather than system-oriented terms.

EXAMPLE 1 A software package uses left-to-right typing for English and right-to-left typing for Arabic.

EXAMPLE 2 The layout of a keyboard corresponds to the local language conventions including language-specific characters.

**5.3.3.2** The interactive system's behaviour and presentation should be consistent within the interactive system and across other interactive systems which the user can be expected to interact with.

NOTE 1 Consistency across similar tasks enables the user to develop common procedures for performing tasks.

NOTE 2 Often times, there is a trade-off between consistency and major improvements of the user interface. In such cases, consistency between the old and the new system can be de-prioritized after careful consideration.

EXAMPLE 1 Within a software package, the buttons "OK" and "Cancel" are always located at the same place.

EXAMPLE 2 Within a software package that supports compressing and decompressing files, the interaction steps for both tasks are designed similarly.

EXAMPLE 3 In a school, teachers use different systems for grading and communicating with students. Both systems use the same phrases consistently, for example "user name" (not user-id) and "password" (not access key, not keyword).

**5.3.3.3** The interactive system's behaviour and presentation should be obviously different for items with different purposes within the interactive system and across other interactive systems.

EXAMPLE 1 Across all forms, across all applications, push buttons are only used to initiate actions and hyperlinks are only used to access additional information on available choices and entries.

EXAMPLE 2 Across all menus of all applications, the titles of menu items leading to an additional menu have an indication of the availability of additional information (e.g. three dots or an arrow) at the end the title.

### 5.3.4 Recommendations related to changes in the context of use

**5.3.4.1** The interactive system should be capable of responding to the different needs of individual users.

NOTE The system can respond to the different needs of an individual by providing the user alternate ways of indicating or by automatically identifying and adapting to the need.

EXAMPLE 1 A touch screen device allows different users to enlarge an image by a two-finger spread gesture or by a double tap. Users who are not capable of these physical interactions can use an "enlarge image" command.

EXAMPLE 2 The driver's seat of an automobile automatically adjusts to the settings for the driver who has entered it.

**5.3.4.2** The interactive system should respond appropriately to changes in connected resources.

EXAMPLE 1 When a projector is connected to a notebook, it is automatically configured as a display.

EXAMPLE 2 When a vehicle is in motion, access to some functions, like changing the time and date, is blocked.

**5.3.4.3** The interactive system should present information appropriately on different device types and display sizes.

EXAMPLE 1 Web pages adapt to be readable on different sizes of display monitors.

EXAMPLE 2 Colours of objects are recognizably the same on a monitor and on a printed page.

**5.3.4.4** The interactive system should adapt to changes in the user's physical environment.

EXAMPLE 1 Calendar entries in an online conferencing system display the local time unless a specific time zone has been selected by the user.

EXAMPLE 2 The display brightness of a smartphone is adapted according to the lighting conditions detected by the front camera.

EXAMPLE 3 A car audio system increases the speaker's volume at increasing speeds, to adapt to the increasing background noise.

## 5.4 Learnability

### 5.4.1 Principle

The interactive system supports discovery of its capabilities and how to use them, allows exploration of the interactive system, minimizes the need for learning and provides support when learning is needed.

Learnability involves guidance related to:

- a) discovery (of information and controls that users are looking for);
- b) exploration (of information and controls that users have discovered);
- c) retention (of information about the system).

### 5.4.2 Recommendations related to discovery

**5.4.2.1** The interactive system should assist the user to discover its capabilities and how to use them for achieving their intended outcomes.

NOTE 1 Discovery allows the user to build up a mental model and strategies for memorizing activities.

NOTE 2 Discovery goes beyond self-descriptiveness to help users find functionalities and interaction conventions of the system that are beyond those that are obvious and that may not otherwise be found.

NOTE 3 Tutorials, online help and user manuals support discovery.

EXAMPLE 1 A word-processing application provides drop-down menu items that include a keyboard shortcut next to the title.

EXAMPLE 2 An initial guided tour is provided for users to learn how to use the interactive system in order to minimize their need to consult a user manual.

**5.4.2.2** The interactive system should enable users to find information beyond their current task.

EXAMPLE 1 A museum website provides notifications about specific future exhibits.

EXAMPLE 2 A museum kiosk provides information under categories, such as exhibitions, artists, building information, opening hours and contact to aid the user in discovering the capabilities of the museum.

### 5.4.3 Recommendations related to exploration

**5.4.3.1** The interactive system should allow the user to explore (“try out”) the system without negative consequences.

EXAMPLE 1 A system for scheduling deliveries of goods in a large warehouse allows a user to simulate potential variations of the schedule, in order to allow the user to foresee negative impacts before changes are applied.

EXAMPLE 2 A scanner allows the user to preview the scanning result without any additional settings by simply pressing the push button “Preview”.

NOTE It is important for a system to protect the user from inadvertent loss of information when exploring other possibilities.

**5.4.3.2** The interactive system should provide appropriate alternatives for the user to navigate to/find information and functionality.

EXAMPLE 1 The interactive system provides a menu to access its functions as well as a search function to find particular functions.

EXAMPLE 2 In addition to the task-oriented menu to access its functions, the interactive system provides an A-Z index to its functions.

### 5.4.4 Recommendations related to retention

**5.4.4.1** The interactive system should provide feedback that helps the user to learn the effect of their actions.

NOTE 1 Feedback and explanations can assist the user in building a conceptual understanding of the interactive system.

EXAMPLE 1 When a user reserves a room using a hotel room reservation system, the user receives step-by-step feedback to refine his/her queries and details about the successful reservation of the room.

EXAMPLE 2 After completion of a scan, the scanner display shows the file size and explains how to repeat the scan with different settings leading to a reduced file size, still maintaining sufficient visual quality.

NOTE 2 It is important that feedback and explanation messages are adapted to the user's knowledge of the system in order to promote learning.

**5.4.4.2** The interactive system should promote the user's development of skills in the tasks that it supports.

EXAMPLE 1 An online system offering patients the ability to make entries into their health record has an example patient available that illustrates how to build and maintain a health record that is useful for effective interaction with medical doctors.

EXAMPLE 2 A requirements management system has an example that illustrates how to structure and specify requirements to help the user getting started with requirements management.

## 5.5 Controllability

### 5.5.1 Principle

The interactive system allows the user to maintain control of the user interface and the interactions, including the speed and sequence and individualization of the user-system interaction.

Controllability involves guidance related to:

- a) interruption by the user;

- b) flexibility;
- c) individualization.

NOTE While flexibility focusses on alternative means readily offered to the user by the interactive system to achieve an intended outcome, individualization focusses on the capability of the interactive system to be adapted by the user based on individual skills, individual knowledge and personal preferences.

## **5.5.2 Recommendations related to interruption by the user**

**5.5.2.1** The interactive system should allow the user to interrupt completing a task at any point of time.

EXAMPLE 1 A virus program that is scanning a hard disk drive for viruses can be stopped at any point of time by the user pressing a prominent stop button.

NOTE If there are significant, negative consequences from the user interruption, confirmation prior to execution of the interruption is warranted (see [5.6.2.6](#)).

**5.5.2.2** The interactive system should allow the user to continue an interrupted task at the point of interruption at a later time.

EXAMPLE 1 An e-mail application allows the user to save a “draft” and to complete it later.

EXAMPLE 2 When a printer runs out of paper in the middle of printing a document and more paper is loaded, it then starts printing the next page in the document rather than reprinting from the beginning.

**5.5.2.3** An interactive system that autonomously performs a task, should allow the user to interrupt the ongoing task and take over control to continue to perform the task manually.

EXAMPLE 1 An automatic update of the operating system can be postponed by the user even after the update has started so it does not interfere with the execution of the current task.

EXAMPLE 2 A self-driving car allows the person seated in the driver's seat to take manual control.

EXAMPLE 3 An automatic vacuum cleaner allows the user to interrupt the ongoing hovering process and lets the user manually direct the vacuum cleaner.

## **5.5.3 Recommendations related to flexibility**

**5.5.3.1** The interactive system should allow the user to perform the task in the user's preferred order.

EXAMPLE 1 An interactive system for tax claims with multiple sections does not prescribe the order in which data has to be entered.

EXAMPLE 2 A ticket machine allows the user to select the destination and the number of passengers in the user's preferred order, rather than forcing the selection in a given order.

**5.5.3.2** The interactive system should allow the user the flexibility to choose different means of interaction to complete the task.

EXAMPLE 1 Within an e-commerce application, the search button can be activated by using the mouse or by pressing the “Enter” key on the keyboard when the button has been selected.

EXAMPLE 2 The system provides the capability to create a macro to automatically perform a repetitive sequence of steps.

EXAMPLE 3 A ticket machine in a railway station permits the user to enter station names either directly or by selecting them from a list.

NOTE This flexibility includes allowing the user to:

- a) use keyboard shortcuts and other means to speed up the interactions;

- b) use the available input/output devices including assistive devices;
- c) choose from alternative modalities and forms of representation to meet individual needs.

**5.5.3.3** The interactive system should allow the user to control the pace of interaction.

NOTE 1 In certain contexts of use, the task itself can dictate the minimum and maximum limits for the pace of interaction.

NOTE 2 The pace of user interaction can be restricted by company policy, e.g. “log off after 2 h of inactivity”.

EXAMPLE 1 When typing in digits of a phone number into a phone, the digits stay visible and editable until the user decides to dial the number, independent of the time taken by the user to complete the typing in of the number.

EXAMPLE 2 When typing in the name of a movie into a smart TV in order to record it, the letters in the input field for the movie remain visible until the user decides to save the title, independent of the time taken by the user to complete the typing.

**5.5.3.4** The interactive system should allow the user to undo at least the last action.

NOTE 1 In some cases, undoing a user action is not possible due to physical or legal constraints, such as sending a message, purchasing goods, or posting an accounting document. See 5.6.2.6 for guidance on irreversible actions with severe consequences.

NOTE 2 The granularity of what constitutes an “action” can be difficult to determine. Ideally, there is a chain of user actions that can be undone step by step, and in its entirety for the respective user session (“Undo all”).

EXAMPLE 1 In a photo processing application, a sequence of changes to an image can be reversed by successively selecting “Undo”.

EXAMPLE 2 In a file management system, the user can undo the previous deletion of a file or change the name of a renamed file back to the original name.

## **5.5.4 Recommendations related to individualization**

**5.5.4.1** The interactive system should allow the user to permanently change default values and/or choices.

EXAMPLE 1 Within the operating system, the user can modify the background image of the start screen.

EXAMPLE 2 Within a train booking system, the user can select “aisle” or “window” for all future seat reservations.

EXAMPLE 3 A car allows drivers to store and retrieve personal settings, for example for seats and entertainment.

**5.5.4.2** The interactive system should allow the users to individualize the user interface to suit their individual needs and preferences.

NOTE ISO 9241-129 provides guidance on individualization.

EXAMPLE 1 A software package allows the user to disable introductory user assistance reflecting the user's development of skills.

EXAMPLE 2 The sensitivity of a pointing device can be adjusted to individual user needs.

EXAMPLE 3 Smart phone settings allow the user to change the amount and type of information contained in calendar reminders.

**5.5.4.3** The interactive system should allow the user to return to previous or original settings after any changes.

**EXAMPLE 1** An operating system allows the user to reset user-initiated changes of colours to the original colour scheme which was supplied with the operating system at its initial installation.

**EXAMPLE 2** A smart lock for a front door allows the user to reverse the setting “open door automatically when I come close” to the previous setting “open door only if I select open door in the smartphone app”.

## **5.6 Use error robustness**

### **5.6.1 Principle**

The interactive system assists the user in avoiding errors and in case of identifiable errors treats them tolerantly and assists the user when recovering from errors.

Use error robustness involves guidance related to:

- a) use error avoidance;
- b) use error tolerance;
- c) use error recovery.

**NOTE 1** An interactive system provides error tolerance when, despite evident errors in input, the intended result can be achieved with either no, or minimal, corrective action by the user.

**NOTE 2** System errors in identifying user inputs (e.g. inappropriate auto-correction) are also considered to be use errors.

### **5.6.2 Recommendations related to use error avoidance**

**5.6.2.1** The interactive system should not require the user to input information that it already knows.

**EXAMPLE 1** A system for issuing insurance contracts prepopulates every input field where data have been entered elsewhere in the system with the data already known by the system, rather than having to enter them again.

**EXAMPLE 2** A new mobile phone offers the user the opportunity of transferring personal information from another phone rather than having to re-enter it.

**5.6.2.2** The interactive system should allow the user to select data (using recognition) rather than having to manually input data (using recall) wherever suitable data is available in the system to minimize the risk of errors in input.

**EXAMPLE 1** An e-commerce system allows to select each delivery address used in the past rather than having to enter them again (with the likelihood of errors in input).

**EXAMPLE 2** In a railway booking system, the user can select dates from a calendar rather than having to manually enter them.

**5.6.2.3** The interactive system should only allow choices that are currently valid.

**EXAMPLE 1** A scheduling system only allows the user to select future times and dates.

**EXAMPLE 2** An automobile does not allow opening a door with a child lock that is engaged while the automobile is in motion.

**5.6.2.4** The interactive system should ensure that the users do not lose their work as the result of use errors or system errors.

**EXAMPLE 1** A database management system keeps track of all successful transactions in case there is a power failure affecting the computer that it is running on.

EXAMPLE 2 A system for exploring budget plans saves each version of a planned budget as a new item in order to avoid possibly overwriting versions of the plan that are intended to be saved.

**5.6.2.5** The interactive system should identify potential errors in inputs and choices before further processing them.

EXAMPLE 1 In an insurance system for car insurances, entered car types are checked by the system for known car types and in case of deviations, the known car types are displayed to the user and suggested to be used.

EXAMPLE 2 An e-mail system checks each draft e-mail for the words “attach”, “attached” and “attachment” and offers a message “Do you want to attach a file to your message?” before sending the message.

**5.6.2.6** If severe consequences can result from a user action, the interactive system should request confirmation before carrying out the action.

EXAMPLE 1 In a system for prescribing medication, the prescriber is warned when the chosen medication is incompatible with other medications that the patient has also been prescribed.

EXAMPLE 2 In a banking system, where amounts of money being transferred from one country to another exceed the value of 50 000 EUR, the user is requested to type in the amount twice before the transaction can be completed.

### 5.6.3 Recommendations related to use error tolerance

**5.6.3.1** The interactive system should allow the user to defer the correction of an input error or allow the input error to remain uncorrected.

EXAMPLE 1 In a data base application where postal (zip) codes are validated during entry, the user is permitted to continue editing other entry fields even if the system recognizes that the postcode entry field contains an invalid postal code.

EXAMPLE 2 In a government system for processing applications for social security, where users type in information from paper-based application forms without looking at the display of their computer during typing, the user can enter all items on the application form including those that are obviously incorrect to the user and correct individual items afterwards.

NOTE This is not intended to support the lack of correction before using the information.

**5.6.3.2** When the interactive system is able to correct errors automatically, it should inform the user of the execution of the corrections and provide the opportunity to override the corrections.

EXAMPLE 1 In a spell-check facility, words with errors are marked. The spell-check facility offers selection of one or more corrected versions of the misspelled word, while giving the user the opportunity to type in another corrected version of the word or the opportunity to accept the word as spelled even if it does not recognize it.

EXAMPLE 2 A universal remote control that allows the user to input the manufacturer and model number of the specific device that the remote control is to be used for, displays similar manufacturers and model numbers to the ones entered by the user and lets the user decide which one to use.

### 5.6.4 Recommendations related to use error recovery

**5.6.4.1** The interactive system should assist the user in detecting, understanding and correcting errors in input.

EXAMPLE 1 An online form presents information on top of the form that there are incorrect entries on the form. In addition, each field containing an incorrect entry is highlighted.

EXAMPLE 2 When entering a word that is not known by the system, it provides the user with recommended alternatives that can be used and allows the user to either choose to use the entered word or one of the recommended alternatives.

**5.6.4.2** The interactive system should provide error messages that are precise, comprehensible and polite.

**NOTE** It is important that error messages state the exact location where the error occurred and the specific type of error in language the user understands without blaming the user.

**EXAMPLE 1** A car rental website says, "The pickup date (2019 Dec. 16) must not be later than the return date (2019 Nov. 5)" instead of "An error occurred".

**EXAMPLE 2** When a user is making a reservation, the system positions the user at the location of the first "error" that it finds with the entries in the form (e.g. the start date for a reservation) and explains what the error is (e.g. "the start date must be in the future").

**5.6.4.3** The interactive system should provide constructive explanations of errors that facilitate their correction.

**NOTE** When appropriate, the interactive system can provide, upon user request, additional information about the error and possible means of correcting it.

**EXAMPLE 1** If a date has been entered in an incorrect format, an error message reading "Please enter date in the format 'dd/mm/yyyy, for example 24/11/2019'" is displayed.

**EXAMPLE 2** A message reservation system provides clear messages such as: "The train you selected is not available on December 25th on this connection. It is available on December 23rd or December 26th. Please select a different train, date, or connection."

**5.6.4.4** The interactive system should minimize the steps and effort required for error correction.

**EXAMPLE 1** Within a form-filling application, after an error has been identified, the cursor is automatically positioned in the entry field of the erroneous input and the field content can be directly modified.

**EXAMPLE 2** In a word-processing application, incorrectly spelled words are underlined. Right-clicking a misspelled word displays a list of correctly spelled suggestions.

## 5.7 User engagement

### 5.7.1 Principle

The interactive system presents functions and information in an inviting and motivating manner supporting continued interaction with the system.

**NOTE 1** An engaging interactive system encourages users to use it for longer and more often, devote resources to it (cognitive, financial, personal, etc.), prefer it to systems of similar functionality.

**NOTE 2** It is important that user engagement is done in an ethical manner. Some aspects of user engagement can be inappropriate for some interactive systems.

**NOTE 3** User engagement can lead to a positive user experience.

**NOTE 4** If the interactive system engages the user, it provides them a sense of ownership and commitment.

**NOTE 5** Adherence to the previous principles is an important precondition for user engagement.

**NOTE 6** Excessive or inappropriate application of techniques intended to increase user engagement can lead to a negative user experience.

User engagement involves guidance related to:

- a) motivating the user;
- b) trustworthiness of the system;
- c) increasing user involvement with the system.

## 5.7.2 Recommendations related to motivating the user to use the system

**5.7.2.1** The interactive system should provide the user with assurances of successful accomplishments and that there are no outstanding issues that need to be addressed by the user.

NOTE A popular way of expressing the guidance is “Put a smile on your interface”.

EXAMPLE 1 An anti-virus program displays a clear assurance “You are protected” together with a large, green checkmark and the link “More information”.

EXAMPLE 2 A door-locking system app informs the user when they leave their house that all doors are closed and locked and that the house is secured.

**5.7.2.2** The interactive system should carefully make use of affective characteristics to promote appropriate emotional responses.

NOTE Where appropriate, the affective characteristics can be light-hearted and fun, to promote a sense of enjoyment. In other cases, they can be warm-hearted and compassionate to evoke a sense of support and sympathy. In yet other cases, the system can evoke the sense of urgency and offer clear and unambiguous choices to the user so as not to worsen the situation or heighten the negative effects. In rare cases, the aim can be to create emotional responses of fear, stress or sadness.

EXAMPLE 1 A planning tool used by an oil company informs the user about the possible negative environmental consequences of specific choices in order to enhance environmental responsibility.

EXAMPLE 2 An online banking system displays the face of the customer's personal advisor to set an emotionally positive attitude for the support conversation.

**5.7.2.3** The interactive system should present information and functions that are understood by the user as respectful.

EXAMPLE 1 An e-commerce website avoids attempting to be too personal in how it addresses users, for example by repeatedly addressing them by their first name.

EXAMPLE 2 An e-commerce website treats customers professionally and avoids behaving overly familiar in order to avoid disturbing the customers.

EXAMPLE 3 Professionals taking an online course are referred to as “candidates” rather than as “students”.

NOTE Exceptions can apply in certain application domains, such as entertainment, where subjective and/or emotional styles are used.

**5.7.2.4** The interactive system should be designed to anticipate user needs that the user may not be aware of.

EXAMPLE 1 A web shop provides the opportunity for passionate support staff, who know users' questions and demands, to input product descriptions instead of just automatically republishing the manufacturer specifications.

EXAMPLE 2 A movie streaming system allows the user to continue watching a movie from the exact location where they last stopped watching, on any device that they are using.

EXAMPLE 3 While walking to an identifiable business, a navigation system informs the user that the intended destination will be reached after closing time.

EXAMPLE 4 In a car, the “Close windows” switches still work for 20 s after ignition has been turned off.

**5.7.2.5** The interactive system should create a positive first impression for its users.

NOTE A user's first experience with an interactive system can have a significant impact on user engagement.

EXAMPLE 1 A requirements management system offers the user an initial set of known requirements for common application cases that can be easily used or modified.

EXAMPLE 2 An e-book lending app allows non-members to browse available books in order to help them to choose to subscribe to it.

**5.7.2.6** The interactive system should be attractive to the user population, without reducing effectiveness or efficiency.

EXAMPLE 1 The website of an online magazine uses a combination of meaningfully presented content and aesthetic presentation to serve the needs of its users.

EXAMPLE 2 A hearing aid comes in a box that is attractive and easy to open for elderly people due to appropriate affordances. Once opened, the contents are neatly and clearly placed with labels showing the purpose of each component.

NOTE Simplicity can lead to draw-in and attraction.

EXAMPLE 3 The website of a charity only shows a large picture of the charity in action together with the name of the charity, a "Donate" button, a "Sign-up for mailings" button and a "Learn more" link.

**5.7.2.7** The interactive system should not place unreasonable demands on the user.

EXAMPLE 1 A patient information entry system does not expect patients to know the exact dates of when they first experienced various medical conditions, especially conditions that occurred far in their past.

EXAMPLE 2 A user survey does not make excessive demands on the user to provide identifying information. Only fields that are essential for ensuring that the user is qualified to answer the survey are required fields.

### **5.7.3 Recommendations related to trustworthiness of the system**

**5.7.3.1** The interactive system should build trust in its use.

NOTE 1 Users trust using a system when they understand and accept the benefits and risks involved in using it.

EXAMPLE 1 An e-commerce site run as a family business shares the story of its founding and introduces the main people in its organization to show a human side to the business.

EXAMPLE 2 A financial website prominently displays the security certification logo of a well-recognized auditing firm, which provides access to a list of the organizations it certifies.

NOTE 2 Some methods of building trust include:

- a) predictability – where consistent design and clear feedback helps the user to understand what will happen next (see also 5.3);
- b) high-quality appearance – where an aesthetic graphic design conveys a professional and reliable image to the user. This also supported by an appropriate language and tone of the user interface messages;
- c) real-world feel – where user trust is fostered by providing information about and contact opportunities to the people and organizations behind the software or website.

EXAMPLE 3 In a web shop, reviews by one customer are displayed along with the number of reviews by that customer, to assure other customers that reviews were not all written by staff.

**5.7.3.2** The interactive system should give the user a realistic level of confidence that its use is free from harm.

NOTE Being free from harm includes not resulting in any health and safety harm, financial harm, privacy harm, or environmental harm.

EXAMPLE 1 A website makes its privacy policy available to the user in clear language via a link available from its home page.

EXAMPLE 2 A banking machine warns the user when input or data can be visible to others near to the user.

## 5.7.4 Recommendations related to increasing user involvement with the system

**5.7.4.1** The interactive system should provide functionality for the users to help each other.

NOTE It is important to protect users of such functionality from incorrect advice and malicious content (e.g. by explicit moderation).

EXAMPLE 1 The support website of a notebook manufacturer allows users of a specific notebook model to offer help to other users for specific problems that they have experienced too and manage to solve.

EXAMPLE 2 A business application provides a forum to ask colleagues for help and to share successful solutions.

**5.7.4.2** The interactive system should provide the user with the opportunity to provide suggestions about changes and additions to the system that would improve its use.

NOTE See also [5.7.4.3](#).

EXAMPLE 1 An application has a function that explicitly invites and makes it easy for the user to suggest changes/additions to the offered functions and informs the user about the status of their proposed changes/additions.

EXAMPLE 2 A website provides a specific e-mail address to provide feedback about accessibility issues encountered by its users.

**5.7.4.3** The interactive system should provide feedback on development decisions made based on user suggestions.

EXAMPLE 1 Suggested improvements by a user are reported back to the user upon their implementation.

EXAMPLE 2 The user receives an e-mail explaining why the suggested improvements were not implemented, which the manufacturer has decided not to implement.

## Annex A (informative)

### Checklist to aid in applying the recommendations in this document

[Table A.1](#) provides an example of a checklist in that can be used to determine whether the recommendations in this document have been met. It can also be modified to suit the needs of its users. Use of this table is not a substitute for understanding and using the entire document.

Permission is granted for organizations to make copies of this checklist for use with document in determining whether the recommendations in it have been met.

[Table A.1](#) contain all recommendations from this document, presented in sequence.

NOTE 1 For ease of use, the full wording of the principles and the recommendations has been summarized in [Table A.1](#). These summary wordings are not intended to replace the full wording of the principle or recommendation in the body of this document. The user is referred to the subclauses in this document for the full wording. Summaries are used in this table to support quick recognition when using this checklist.

Each table contains the following columns:

- a) column with pre-entered information based on this document:
  - 1) identification information (pre-filled);
    - a) entries for the principles are identified with:
      - 1) their subclause number (from the main body of this document); and
      - 2) the name of the principle;
- NOTE 2 The entire row containing a principle is shaded to indicate that principles are not directly complied with.
- b) entries for recommendation are identified in the table with:
  - 1) their subclause number (from the main body of this document); and
  - 2) an abbreviated summary of the recommendation;
- b) columns intended to be filled out for the organization/system being reported on:
  - 1) whether or not a recommendation is considered applicable (all principles are considered as applicable);
  - 2) if the recommendation is considered not applicable, a reason why it is not applicable;
  - 3) a statement of whether or not an applicable recommendation has been applied;
  - 4) an explanation of what was done regarding the application or non-application of an applicable recommendation:
    - a) if applied with, then a brief statement in the comments column as to how the recommendation has been applied;
    - b) if not applied, then a justification in the comments column for why the recommendation has not been applied.

NOTE 3 If a formal conformity assessment is required, a formal “conformity assessment scheme” can be applied. The formal scheme provides a) legal defensibility, b) evidence of contractual compliance, c) consistency of application and comparability of results across assessors and organizations. Conformity assessment schemes are implemented at an international, regional, national and sub-national level. ISO/IEC 17000 provides further information on conformity assessment schemes that can be used with this table.

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Table A.1 — Table for assisting in applying this document

Subclause	Principle/Recommendation	Applicability		What was done	
		Yes/No	Reason, if not applicable	Yes/No	Comments
<a href="#">5.1.1.1</a>	<b>Suitability for the user's tasks</b>	Yes			
<a href="#">5.1.1.2</a>	Recommendations related to identifying suitability of the interactive system for a given task				
<a href="#">5.1.1.2</a>	Provide sufficient information to enable the users to determine whether the system is appropriate for their intended outcomes				
<a href="#">5.1.1.3</a>	Recommendations related to optimizing effort in task accomplishment				
<a href="#">5.1.3.1</a>	Provide the user with the controls and task-related information needed for each step of the task				
<a href="#">5.1.3.2</a>	Avoid imposing steps on the user that are derived from the technology rather than from the needs of the task itself				
<a href="#">5.1.3.3</a>	Avoid offering functionality to the user and presenting information that interferes with completing current tasks				
<a href="#">5.1.4</a>	Recommendations related to default choices supporting the tasks				
<a href="#">5.1.4.1</a>	Offer defaults, where appropriate				
<a href="#">5.1.4.2</a>	Avoid defaults, where they can mislead the user				
<a href="#">5.2.1</a>	<b>Self-descriptiveness</b>	Yes			
<a href="#">5.2.2</a>	Recommendations related to presence and obviousness of the information				
<a href="#">5.2.2.1</a>	Provide information that guides the user and minimizes the need for consulting online help, user manuals or other external information				
<a href="#">5.2.2.2</a>	Clearly indicate where the user is in its navigation structure, what actions can be taken by the user at this time and how they can be performed				
<a href="#">5.2.2.3</a>	Enable users to locate the controls needed to complete the task				
<a href="#">5.2.2.4</a>	Present information in a way that clearly indicates which user interface elements are interactive and which user interface elements are non-interactive				
<a href="#">5.2.2.5</a>	Present information in a vocabulary that is familiar to the user				
<a href="#">5.2.3</a>	Recommendations related to clear indication of processing status				
<a href="#">5.2.3.1</a>	Indicate the progress in the completion of the task				