
**Ergonomics of human-system
interaction —**

Part 129:

Guidance on software individualization

Ergonomie de l'interaction homme-système —

Partie 129: Lignes directrices relatives à l'individualisation des logiciels
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Foreword

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

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

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

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

ISO 9241-129 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

ISO 9241 consists of the following parts, under the general title *Ergonomic requirements for office work with visual display terminals (VDTs)*: **(standards.iteh.ai)**

- *Part 1: General introduction* [ISO 9241-129:2010](https://standards.iteh.ai/catalog/standards/sist/788b5c3a-1552-413d-83ff-1da3ed794ace/iso-9241-129-2010)
- *Part 2: Guidance on task requirements* <https://standards.iteh.ai/catalog/standards/sist/788b5c3a-1552-413d-83ff-1da3ed794ace/iso-9241-129-2010>
- *Part 4: Keyboard requirements*
- *Part 5: Workstation layout and postural requirements*
- *Part 6: Guidance on the work environment*
- *Part 9: Requirements for non-keyboard input devices*
- *Part 11: Guidance on usability*
- *Part 12: Presentation of information*
- *Part 13: User guidance*
- *Part 14: Menu dialogues*
- *Part 15: Command dialogues*
- *Part 16: Direct manipulation dialogues*
- *Part 17: Form filling dialogues*

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ISO 9241 also consists of the following parts, under the general title *Ergonomics of human-system interaction*:

- *Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services*
- *Part 100: Introduction to standards related to software ergonomics* [Technical Report]
- *Part 110: Dialogue principles*
- *Part 129: Guidance on software individualization*
- *Part 151: Guidance on World Wide Web user interfaces*
- *Part 171: Guidance on software accessibility*
- *Part 210: Human-centred design for interactive systems*
- *Part 300: Introduction to electronic visual display requirements*
- *Part 302: Terminology for electronic visual displays*
- *Part 303: Requirements for electronic visual displays*
- *Part 304: User performance test methods for electronic visual displays*
- *Part 305: Optical laboratory test methods for electronic visual displays*
- *Part 306: Field assessment methods for electronic visual displays*
- *Part 307: Analysis and compliance test methods for electronic visual displays*
- *Part 308: Surface-conduction electron-emitter displays (SED)* [Technical Report]
- *Part 309: Organic light-emitting diode (OLED) displays* [Technical Report]
- *Part 310: Visibility, aesthetics and ergonomics of pixel defects* [Technical Report]
- *Part 400: Principles and requirements for physical input devices*
- *Part 410: Design criteria for physical input devices*
- *Part 420: Selection of physical input devices*
- *Part 910: Framework for tactile and haptic interaction*
- *Part 920: Guidance on tactile and haptic interactions*

The following parts are under preparation:

- *Part 143: Form-based dialogues*
- *Part 154: Design guidance for interactive voice response (IVR) applications*

Requirements, analysis and compliance test methods for the reduction of photosensitive seizures and evaluation methods for the design of physical input devices are to form the subjects of future parts 391 and 411.

Introduction

Individualization is used in a wide variety of ways to enhance applications both for users and for branding of the applications themselves. The wide variety of different implementations includes many instances where individualization creates considerable challenges for the users that it ought to be helping. This becomes an even greater challenge when users have to deal with different individualization approaches in each of the several applications that they use.

The purpose of this part of ISO 9241 is to provide guidance on the application of software individualization in order to achieve as high a level of usability as possible. Thus it addresses individualization as the modification of interaction and presentation of information to suit individual capabilities and needs of users. Individualization enables support of a wide range of users, tasks, and contexts of use. It is particularly useful in increasing accessibility (which is discussed in ISO 9241-171).

On the one hand, ISO 9241-110 provides general guidance on individualization, identifying it as one of the seven dialogue principles that are important for the design and evaluation of interactive systems. On the other hand, this part of ISO 9241 provides considerably more detail on the ergonomic use of individualization.

This part of ISO 9241 addresses both user-initiated and system-initiated individualization. It encompasses the concepts of configuration, customization, adaptivity, adaptation, profiling, and internationalization.

It serves the following types of users:

- designers of user-interface development tools and style guides to be used by interface designers;
- user-interface designers, who will apply the guidance during the development process;
- developers, who will apply the guidance during the design and implementation of system functionality;
- system administrators responsible for implementing solutions to meet end-user needs;
- buyers, who will reference this part of ISO 9241 during product procurement;
- evaluators, who are responsible for ensuring that products are in accordance with this part of ISO 9241.

The ultimate beneficiary of this part of ISO 9241 will be the end-user of the software. Although it is unlikely that end-users will read this part of ISO 9241, its application by designers, developers, buyers and evaluators ought to provide user interfaces that are more usable through the use of individualization. This part of ISO 9241 concerns the development of software for user interfaces. However, those involved in designing the hardware aspects of user interfaces may also find it useful when considering the interactions between software and hardware aspects.

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Ergonomics of human-system interaction —

Part 129: Guidance on software individualization

1 Scope

This part of ISO 9241 provides ergonomics guidance on individualization within interactive systems, including recommendations on

- where individualization might be appropriate or inappropriate, and
- how to apply individualization.

It focuses on individualization of the software user interface to support the needs of users as individuals or as members of a defined group.

It does not recommend specific implementations of individualization mechanisms. It provides guidance on how the various aspects of individualization are made usable and accessible, but does not specify which individualizations are to be included within a system.

NOTE Individualizations depend on the specific context of use for which an interactive system is to be designed and/or used, and need to be developed for that specific context of use.

This part of ISO 9241 is not intended to be used in isolation. It deals only with individualization within the context of designing a complete software system. It is intended to be used with ISO 9241-110 and any other parts in the ISO 9241 series applicable to the design of the intended system.

Some of its guidance can also be applied to hardware user interfaces and user interfaces that combine software and hardware.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9241-171, *Ergonomics of human-system interaction — Part 171: Guidance on software accessibility*

ISO/IEC 24786, *Information technology — User interfaces — Accessible user interface for accessibility settings*

3 Terms and definitions

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

3.1 accessibility

(interactive systems) usability of a product, service, environment or facility by people within the widest range of capabilities

NOTE 1 The concept of accessibility addresses the full range of user capabilities and is not limited to users who are formally recognized as having a disability.

NOTE 2 The usability-oriented concept of accessibility aims to achieve levels of effectiveness, efficiency and satisfaction that are as high as possible considering the specified context of use, while paying attention to the full range of capabilities within the user population.

[ISO 9241-20:2008, 3.1]

3.2 context of use

users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used

[ISO 9241-11:1998, 3.5]

3.3 individualization

modification of interaction and presentation of information to suit individual capabilities and needs of users

[ISO 9241-171:2008, 3.17]

3.4 preconfiguration

configuration of software prior to first use of the software

3.5 predefined user profile

profile based on a stereotype or combination of stereotypes

NOTE 1 Stereotypes used as the basis of a predefined user profile could include a role, a job function or a group membership.

NOTE 2 Predefined user profiles are often used to define access privileges to specific web content.

[ISO 9241-151:2008, 3.20]

3.6 profile user profile

set of attributes used by the system that are unique to a specific user/user group

[ISO 9241-151:2008, 3.19]

3.7 reconfiguration

changing the configuration of software that has already been configured

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3.8**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

[ISO 9241-210:2010, 2.13]

3.9**user interface**

all components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system

[ISO 9241-110:2006, 3.9]

3.10**user interface element**

user interface object

entity of the user interface that is presented to the user by the software

EXAMPLE Text, graphic, control.

NOTE 1 User-interface elements can be interactive or not.

NOTE 2 Both entities relevant to the task and entities of the user interface are regarded as user-interface elements. A user-interface element can be a visual representation or an interaction mechanism for a task object (such as a letter, sales order, electronic part or wiring diagram) or a system object (such as a printer, hard disk or network connection). It can be possible for the user to directly manipulate some of these user-interface elements.

NOTE 3 User-interface elements in a graphical user interface include such things as basic objects (such as window title bars, menu items, push buttons, image maps, and editable text fields) or containers (such as windows, grouping boxes, menu bars, menus, groups of mutually-exclusive option buttons, and compound images that are made up of several smaller images). User-interface elements in an audio user interface include such things as menus, menu items, messages, and action prompts.

[ISO 9241-171:2008, 3.38]

4 Conformance

If it is claimed that a system or service has met the provisions of this part of ISO 9241, then the procedures used to establish user requirements, to develop individualization capabilities and to evaluate the individualizations shall be specified. The level of detail of the specification is a matter of negotiation between the involved parties. Annex C provides assistance in documenting conformance.

5 Framework for applying this part of ISO 9241

The following clauses range from general high-level guidance (applicable to all uses of individualization) to specialized detailed guidance (applicable to specific instances of individualization).

Clauses 6 and 7 provide general guidance related to the use and goals of individualization. They provide information that applies throughout the development of a system.

Clauses 8, 9, and 10 provide guidance related to choice of individualization mechanisms, individualization of configurations and support of individual users.

Clauses 11, 12, and 13 provide guidance related to particular interfaces, components, and actions that might be involved in specific cases of individualization.

Figure 1 shows the framework in which this part of ISO 9241 can be applied to assist in the analysis, design and evaluation of interactive systems. The arrows illustrate the flow of information between various elements in the figure.

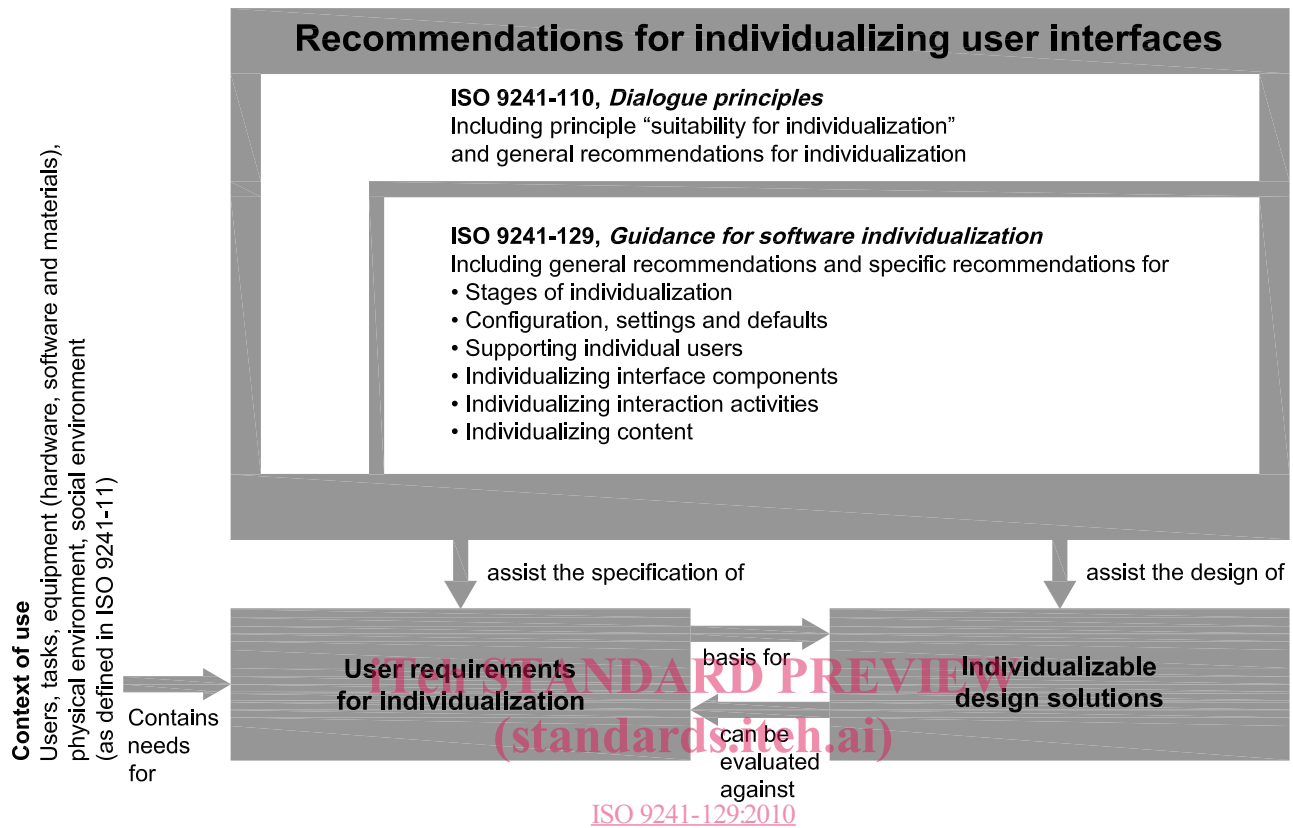


Figure 1 – Framework for the application of this part of ISO 9241

6 Introduction to individualization

6.1 The role of individualization

Individualization involves modifying the behaviour of the interactive system and the presentation of its user interface elements, prior to use or while it is in use, to better meet characteristics of its context of use for an individual or a group of users.

The capability to individualize should be built into an application in response to the identification of user requirements, i.e. different users can have different needs and/or individual users can have different needs at different times.

Individualization refers to modifications that are achievable without reprogramming the application, because individualization capabilities have already been built into the application.

NOTE More details on factors to consider when designing individualization can be found in Annex B.

6.2 When to provide the capability for individualization

Individualization capabilities may be provided to accommodate one or more of the following, when a single design solution is not sufficiently usable.

a) Variation in user characteristics

- 1) Differences in user characteristics (capabilities and preferences) that will increase accessibility
 - i) within a user group, or
 - ii) between user groups

EXAMPLE 1 A user group includes people with limited vision. Individualization can provide these users with bigger fonts.

- 2) Temporary or permanent changes in user characteristics (resulting from learning, illness, etc.)

EXAMPLE 2 A user of media player software is losing her hearing capabilities. Individualization can provide her with an option for activating captioning of videos.

b) Different user needs and goals

- 1) Enhancing user understanding
- 2) Meeting needs of infrequent, intermittent, or discretionary users

EXAMPLE 3 Individualization can provide additional description of the task to be performed by the user.

- 3) Meeting the needs of users who are least adaptable to new ways of working

c) Variation in task characteristics

- 1) Characteristics of different tasks (complexity, difficulty, frequency, information content, time constraints, etc.)
- 2) Temporary or permanent changes in task characteristics (involving internationalization, accommodating different jurisdictions, etc.)

d) Different equipment used by a single user

EXAMPLE 4 A web application reconfigures its interface layout and structure based on recognition of the capabilities of the current device (e.g. desktop computer vs. mobile phone vs. kiosk) currently used by a user. Individualization can provide additional description of the task to be performed by the user.

e) Different environments experienced by a single user

EXAMPLE 5 A user is able to change the colour scheme on a mobile device to a high contrast scheme when going from a dark environment (e.g. indoors) to a brighter environment (e.g. outdoors).

NOTE The existence of variability in these factors is not usually sufficient to justify providing individualization without objective data that suggest that individualization will result in the improvement of usability.

6.3 Limitations on the provision of individualization

Providing individualization capabilities may not be appropriate under the following circumstances.

- a) Where used as a substitute for ergonomically designed dialogues.

EXAMPLE 1 Initial system-provided defaults are used to avoid requiring the user to configure a system before it can be used.

- b) Where performance might be degraded or human error might occur in safety-critical and mission-critical systems.

EXAMPLE 2 In a power plant, individual modifications to the control room interface could lead to a delay in responding to critical information.

- c) Where procedures are streamlined for organizational or customer considerations.

EXAMPLE 3 In call centres, individualization could lead to unacceptable increases in processing times.

NOTE 1 If individualization provides access to a system that was previously inaccessible to a person with disabilities, then individualization is appropriate even if the process takes longer.

- d) Where individualization would be likely to lead to usability or accessibility problems for the intended users.

NOTE 2 Even where individualization is provided, it is important to limit the extent of individualization choices to avoid foreseeable usability problems.

EXAMPLE 4 Changing text font colour such that it is so similar to the background colour as to make the text unreadable.

EXAMPLE 5 The volume level of user-configured auditory feedback is limited to avoid disturbing other users in the same work space.

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6.4 Initiation of individualization

Individualization may be initiated by

- a) an individual user, someone assisting the user, or a system administrator (human-initiated modification), or
b) the system itself, in response to user interactions or changes of context (system-initiated modification).

NOTE Individualization capabilities are seldom included in an application to support a particular user. Rather, individualization capabilities are usually provided to meet different attributes and needs within a population of users.

7 General guidance on individualization

7.1 Accessibility

A system which provides capability for individualization shall be in accordance with ISO 9241-171 and ISO/IEC 24786.

NOTE 1 A user might require accessibility features in order to be able to perform individualization-related actions.

NOTE 2 It is important that the system, after any individualization, maintain accessibility for the current user.

NOTE 3 ISO 9241-20 provides high level guidance that can be helpful in achieving accessible individualizations.

7.2 Controllability

7.2.1 Maintaining user control after individualization

The user should remain in control of the interaction after individualization has occurred.

7.2.2 User activation or deactivation of individualization

Users should be provided with mechanisms to activate and deactivate individualization features:

- a) for the whole of the user interface or parts of the user interface;
- b) before interactions commence or after a specific individualized state has been reached.

7.2.3 Limitation of use of individualization features

Where the use of an individualization feature might result in usability problems for the current user, the system should notify the user of the potential problem(s) and allow the user to accept or reject the individualization, or to select between various possibilities that could result from the individualization.

EXAMPLE 1 Where an individualization feature could change both the foreground and background colour to the same value, the user is warned that the result will be unreadable and is asked whether or not to allow this change.

EXAMPLE 2 The current user is known to be colour blind and the system has an individualization feature that can change both the foreground and background colours. If the selected combination is considered to be unreadable to the user (such as red against green), then the user is warned that the result will be unreadable and is asked whether or not to allow this change.

7.2.4 Reversibility

Users should be given the ability to “undo” the individualization.

EXAMPLE 1 If a user changes the colour scheme to a set of individual colours, the original colour scheme can be reset.

EXAMPLE 2 If a user dismisses a warning message (“don’t show this message again”), the message can be recalled.

EXAMPLE 3 Where a user-selected template results in unsuitable automatic formatting results, the user is able to reverse the automatic formatting.

7.2.5 Privacy

The user's permission should be obtained before personal context information and/or individualization settings are shared with other applications or users.

NOTE Permissions can be stored with context information so that they do not need to be obtained each time they are used.

7.2.6 Safety and security

The system should not allow users to turn off or set inappropriate values for safety-critical or security-critical functions.

NOTE This includes both situations affecting a single user and situations affecting multiple users.

EXAMPLE 1 The system does not allow individualizations that would affect the full synchronization of information that is shared between users in critical applications (e.g. air traffic control).

EXAMPLE 2 The system does not allow the user to turn off features that prevent hacking.