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Ergonomics of human-system interaction —

Part 143:
Forms

Ergonomie de l'interaction homme-système —
Partie 143: Formulaires

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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 9241-143 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction.*

This first edition of ISO 9241-143 cancels and replaces ISO 9241-17:1998, of which it constitutes a technical revision.

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

— *Part 1: General introduction*

— *Part 2: Guidance on task requirements*

— *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*

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 143: Forms*

⎯ *Part 151: Guidance on World Wide Web user interfaces*

⎯ *Part 154: Interactive voice response (IVR) applications*

⎯ *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 331: Optical characteristics of autostereoscopic displays* [Technical Report]

⎯ *Part 391: Requirements, analysis and compliance test methods for the reduction of photosensitive seizures*

⎯ *Part 400: Principles and requirements for physical input devices*

⎯ *Part 410: Design criteria for physical input devices*

⎯ *Part 411: Evaluation methods for the design of physical input devices* [Technical Specification]

⎯ *Part 420: Selection of physical input devices*

⎯ *Part 910: Framework for tactile and haptic interaction*

⎯ *Part 920: Guidance on tactile and haptic interactions*

User-interface elements, human-centred design and evaluation methods, ergonomic requirements for the reduction of visual fatigue from stereoscopic images, and the evaluation of tactile and haptic interactions are to form the subjects of future parts 161, 230, 392 and 940.

Introduction

This part of ISO 9241 is concerned with the ergonomic design of forms.

Forms, including dialogue boxes, are appropriate for data entry tasks requiring input or modification of multiple data items. Forms are used in various circumstances, including

— filling forms, such as income tax forms, registration (school, motor vehicle), and service order completion,

— entering information received over the telephone,

— interactively populating data in an application, such as database updates, consumer profiles and e-commerce transactions,

— specifying the application options and parameters (complex data retrieval requests, personalisation, system configurations settings), and

— responding to a mediate request for system information (e.g. using a dialogue box).

Forms can vary in content and complexity from a simple field to complex data entry that involves multiple data records. Forms are often based on a visual spatial metaphor but can be implemented in other modalities (e.g. voice user interfaces over the telephone).

Form users fill-in, select entries for, modify fields and/or use, the form to retrieve information from the system.

This part of ISO 9241 is aimed at

a) user-interface designers, who will apply it during the development process,

b) the designers of printed forms which serve as source documents,

c) buyers, who will reference it during the product procurement process,

d) evaluators responsible for ensuring products meeting its requirements and recommendations,

e) the designers of development tools to be used by interface designers, and

f) end users, who will gain from the potential benefits it provides.

This part of ISO 9241 provides requirements and recommendations concerning forms. Some of these are conditional with respect to whether they are relevant in terms of context of use variables such as particular kinds of users, tasks, environments or technology.

Designers using this part of ISO 9241 ought to be able to determine whether they are developing an interface that will meet those of the standard's requirements and recommendations that are applicable. Likewise, buyers and evaluators ought to have a means of determining how a product matches the applicable requirements and recommendations. It is not intended that every requirement and recommendation given in this part of ISO 9241 be applied, only those that are relevant. Annex B provides an example of a procedure for evaluating the applicability of, and conformance with, the requirements and recommendations.

The application of this part of ISO 9241 is expected to improve the overall quality of the form, but this International Standard (like any other standard) will not guarantee the quality of the interface. Quality depends on specific usability criteria as set by the user, buyer or other form consumer, which may include specifications based on this part of ISO 9241.

ISO 9241-110 describes dialogue principles that are relevant for the design of forms. The principles provide the designer and evaluator with additional information concerning the ergonomic rationale for the various recommendations given in this part of ISO 9241 and, therefore, assist in making trade-offs. However, it is often necessary to base trade-offs on other considerations as well.

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Ergonomics of human-system interaction —

Part 143:
Forms

1 Scope

This part of ISO 9241 provides requirements and recommendations for the design and evaluation of forms — in which the user fills-in, selects entries for, or modifies labelled fields on, a "form" or dialogue box presented by the system. Often the system then creates or updates the data associated with the form. Form-based entries typically are in the form of typed input (abbreviations, or full names) or selections from available option lists.

This part of ISO 9241 is applicable to forms regardless of the modality in which they are rendered (visual, spatial, vocal). However, much of the guidance is based on a model of visual and spatial relationship.

In addition, this part of ISO 9241 specifies the use of non-text methods for providing forms entries (e.g. list boxes) and pertains to dialogue boxes which utilize form techniques. Guidance is provided on the selection and design of those user-interface elements relevant to forms.

While lists used to enter forms data are covered in this part of ISO 9241, menus which are similar to lists are outside its scope but are covered in ISO 9241-14. Neither is this part of ISO 9241 applicable to the hardware aspects of forms.

NOTE   Some of the requirements and recommendations in this part of ISO 9241 are based on Western Language conventions. For other languages, particular requirements or recommendations might need to be modified to fit the readability and/or text input considerations inherent in these languages.

The requirements and recommendations in this part of ISO 9241 are applicable throughout the development process — for example, as guidance for designers during design, as a basis for heuristic evaluation, as guidance for usability testing — and in the procurement process.

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 9241-12:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 12: Presentation of information*

ISO 9241-16, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 16: Direct manipulation dialogues*

ISO 9241-171:2008, *Ergonomics of human-system interaction — Part 171: Guidance on software accessibility*

3 Terms and definitions

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

3.1
analogue form element
user-interface element that allows the user to select a value within a continuous range

EXAMPLE   Rotary dials, slider.

3.2
check box
check button
user-interface element used to select an option that can be either {"on" or "off"} or {"yes" or "no"} with a label (usually text) that indicates what the option is and an indicator (e.g. graphic checkmark within the individual check box) that indicates whether or not the option is selected

NOTE 1   Check boxes in a group are independent, i.e. selecting one option does not affect the selection of other options in that check box group. In a group of check boxes, one or many of them can be checked at the same time.

NOTE 2   Contrast with **radio button** (3.20).

3.3
combination box
combo box
user-interface element that combines a text field with a list box and allows the user to type input into a text field or to select an option from a list box, which will fill in the text field

NOTE 1   A combination box typically has a label (textual or graphical) that indicates the purpose of the combination box.

NOTE 2   Contrast with **list box** (3.15).

3.4
default action
operation predefined for an object or set of objects (including an entire dialogue box) that will take place when the user actuates the default action mechanism

3.5
dialogue box
subordinate form (typically presented in a separate window) that supplements and/or supports the interaction that is taking place in the main application dialogue

NOTE   If a message requires user input it could be considered a dialogue box.

3.6
dialogue
interaction between a user and an interactive system as a sequence of user actions (inputs) and system responses (outputs) in order to achieve a goal

NOTE 1   User actions include not only entry of data but also navigational actions of the user.

NOTE 2   Dialogue refers to both the form (syntax) and the meaning (semantics) of interaction.

[ISO 9241-110:2006]

3.7
entry field
input field
field in which users can input data or edit displayed data

NOTE 1   Entry fields can be optional or mandatory (required) fields for the user.

NOTE 2   Content can be prepopulated with a default value relevant to the task.

NOTE 3   Data in entry fields could be numerical, textual, alphanumerical, etc.; see also **text field** (3.29) and ISO 9241-12:1998, 3.5.

[ISO 9241-12:1998, 3.5.1]

3.8
field
user-interface element in which data is entered or presented

NOTE   Adapted from ISO 9241-12:1998.

3.9
form
structured display of fields and other user-interface elements that the user reads, fills in, selects entries for (e.g. through check boxes or radio buttons) or modifies

3.10
form element
user-interface element applicable to forms

3.11
form structure
organization and arrangement of information on individual and sets of forms, and the interconnections among forms for user navigation

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3.12
hierarchical list
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series of lists which are structured in a hierarchical or "tree-like" manner, where the selection of the initial item leads to another list containing additional items which can lead to another list, etc., until the desired item is located

3.13
implicit designator
portion of an option name or control label used for keyboard selection

[ISO 9241-171:2008, 3.16]

3.14
label
short descriptive title for an entry or read-only field, table, control or other user-interface element

NOTE 1   In some applications, labels are classified as protected fields.

NOTE 2   Adapted from ISO 9241-12:1998, 3.9.

3.15
list box
user-interface element that provides a presentation (usually vertical) of items from which the user can select only one (single selection) or more than one (multiple selection)

NOTE 1   The items in the list can be represented by a text and/or graphic label.

NOTE 2   One particular instance is the drop-down list box. When a drop-down list is inactive, it displays a single value. When activated, it displays (drops down) a list of values, from which the user can select one. When the user selects a new value, the user-interface element reverts to its inactive state, displaying the selected value.

3.16
list button
user-interface element used to access a list whereby when the button is activated, a pop-up list of items is displayed

NOTE   The list button contains the name of the currently selected list item and has a graphic (usually a bar) indicating that additional selections are available.

3.17
name
word or phrase associated with a user-interface element and that is used to identify the element to the user

[ISO 9241-171:2008]

3.18
navigation
⟨forms⟩ ability to move from one user-interface element to another within a form, to move throughout a form and to move from form to form

3.19
push button
command button
user-interface element used for executing an immediate command or action

NOTE   A push button typically contains a label, which can be textual and/or graphical.

3.20
radio button
user-interface element used to select an option from a group of mutually exclusive options, which has a (usually text) label that indicates what the option is and an indicator (e.g. graphic dot) that indicates whether or not the option is set

NOTE 1   Radio buttons exist in groups used for a "one of many" choice, where exactly one option in the group can be selected at any time, and selecting one results in the de-selection of any different previously selected option.

NOTE 2   Contrast with **check box** (3.2).

3.21
read only field
protected field
field that contains data that cannot be modified by the user

NOTE   Adapted from 9241-12:1998, 3.5.2.

3.22
scroll bar
user-interface element that allows a user to view objects that extend beyond the size of a displayed related window or list by moving them into or out of the available display area

NOTE 1   A scroll bar for an area indicates whether or not additional information is available and can also indicate the relative position of the displayed part of the information.

NOTE 2   Adapted from 9241-16:1999, 3.19.

3.23
scroll box
elevator
thumb
user-interface element in the shape of a rectangle within a scroll bar that allows the user to move to a specific region of a displayed file by dragging the rectangle to the appropriate location within the scrollbar (shaft)

NOTE   The length of the scroll box typically denotes the relative amount of material in the file (e.g. form).

3.24
selection cursor
indicator of an item whose selection state can be changed by a defined confirming action

3.25
selection indication
visual or other cue that indicates the selected element on the display, to which the user can apply a subsequent action

[ISO 9241-16:1999, 3.21]

3.26
selection list
choice list
user-interface elements presented as a list containing a number of items from which a user can select

NOTE 1   Single selection or multiple selection can be possible. The number of items can be fixed or can change during the dialogue.

NOTE 2   Selection lists are often presented in a box, i.e. list box 3.15.

3.27
stepper
user-interface element that allows the user to move through the available alternatives, options or values, one at a time

NOTE 1   A stepper typically has an area that displays the current value and one or two graphical elements that allow the user to move through the options.

NOTE 2   Steppers can be combined with data entry fields.

NOTE 3   There are various types of stepper elements including spin buttons, cycle buttons, little arrows and sliders.

3.28
tab set
user-interface element that uses a metaphor of a set of index cards with tabs to identify them

NOTE   Each tab in a tab set has an associated set of displayed information and/or controls. Selection of a different tab within the tab set allows users to move among the various sets of information and options.

3.29
text field
user-interface element that allows the user to enter character based data

NOTE   A label can be used to indicate the type of information to be provided in the field.

3.30
toggle button
user-interface element that provides a choice between two states

NOTE   A toggle button's two states, set and unset, are typically shown by its appearing "pushed in" or "popped out" respectively.

3.31
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   Forms

4.1   Selection

Forms, including dialogue boxes, should be used for structured data entry tasks requiring input or modification of multiple data items.

A major use of forms is in entering information into forms displayed on a computer. Also, forms are often used for data entry into a computer from a paper source document. Examples include income tax forms, registration (school, motor vehicle) and service order completion. Another use of forms is for entering information received over the telephone.

Dialogue boxes are commonly used for specifying application options and parameters. Also, dialogue boxes are often appropriate for certain complex data retrieval requests where the user might find it easier to fill in parameter information than to input the parameters via a command language.

Interface design depends upon the task, the user, the environment and the available technology. Consequently, this part of ISO 9241 cannot be applied without knowledge of the design and use context of the interface and it is not intended to be used as a prescriptive set of rules to be applied in their entirety (see ISO 9241-11 and ISO 9241-210). Rather, it assumes that the designer has proper information available concerning task and user requirements and understands the use of available technology (this may require consultation with a qualified ergonomics professional as well as empirical testing with real users).

4.2   General requirements and recommendations

4.2.1   Form titles

Forms shall be titled unless a title would be redundant (e.g. if it is provided by the surrounding user interface). Any title shall clearly indicate the purpose of the form and differentiate it from other forms.

NOTE 1   In visually displayed forms, titles are usually placed at the top of the form (or page in the case of a web-based application).

NOTE 2   In window-based interfaces, the title of a form can be the window title, if the form is the only content of the window.

NOTE 3   Forms are typically embedded in larger user interfaces, such as applications.

4.2.2   Relationship of form title to application structure

The title should provide the user with a sense of the location of the form within the application structure.

4.2.3 Visual coding

If the task requires, or is enhanced by, discrimination between user entries, defaults and previously entered data, and the form is presented visually, distinctively different visual coding should be used.

Distinctively different visual coding shall not be limited to colour (see ISO 9241-171:2008, 10.4.1).

4.2.4 Appearance of form elements

If elements have different states, the current state of the element shall be clearly indicated by a perceptible cue.

EXAMPLE 1   Inactive elements are dimmed.

EXAMPLE 2   In voice-based interaction, unavailable elements might not be presented but still be responded to by the system to tell the user that the option is inactive.

EXAMPLE 3   A check box has a check or tick in it to show it has been selected.

NOTE   See ISO 9241-171:2008, 8.5.4, on providing information on a state to assistive technology.

4.2.5 Form display density

Unless required by the task or context of use, forms should limit the density of the textual information displayed.

NOTE   For character density within forms, the limit of 40 % overall density, based on a percentage of the total available form space filled, is appropriate (see ISO 9241-12:1998, 5.4.2).

4.2.6 Complexity

Complexity in dialogue boxes and forms should be appropriate for the task. If a dialogue box or form supports basic functionality, as well as advanced, auxiliary or less frequently used functionality, it should use one of the following to reduce the complexity:

a)   an expandable form to present the advanced, auxiliary or less frequently used functionality;

b)   additional forms or dialogue boxes with advanced, auxiliary or less frequently used functions, accessible via controls within the higher level dialogue box or form;

c)   a multiple-page dialogue box, with advanced, auxiliary or less frequently used functions on later pages (e.g. tabbed dialogues, scrollable dialogues).

4.2.7 Restricting use of expanded dialogues

Dialogue box expansions and additional dialogues should be restricted to functions that are needed only by a subset of users or that are not needed for the typical execution of a task.

4.2.8 Instructions

Access to instructions should be provided.

NOTE 1   Instructions are particularly important for helping the user to navigate through, complete, save and transmit the form.

NOTE 2   Instructions are helpful for infrequent users and users unfamiliar with the form.

NOTE 3   A list at the beginning of the form as to the information required to complete the form is particularly useful for blind or elderly users.