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Ergonomics of human-system interaction — Part 100: Overview of ISO 9241 software ergonomic standards

Contents

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).

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).

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

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

This document was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*. in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 122, *Ergonomics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO/TR 9241-100:2010), which has been technically revised.

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

— The overview of the ISO 9241 standards was series updated and completed;

— Text has been text edited and some have been added to;

— New new Figure 1 has been added.

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

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

Introduction

The purpose of this document is to provide concise descriptions of the parts of the ISO 9241 series that provide requirements and recommendations for the ergonomic design of software-based interactive systems. It includes descriptions of all the current parts in the ISO 9241-~~100 series~~1XX family of documents, which are specifically directed at software, together with descriptions of ISO 9242-11, ISO 9241-210 and ISO 9241-220, which address the concept of usability, human-centred design and human-centred design processes, respectively.

It also informs the reader about upcoming ~~standards~~documents that are currently under development.

The adoption of a human-centred approach to the development of products~~,~~ and systems~~,~~ and the application of the requirements and recommendations contained in the ISO 9241-~~100 series~~1XX family of documents helps prevent users 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;

— navigational limitations during use; ~~and~~

— inefficient error recovery.

The ~~standards~~documents contain guidance at the levels of:

— principles~~:~~, e.g. “conformity with user expectations~~”, [”~~ (ISO 9241- 110, 5.3~~]~~);

— general recommendations~~:~~, e.g. “The interactive system should use cultural and linguistic conventions for presentation, input and control that the users are familiar with~~.”, [”~~ (ISO 9241-110, 5.3.3.1~~]~~);

— guidance specific to a thematic subject~~:~~, e.g. ~~“~~“If sounds need to be used in different countries or cultures, or will be presented to individuals speaking different languages, then the sounds should be culturally appropriate~~.”, [”~~ (ISO 9241-126, 6.1.11~~]~~).

NOTE~~:~~ Currently, when people phone someone whose line is in use, they hear a different signal in different countries.

The ~~standards~~documents do not specify “standardized solutions” in terms of conventions, for example, “the title bar of a window in focus is coloured blue” or “the push button ~~“OK”~~'OK' is always placed ~~left~~ to the left of the push button ~~“Cancel”~~.'Cancel'.” Such “industry conventions” or even “industry regulations” are published by industry sources and can be found in literature. However, the guidance relating to presented information in ISO ~~standards~~documents is intended to be applied when establishing or assessing industry conventions for user interfaces of interactive systems.

Ergonomics of human-system interaction — Part 100: Overview of ISO 9241 software ergonomic standards

1 Scope

This document provides an overview of ISO 9241 software ergonomic standards in the form of executive summaries of these standards, in particular the parts in the ISO 9241-~~1xx series~~1XX family of ~~standards~~documents. In addition, it provides executive summaries for ~~parts 9241~~ISO 9242-11, ISO 9241-210 and ISO 9241-220, which have specific relevance to the design of software-based interactive systems.

~~The standards are~~This document is intended for the following types of users:

— managers, who are involved in planning and managing product, system and/or service development projects, who are to be informed on the human-centred design approach and on guidance on software ergonomics;

— developers, who will apply the guidance in these documents during the development process (either directly, based on training, or by using tools and style guides which incorporate the guidance);

— user interface design roles (including interaction designers, information architects, user interface designers, visual designers and content creators), who will apply the guidance in these documents during the creation and design process (either directly, based on training, or by using tools and style guides which incorporate the guidance);

— user researchers, who are responsible ~~to~~for identifying user needs and inform context of use of a product, system or service;

— evaluators, who are responsible for ensuring that products, systems or services meet the recommendations contained in ~~this document;~~ these documents;

— buyers, who will reference ~~this document~~these documents in contracts during product procurement;

— designers of user interface development tools and style guides to be used by user interface designers and developers.

While the ~~standards~~documents are applicable to all types of interactive systems, they do not cover the specifics of every context of use, such as safety critical systems and collaborative work.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Overview of ISO 9241 software ergonomic standards

The ISO 9241 series ~~of standards~~ provides requirements and recommendations that address the ergonomics issues that arise in the design and development of interactive systems. By applying and observing the theory, principles, data and methods of ergonomics presented in the series ~~of standards~~, people's wellbeing is increased~~,~~ and the overall system performance is optimized. Table 1 shows the structure of the ISO 9241 series and the way in which the numbering system is used to group the documents according the aspects of the interactive system that are being addressed. This document focuses on the description of the standards which address software ergonomics issues. The majority of the documents form part of the ~~9242-100 series~~ISO 9241-1XX family of documents and are listed in Figure 1. Executive summaries for all the current 100 series parts are included in this document.

There are three further documents which are particularly relevant to the design of the software aspects of interactive systems, while also applying to the overall design. ISO 9241-11 provides the conceptual framework for addressing usability, while ISO 9241-210 and ISO 9241-220 provide guidance on the design activities within an organization that form the basis of a human-centred approach to designing interactive systems. Executive summaries for these parts are also included in this document. Information on additional guidance beyond the ISO 9241-1XX family of documents is given in Annex A, addressing topics such as accessibility, visual interfaces, audio interfaces and tactile interfaces.

Table 1 — Overview of ISO 9241 software ergonomic standards

Part of ISO 9241	Title	Revised	Pages	Core	Ref
100	~~Introduction to standards related to software ergonomics~~Ergonomics of human-system interaction — Part 100: Overview of ISO 9241 software ergonomic standards	~~2010~~2022	19	13	~~—~~
Hardware and software usability					
11	Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts	2018	29	8	~~p10~~5.1
13	~~Office~~Ergonomic requirements for office work with visual display terminals~~,~~ (VDTs) — Part 13: User guidance	1998	32	13	~~p11~~5.2
14	~~Office~~Ergonomic requirements for office work with visual display terminals~~,~~ (VDTs) — Part 14: Menu dialogues	1997	57	20	~~p12~~5.3
General guidance on software ergonomics					
110	Ergonomics of human-system interaction — Part 110: Interaction principles	2020	43	20	~~p13~~5.4
112	Ergonomics of human-system interaction — Part 112: Principles for the presentation of information	2017	20	12	~~p14~~5.5
Input, output and interaction					

125	Ergonomics of human-system interaction — Part 125: Guidance on visual presentation of information	2017	42	34	~~p15~~5.6
126	Ergonomics of human-system interaction — Part 126: Guidance on the presentation of auditory information	2019	33	19	~~p16~~5.7
129	Ergonomics of human-system interaction — Part 129: Guidance on software individualization	2010	58	19	~~p17~~5.8
Performance support (currently no standards)					
Interaction techniques					
143	~~Forms~~Ergonomics of human-system interaction — Part 143: Forms	2012	95	46	~~p18~~5.9
Topic specific guidance					
154	Ergonomics of human-system interaction — Part 154: Interactive voice response (IVR) applications	2013	35	22	~~p19~~5.10
Interface control components					
161	Ergonomics of human-system interaction — Part 161: Guidance on visual user-interface elements	2016	63	54	~~p20~~5.11
Cross-topic guidance on accessibility					
171	Ergonomics of human-system interaction — Part 171: Guidance on software accessibility	2008	90	39	~~p21~~5.12
Process related guidance for human-centred design					
210	Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems	2019	33	15	~~p22~~5.13
220	Ergonomics of human-system interaction — Part 220: Processes for enabling, executing and assessing human-centred design within organizations	2019	104	42	~~p23~~5.14

~~Key~~

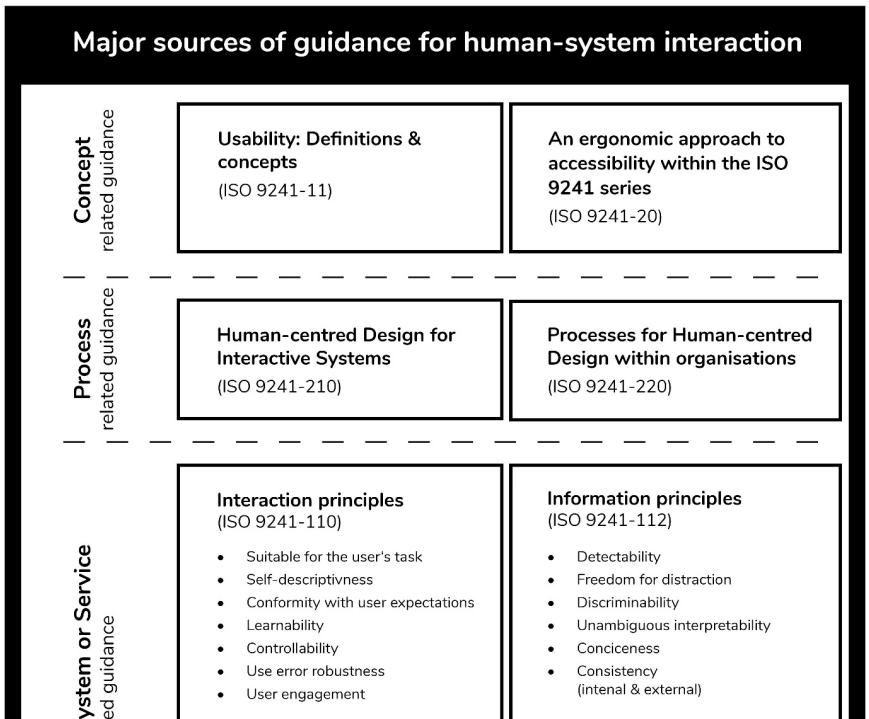
pages number of pages in main body of standard

core number of pages that comprise the core of the standard

ref. subclause where more detailed information is provided in this document

~~Pages = Number of pages in main body of standard;~~
~~Core = Number of pages that comprise the core of the standard;~~
~~Ref = Page where more detailed information is provided in this document;~~

~~Table 1 — Overview of ISO 9241 software ergonomic standards~~



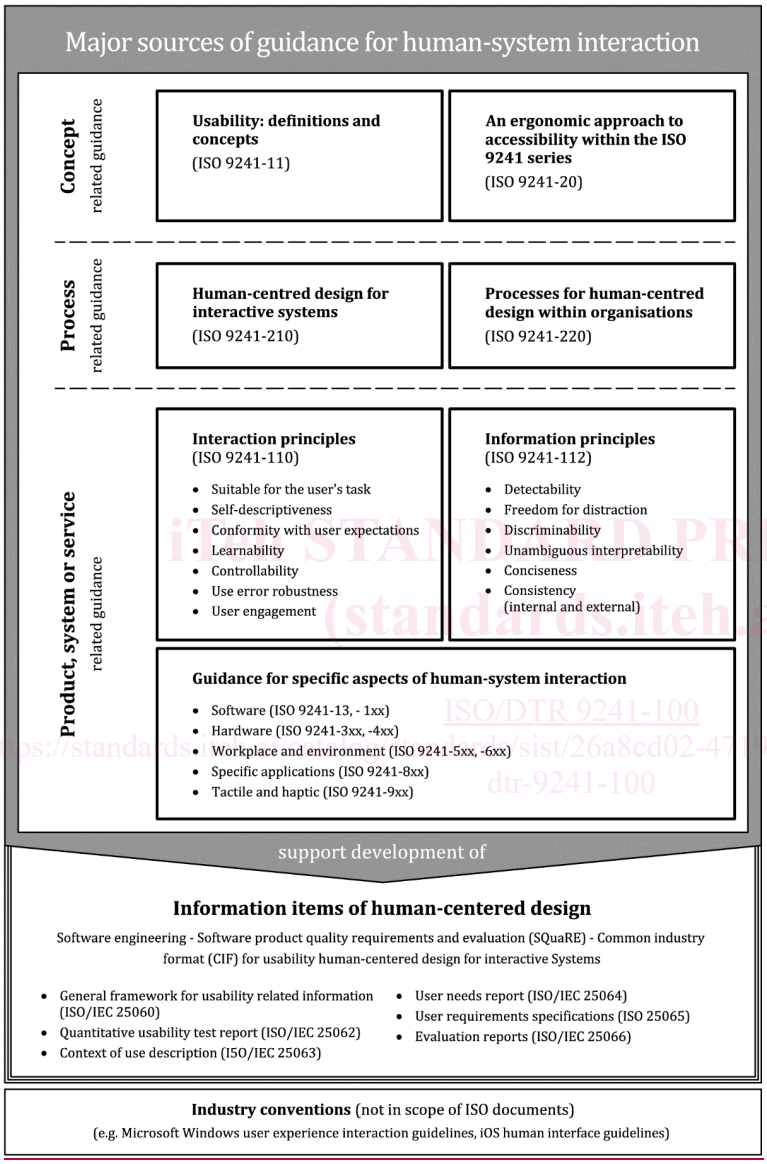


Figure 1 — The relationship between major sources of guidance for human-system interaction

5 Executive summaries of ISO software ergonomic standards

5.1 ISO 9241-11:2018

Title	~~9241-~~Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts
Abstract	This standard provides a framework for understanding the concept of usability and applying it to situations where people use interactive systems, ~~and~~ other types of systems (including built environments), ~~and~~ products (including industrial and consumer products~~),~~) and services (including technical and personal services). The standard explains usability and its key components: effectiveness, efficiency and satisfaction with definitions and examples. It also explains the context of use and its key components: users, goals, tasks, resources and environments with definitions and examples.
Sample 1 ~~Sample 1~~ Sample 2	5.1 Concept of 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. ~~5.1 Concept of 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.~~ 6.2 Effectiveness Effectiveness is the accuracy and completeness with which users achieve specified goals. Accuracy is the extent to which an actual outcome matches an intended outcome. The basis for accuracy will depend on the specificity of the intended outcome(s). In some cases, accuracy is based on whether or not the outcome is correct. ~~*Example*~~ EXAMPLE 1~~:~~ The user successfully recorded the intended TV programme on a personal video recorder (PVR) Causes of lack of accuracy can include ... use errors or difficulties. ~~*Example*~~ EXAMPLE 2~~:~~ A person selects a valid ticket from a train ticket machine but buys a higher-class ticket than intended, not realizing the double fare (price).
Contents	29 pages. Includes: ~~-~~ Table of contents (2 pages) ~~-~~ Rationale and benefits of usability (1 page) ~~-~~ Usability in a context of use (2 pages) ~~-~~ Outcomes of use (definitions of effectiveness, efficiency and satisfaction) (4 pages) ~~-~~ Context of use (4 pages) ~~-~~ Applying the concept of usability (2 pages) ~~-~~ Annex A. Relationship of usability to other concepts (5 pages) ~~-~~ Annex B. Usability measurement (3 pages) ~~-~~ Bibliography (2 pages)
Relations	The definitions in this standard are used throughout the ISO 9241 ~~standards~~series and many other ISO standards.
Keywords	Definitions of basic usability concepts: ~~Usability~~usability, effectiveness, efficiency, satisfaction, context of use, user, goal, task, resource, environment.

