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Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — General framework for Common Industry Format (CIF) for usability-related information

Ingénierie des systèmes et du logiciel — Exigences de qualité et évaluation des systèmes et du logiciel (SQuaRE) — Cadre général pour le format industriel commun (CIF) concernant les informations relatives à l'utilisabilité

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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).

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 first edition cancels and replaces ISO/IEC TR 25060:2010, which has been technically revised.

The main changes are as follows:

— Information on the ISO 2506X family of documents has been updated.

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 define a framework and consistent terminology for the specification and evaluation of the usability of an interactive system. Specifying and evaluating usability assists those developing and acquiring interactive systems. This document describes a framework that defines a set of information items as part of a human-centred approach to the design of an interactive system. The framework is intended to assist in documenting and communicating usability-related information through the system development life cycle.

The human-centred design approach of ISO 9241-210 is well established and focuses specifically on making systems usable. Usability can be achieved by applying human-centred design and testing throughout the life cycle. In order to enable a human-centred design approach to be adopted, it is important that all the relevant usability information items are identified and documented. This identification and documentation enables the usability of a system to be designed and tested.

This framework forms the basis for a family of documents that will provide a Common Industry Format (CIF) for specific information items to be used as part of a human-centred approach to the design of interactive systems. ISO/IEC 25062, which standardizes the types of information that are documented when providing a detailed report of the results of measuring effectiveness, efficiency and satisfaction, is the first specific International Standard in this family.

The CIF for usability documents are part of the SQuaRE documents on software product quality requirements and evaluation. The scope of the CIF family covers systems rather than just software, so is broader than that of the current SQuaRE documents. The CIF family of documents uses definitions (reproduced in Clause 2) that are consistent with ISO 9241, as this is the terminology that is normally used for this subject matter. In some cases, these definitions differ from those in ISO/IEC 25000.

NOTE Some CIF documents are prefixed “ISO” while others are prefixed “ISO/IEC”, depending on how they are administered. However, all CIF documents are jointly developed by ISO/IEC JTC 1/SC 7 and ISO TC 159/SC 4.

To ensure that these information items can be used within the broadest range of process models and can be used in combination with other information items, the descriptions are given in the format defined in ISO/IEC/IEEE 15289 and ISO/IEC TS 33060.

The information items for documenting usability-related information can be integrated in any process models. For the purpose of establishing process models, ISO/IEC/IEEE 24774 and ISO/IEC TS 33061 specify the format and conformity requirements for process models, respectively. In addition, ISO/IEC/IEEE 15289 defines the types and content of information items developed and used in process models for system and software life cycle management. ISO/IEC TS 33060 and ISO/IEC TS 33061 define work products, including information items, for the purpose of process capability assessment. Process models and associated information items for human-centred design of interactive systems are contained in ISO 9241-210 and ISO TS 18152, respectively.

While this document focuses on information items needed as the basis for design and development of interactive systems, the data contained in the information items can support post-development activities such as (product) conformity assessment as defined in ISO/IEC 17000.

Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — General framework for Common Industry Format (CIF) for usability-related information

1 Scope

This document describes information items enabling systematic human-centred design for interactive systems.

Some of these information items are elaborated by separate International Standards, named the Common Industry Format (CIF) for usability-related information.

This document provides the framework of information items, including definitions and the content for each information item.

This document includes the following:

— the intended users of the information items;

— consistent terminology;

— the high-level content structure to be used for documenting each information item.

The information items are intended to be used as part of system-level documentation resulting from development processes such as those in ISO 9241-210, ISO 9241-220 and ISO/IEC JTC 1/SC 7 process standards (e.g. ISO/IEC/IEEE 15288, ISO/IEC/IEEE 29148).

This document focuses on those information items needed for design, development and evaluation of usable systems, rather than prescribing a specific process. It is intended to be used in conjunction with existing International Standards, including the standards of the ISO 9241 series and the SQuaRE documents.

This document does not prescribe any kind of method, life cycle or process.

NOTE The information items produced by human-centred design activities can be incorporated in design approaches as diverse as object-oriented, waterfall, HFI (human factors integration), agile and rapid development.

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 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/

3.1 Terms related to usabililty

3.1.1
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 and usability heuristic.

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

3.1.2
interactive system
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.

[SOURCE: ISO 9241-11:2018, 3.1.5]

3.1.3
product
item that is made or created by a person or machine

[SOURCE: ISO 9241-11:2018, 3.1.2]

3.1.4
service
means of delivering value for the customer by facilitating results the customer wants to achieve

Note 1 to entry: Services can include both human–system interactions (e.g. accessing a word processor through the web) and human–human interactions (e.g. a citizen interacting with a clerk at the post office counter).

Note 2 to entry: The "customer" is a user and does not necessarily have a financial relationship.

[SOURCE: ISO 9241-11:2018, 3.1.6]

3.1.5
user
person who interacts with a 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]

3.1.6
goal
intended outcome

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

3.1.7
effectiveness
accuracy and completeness with which users achieve specified goals

[SOURCE: ISO 9241-11:2018, 3.1.12]

3.1.8
efficiency
resources used in relation to the results achieved

Note 1 to entry: Typical resources include time, human effort, costs and materials.

[SOURCE: ISO 9241-11:2018, 3.1.13]

3.1.9
satisfaction
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

Note 1 to entry: Satisfaction includes the extent to which the user experience that results from actual use meets the user's needs and expectations.

Note 2 to entry: Anticipated use can influence satisfaction with actual use.

[SOURCE: ISO 9241-11:2018, 3.1.14]

3.1.10
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]

3.1.11
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.

[SOURCE: ISO 9241-11:2018, 3.1.11]

3.1.12
stakeholder
person or organization that can affect, be affected by or perceive themselves to be affected by a decision or activity

Note 1 to entry: Stakeholders can include users, purchasers, systems owners or managers and people who are indirectly affected by the operation of a system, product or service.

Note 2 to entry: Different stakeholders can have different needs, requirements or expectations.

[SOURCE: ISO 9241-11:2018, 3.1.9]

3.1.13
human-centred quality
extent to which requirements relating to usability, accessibility, user experience and avoidance of harm from use are met

Note 1 to entry: Human-centred quality is a collective term for the intended outcomes of interaction of the user with the system.

Note 2 to entry: Provision of the necessary technical functionality is a prerequisite for human-centred quality.

[SOURCE: ISO 9241-11:2018, 3.2.1, modified — Original note 2 to entry removed.]

3.1.14
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]

3.1.15
user experience
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 and 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]

3.1.16
harm from use
negative consequences regarding health, safety, finances or the environment that result from use of the system

Note 1 to entry: The negative consequences can be for the user or for any other stakeholder.

[SOURCE: ISO 9241-11:2018, 3.2.4]

3.2 Terms related to interaction and interface

3.2.1
interaction
user-system interaction
exchange of information between a user and an interactive system via the user interface

[SOURCE: ISO 9241-110:2020, 3.11, modified — Definition revised.]

3.2.2
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

[SOURCE: ISO 9241-110:2020, 3.10]

3.2.3
interaction sequence
exchange of information between a user and an interactive system via the user interface to complete an intended task or to navigate through the interactive system

[SOURCE: ISO 9241-110:2020, 3.11, modified — Term and definition revised.]

3.2.4
action
user behaviour that a system accepts as a request for a particular operation

[SOURCE: ISO/IEC TR 11580:2007, 2.3, modified — Examples removed.]

3.2.5
control
object, often analogous to physical controls, which allows a user to take some action which manipulates data, other objects or their attributes

[SOURCE: ISO 14915-2:2003, 3.8]

3.2.6
data item
data element or well-defined set of data elements that is associated with a single tag, which defines its meaning and layout

[SOURCE: ISO/IEC 11694-5:2014, 3.4]

3.2.7
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 to entry: User interface elements can be interactive or not.

Note 2 to entry: 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 (e.g. letter, sales order, electronic part, wiring diagram) or a system object (e.g. printer, hard disk, network connection). It can be possible for the user to directly manipulate some of these user interface elements.

Note 3 to entry: User interface elements in a graphical user interface include such things as basic objects (e.g. window title bars, menu items, push buttons, image maps, editable text fields) or containers (e.g. windows, grouping boxes, menu bars, menus, groups of mutually-exclusive option buttons, 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.

[SOURCE: ISO 9241-171:2008, 3.38, modified — Term revised.]

3.2.8
content chunk
unit of content that satisfies a requirement of a specific task for a specific user

Note 1 to entry: to entry A content chunk can also meet other requirements of one or more tasks for one or more users, either by itself or in combination with other content chunks.