



SLOVENSKI STANDARD
SIST EN ISO 13407:2001
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Human-centred design processes for interactive systems (ISO 13407:1999)

Benutzer-orientierte Gestaltung interaktiver Systeme (ISO 13407:1999)

Processus de conception centrée sur l'opérateur humain pour les systèmes interactifs (ISO 13407:1999)

STANDARD PREVIEW
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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English version

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13407:1999)

Processus de conception centrée sur l'opérateur humain
pour les systèmes interactifs (ISO 13407:1999)

Benutzer-orientierte Gestaltung interaktiver Systeme (ISO
13407:1999)

This European Standard was approved by CEN on 19 May 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of the International Standard ISO 13407:1999 has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with Technical Committee CEN/TC 122 "Ergonomics", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1999, and conflicting national standards shall be withdrawn at the latest by December 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CEN/CS: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

Endorsement notice

The text of the International Standard ISO 13407:1999 was approved by CEN as a European Standard without any modification.

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INTERNATIONAL STANDARD

ISO
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First edition
1999-06-01

Human-centred design processes for interactive systems

*Processus de conception centrée sur l'opérateur humain pour les systèmes
interactifs*

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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 3.

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.

International Standard ISO 13407 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

Annexes A, B and C of this International Standard are for information only.

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Introduction

Human-centred design is an approach to interactive system development that focuses specifically on making systems usable. It is a multi-disciplinary activity which incorporates human factors and ergonomics knowledge and techniques. The application of human factors and ergonomics to interactive systems design enhances effectiveness and efficiency, improves human working conditions, and counteracts possible adverse effects of use on human health, safety and performance. Applying ergonomics to the design of systems involves taking account of human capabilities, skills, limitations and needs.

Human-centred systems support users and motivate them to learn. The benefits can include increased productivity, enhanced quality of work, reductions in support and training costs, and improved user satisfaction. Although there is a substantial body of human factors and ergonomics knowledge about how such design processes can be organized and used effectively, much of this information is only well-known by specialists in these fields. This International Standard aims to help those responsible for managing hardware and software design processes to identify and plan effective and timely human-centred design activities. It complements existing design approaches and methods.

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Human-centred design processes for interactive systems

1 Scope

This International Standard provides guidance on human-centred design activities throughout the life cycle of computer-based interactive systems. It is aimed at those managing design processes and provides guidance on sources of information and standards relevant to the human-centred approach.

This International Standard is concerned with both hardware and software components of interactive systems.

NOTE Computer-based interactive systems vary in scale and complexity. Examples include off-the-shelf (shrink wrap) software products, custom office systems, plant monitoring systems, automated banking systems and consumer products.

This International Standard addresses the planning and management of human-centred design. It does not address all aspects of project management.

This International Standard provides an overview of human-centred design activities. It does not provide detailed coverage of the methods and techniques required for human-centred design, nor does it address health and safety aspects in detail.

The main users of this International Standard will be project managers. This International Standard therefore addresses technical human factors and ergonomics issues only to the extent necessary to allow managers to understand their relevance and importance in the design process as a whole. Such issues are dealt with more fully in ISO 9241 (see bibliography) which is complementary to this International Standard and is aimed at system developers, specifiers and purchasers of systems. Nonetheless, all parties involved in human-centred system development, including the end-users of systems, should find the guidance in this International Standard relevant.

2 Terms and definitions

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

2.1

interactive system

combination of hardware and software components that receive input from, and communicate output to, a human user in order to support his or her performance of a task

NOTE The term “system” is often used rather than “interactive system”.

2.2

prototype

representation of all or part of a product or system that, although limited in some way, can be used for evaluation

2.3

usability

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

[ISO 9241-11:1998, definition 3.1]

2.4**effectiveness**

accuracy and completeness with which users achieve specified goals

[ISO 9241-11:1998, definition 3.2]

2.5**efficiency**

resources expended in relation to the accuracy and completeness with which users achieve goals

[ISO 9241-11:1998, definition 3.3]

2.6**satisfaction**

freedom from discomfort, and positive attitudes to the use of the product

[ISO 9241-11:1998, definition 3.4]

2.7**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, definition 3.5]

2.8**user**

individual interacting with the system

[ISO 9241-10:1996, definition 2.2]

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3 Structure of this International Standard

Clause 4 outlines the reasons for adopting a human-centred design process. These can be used to provide a rationale for the use of human-centred methods, or to determine priorities for resource allocation during a project.

Clause 5 gives guidance on the principles of human-centred design. Clause 6 lists the issues to be considered when planning human-centred design activities and discusses how these should relate to system design goals.

Clause 7 is the core of this International Standard. It describes each of the four essential human-centred activities which should take place during the design process. Clause 8 gives further guidance on reporting human-centred activities.

4 Rationale for adopting a human-centred design process

All work systems should follow the ergonomic principles described in ISO 6385:1981. Making interactive systems more human-centred has substantial economic and social benefits. In most countries, employers and system providers have legal obligations to protect users from risks to their health and safety. Making systems more usable means systems can contribute to these aims, meeting user and organizational needs better. They

- a) are easier to understand and use, thus reducing training and support costs,
- b) improve user satisfaction and reduce discomfort and stress,
- c) improve the productivity of users and the operational efficiency of organizations, and
- d) improve product quality, appeal to the users and can provide a competitive advantage.

The complete benefits of human-centred design can be determined by taking into account the total life-cycle costs of the system including conception, design, implementation, support, use and maintenance.

5 Principles of human-centred design

5.1 General

There are many industry and proprietary standard methods for the design of computer-based interactive systems. This International Standard does not assume any one standard design process, nor does it cover all the different activities necessary to ensure effective system design. It is complementary to existing design methods and provides a human-centred perspective that can be integrated into different forms of design process in a way that is appropriate to the particular context. All the human-centred design activities identified in clause 7 are applicable, to a greater or lesser extent, at any stage in the development of a system.

Whatever the design process and allocation of responsibilities and roles adopted, the incorporation of a human-centred approach is characterized by the following:

- a) the active involvement of users and a clear understanding of user and task requirements;
- b) an appropriate allocation of function between users and technology;
- c) the iteration of design solutions;
- d) multi-disciplinary design.

5.2 The active involvement of users and a clear understanding of user and task requirements

The involvement of users in the development process provides a valuable source of knowledge about the context of use, the tasks, and how users are likely to work with the future product or system. The effectiveness of user involvement increases as the interaction between the developers and the users increases. The nature of user involvement varies depending on the design activities which are being undertaken.

When custom-made products are being developed, the proposed users and the tasks performed can be directly linked to the development process. The organization procuring the system has the opportunity to have a direct influence on the design as it emerges, and solutions can be evaluated by those who are actually going to be working with them. Such involvement and participation also increase user acceptance and commitment.

When generic or consumer products are being developed, the user population is dispersed and is perhaps not easily accessible. It is still essential that users or appropriate representatives are involved in development, in order that the relevant user and task requirements can be identified for inclusion in the system specification, and in order to provide feedback through testing of the proposed design solutions.

5.3 An appropriate allocation of function between users and technology

One of the most important human-centred design principles concerns the appropriate allocation of function – the specification of which functions should be carried out by the users and which by the technology. These design decisions determine the extent to which a given job, task, function or responsibility is to be automated or assigned to human performance.

The decisions should be based on many factors, such as relative capabilities and limitations of humans versus technology in terms of reliability, speed, accuracy, strength, flexibility of response, financial cost, the importance of successful or timely accomplishment of tasks and user well-being. They should not simply be based on determining which functions the technology is capable of performing and then simply allocating the remaining functions to users, relying on their flexibility to make the system work. The resulting human functions should form a meaningful set of tasks. Representative users should generally be involved in these decisions. For further guidance, see ISO 9241-2 and ISO 10075.

5.4 Iteration of design solutions

In iterative design approaches, feedback from users becomes a critical source of information. Iteration, when combined with active user involvement, provides an effective means of minimizing the risk that a system does not meet user and organizational requirements (including those requirements that are hidden or difficult to specify

explicitly). Iteration allows preliminary design solutions to be tested against “real world” scenarios, with the results being fed back into progressively refined solutions.

Iteration can be incorporated in other design approaches. Even in the “waterfall” model, where there is a systematic top-down hierarchy of design decisions and the relationship between the stages generally precludes iteration between them, there can be extensive iteration within a stage.

5.5 Multi-disciplinary design

Human-centred design needs a variety of skills. A range of personnel is necessary to address the human aspects of the design. This means that multi-disciplinary teams should be involved in a user-centred design process. These can be small, dynamic and need only last the life of the project. The composition of the teams should reflect the relationship between the organization responsible for technical development and the customer. The roles can include the following

- a) end-user;
- b) purchaser, manager of user;
- c) application domain specialist, business analyst;
- d) systems analyst, systems engineer, programmer;
- e) marketer, salesperson;
- f) user interface designer, visual designer;
- g) human factors and ergonomics expert, human-computer interaction specialist;
- h) technical author, trainer and support personnel;

Individual team members can cover a number of different skill areas and viewpoints. Multi-disciplinary teams do not have to be large but the team should be sufficiently diverse to make appropriate design trade-off decisions.

6 Planning the human-centred design process

A plan should be developed to specify how the human-centred activities fit into the overall system development process.

The plan should identify:

- a) the human-centred design process activities described in clause 7, i.e. understanding and identifying context of use, specifying user and organizational requirements, producing prototypes and evaluating designs according to user criteria;
- b) procedures for integrating these activities with other system development activities, e.g. analysis, design, testing;
- c) the individuals and the organization(s) responsible for the human-centred design activities and the range of skills and viewpoints they provide;
- d) effective procedures for establishing feedback and communication on human-centred design activities as they affect other design activities, and methods for documenting these activities;
- e) appropriate milestones for human-centred activities integrated into the overall design and development process;
- f) suitable timescales to allow feedback, and possible design changes, to be incorporated into the project schedule.