TECHNICAL REPORT

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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.

Note 2 to entry: A content chunk defines a subtopic that justifies separate consideration by the user. However, designers can decide whether or not to present one or more content chunks together within a single presentation segment.

EXAMPLE A research report is divided into five content chunks that deal with background information, methodology, results, conclusions and recommendations.

[SOURCE: ISO 14915-2:2003, 3.1, modified — Note 2 to entry revised.]

3.2.9
individual interface
physical implementation of one or more user interface elements and content chunks that is presented at a point in time

3.3 Terms related to products

3.3.1
information item
information product
separately identifiable body of information that is produced, stored and delivered for human use

Note 1 to entry: A document produced to meet information requirements can be an information item, part of an information item or a combination of several information items.

Note 2 to entry: An information item can be produced in several versions during a project or system life cycle.

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.12]

3.3.2
information item content
information included in an information item, associated with a system, product or service, to satisfy a requirement or need

[SOURCE: ISO/IEC/IEEE 15289:2019, 3.1.13]

3.3.3
user need
prerequisite identified as necessary for a user, or a set of users, to achieve an intended outcome, implied or stated within a specific context of use

EXAMPLE 1 A presenter (user) needs to know how much time is left (prerequisite) in order to complete the presentation in time (goal) during a presentation with a fixed time limit (context of use).

EXAMPLE 2 An account manager (user) needs to know the number of invoices received and their amounts (prerequisite), in order to complete the daily accounting log (goal) as part of monitoring the cash flow (context of use).

Note 1 to entry: A user need is independent of any proposed solution for that need.

Note 2 to entry: User needs are identified based on various approaches, including interviews with users, observations, surveys, evaluations and expert analysis.

Note 3 to entry: User needs often represent gaps (or discrepancies) between what should be and what is.

Note 4 to entry: User needs are transformed into user requirements considering the context of use, user priorities, trade-offs with other system requirements and constraints.

[SOURCE: ISO 25065:2019, 3.1.9]

3.3.4
user requirements
set of requirements for use that provide the basis for design and evaluation of interactive systems to meet identified user needs

Note 1 to entry: User requirements are derived from user needs and capabilities in order to allow the user to make use of the system in an effective, efficient, safe and satisfying manner.

Note 2 to entry: User requirements are not requirements on the users.

Note 3 to entry: User requirements include user-system interaction requirements and use-related quality requirements.

Note 4 to entry: In software engineering terms, user requirements include both "functional" and "non-functional" requirements derived from user needs and capabilities.

[SOURCE: ISO 9241-220:2019, 3.46, modified — Note 3 to entry added.]

3.3.5
user-system interaction requirements
user requirements that specify the interactions (e.g. recognizing information, making inputs, making selections, receiving outputs) required by users to achieve the goals

[SOURCE: ISO 25065:2019, 3.1.11]

3.3.6
use-related quality requirements
user requirements that specify the intended outcomes of use of the interactive system and associated quality criteria

[SOURCE: ISO 25065:2019, 3.1.12]

3.4 Terms related to processes

3.4.1
usability testing
evaluation that involves representative users performing specific tasks with the system to enable the measurement of efficiency, effectiveness and/or user satisfaction

3.4.2
usability inspection
evaluation based on the considered judgment of evaluators who examine the usability-related aspects of a user interface with respect to specified criteria

Note 1 to entry: The inspectors can include usability specialists, developers, end users or other types of professionals.

Note 2 to entry: The evaluative criteria can include good practice and/or documented principles, guidelines, requirements or standards.

Note 3 to entry: The evaluation can be conducted with or without the help of referenced documents.

Note 4 to entry: Usability inspection is the generic term for several methods, including but not limited to heuristic evaluation, cognitive walkthroughs, standards inspection, pluralistic walkthroughs and consistency inspections.

3.4.3
cognitive walkthrough
usability evaluation in which one or more evaluators (and/or users) step through a use scenario identifying usability problems from a user's perspective that are associated with successful completion of the scenario using the interactive system

Note 1 to entry: The evaluators can include usability specialists, developers, subject-matter experts, end users and multidisciplinary teams.

Note 2 to entry: IEC/TR 62366-2 provides guidance on performing cognitive walkthroughs.

4 A general framework for usability-related information

4.1 Common Industry Formats (CIFs) for usability-related information

An effective human-centred design approach relies on explicit human factors data. This document defines the information items that are necessary for the specification, development and evaluation of the usability of interactive systems.

The CIFs provide a common format for reporting on the outcomes of human-centred design activities according to ISO 9241-210 during the development of an interactive system.

The CIFs apply to all design approaches and methodologies, including human-centred design, object-oriented, waterfall, HFI (human factors integration), agile and rapid development. The CIFs do not include documentation that is specific to particular development methodologies or activities. In addition to their use in the development and evaluation of interactive systems, the CIFs can also be used to evaluate the completeness of specific methods or development tools that might be used.

4.2 Intended users and uses of usability-related information items

CIFs are based on the concepts of information items and information item content as defined and described in ISO/IEC/IEEE 15289.

The set of CIF information items supports effective communication among the target users of the framework to obtain a common understanding of the usability of the product.

Usability-related information items are primarily intended for use by the following types of users:

— usability and accessibility professionals;

— requirements engineers;

— developers;

— interaction designers;

— assessors and certifiers;

— corporate governance;

— purchase decision-makers;

— project managers;

— product managers;

— business analysts.

The CIFs are particularly relevant to the development of systems where the human-centred quality of the outcome is important or where risk needs to be controlled, including systems that are software intensive or safety critical.

4.3 Situations in which the usability-related information items apply

4.3.1 General

Use of the framework to communicate usability information assists the intended users in accomplishing their tasks in various situations, as follows:

4.3.2 Acquisition situation

— Issuing a specification as part of a purchasing project.

— Comparison across products.

— Responding to a tender.

— Creating a proposal in response to a request for proposals (RFP).

— Evaluating a proposal in response to an RFP.

— Competitive comparison across versions of one product.

— Conformity testing and certification of a product.

4.3.3 Development situation

Development situations vary according to the given situation, for example design from scratch, redesign, complexity or time constraints. Irrespective of the life cycle methodology, the following processes will occur:

— analysis;

— design;

— implementation;

— testing.

4.3.4 Maintenance situation

— Monitoring usability aspects throughout the life cycle of an interactive system.

— Revalidation of an interactive system.

— Identifying the suitability of an interactive system product in relation to other interactive systems.

— Evaluating the usability of a combination of different interactive systems.

— Evaluating the usability of an interactive system in various contexts of use.

4.4 Process independence

No formal process for processing the information items is given. The framework is not intended to prescribe an ordering of the information items. The order used in this document follows the order of presenting the human-centred design activities in ISO 9241-210. Usability related information items are not static, thus the framework supports iteration as a principle of human-centred design.

4.5 Relationship to human-centred design (HCD) as described in ISO 9241-210

The goal of the human-centred design approach is to ensure that the development, acquisition and operation of an interactive system take account of the needs of the user as well as the needs of the developer and owner. A human-centred design approach takes account of the user's interaction with the components of the system and with other stakeholders. Human-centred design processes allow developers and owners to analyse how the system will behave when it is in operation and to measure its usability. Human-centred design processes take account of context of use, i.e. the complete environment in which the interactive system will be used. Human-centred design processes address the total system within which software and hardware are components.

ISO 9241-210 describes four linked human-centred design activities that take place during the design of any interactive system:

a) Understand and specify the context of use

The characteristics of the users, tasks and the organizational technical and physical environment define the context in which the system is used. It is useful to gather and analyse information on the current context in order to understand and then specify the context that will apply in the future system.

The information item that is used to structure and document this information is described in ISO/IEC 25063.

b) Specify the user requirements

User requirements are statements that provide the basis for design and evaluation of interactive systems to meet the user needs. The user needs are used as the basis for creating an explicit statement of user requirements in relation to the intended context of use and the business objectives of the system. The user requirements can include requirements for organizational changes, revised work styles and opportunities to combine products and services. If the proposed interactive system will impact organizational practice, the development process will involve organizational stakeholders in the design process with the aim of optimizing both the organizational and technical systems.

The information items that are used to structure and document this information are described in ISO/IEC 25064 and ISO 25065.

c) Produce design solutions to meet user requirements

Potential design solutions are produced by drawing on the description of the context of use, derived user requirements, the results of any evaluations and the established state of the art in the application domain. These design solutions can lead to identifying further user requirements. The process involves designing the user experience, interaction design and interface design; making the design solutions more concrete (using scenarios, simulations, prototypes, mock-ups, etc.); altering the design solutions based on user-centred evaluation and feedback; and communicating the design to those responsible for implementation.

The information items that are used to structure and document this information are described in 5.5.

NOTE Currently there are no ISO documents covering the information items “user-system interaction specification” and “user interface specification”.

d) Evaluate the design

User-centred evaluation includes assessing the usability, accessibility and user experience of the system, product or service. Evaluation starts at the earliest stages of the project, continues throughout development and is used to provide feedback on actual use.

User-centred evaluation can be used:

— to provide feedback on strengths and weaknesses of the design solution from the user's perspective (in order to improve the design);

— to assess whether user and organizational objectives have been achieved, which can include assessing conformity to international, national, local, corporate or statutory standards.

Two widely used user-centred evaluation methods are inspection-based evaluation using a checklist of usability and accessibility guidelines or requirements, and usability testing with actual users. Real-life use of a product, system or service is complex and even though standards can provide much useful guidance, user testing is an essential element of human-centred design.

The information items that are used to structure and document this information are described in ISO/IEC 25062 and ISO/IEC 25066.

4.6 Iteration based on new insights

Iteration is a principle of human-centred design that helps to eliminate the uncertainty of data given at a specific point in time. Usability-related information rests on the facts available at a given point of time. The usability information items described in this document are revised and refined as often as new insights for the interactive system under development are to be taken into account.

5 Usability-related information items

5.1 General

The following subclauses describe information items that are essential to provide the data required to allow systematic human-centred design of an interactive system under development. These information items are typically revised and further progressed across iterations within one release cycle and across releases. The information items can also be used to describe existing systems. Where there is an International Standard for a common industry format (for usability-related information), the standard is referenced in the corresponding subclause. Where there is no International Standard, the corresponding subclause contains the relevant guidance.

5.2 Context of use description (ISO/IEC 25063)

A context of use description provides a collection of information relevant for analysis, specification, design and evaluation of an interactive system from the perspective of the various user groups and other stakeholders.

ISO/IEC 25063 describes the information item content of a context of use description.

The characteristics of the users, tasks and the organizational and physical environment define the context in which the system is used. It is important to gather and analyse information on the current context in order to understand and then describe the context that will apply in the future system.

NOTE 1 The same formats can be used for describing both existing context of use and the context of use intended for design.

ISO/IEC 25063 provides requirements for the information item content of various types of context of use descriptions:

— summary context of use description;

— detailed context of use description;

— part of a detailed context of use description used for an evaluation;

— part of a detailed context of use description contained within a product description.

It identifies the following information item content:

— subject of the context of use description;

— user population;

— goals and responsibilities of the identified user groups and the organization;

— tasks of the users;

— environment(s) of the user;

— problems.

NOTE 2 Annex A identifies typical representations used for information items contained in context of use descriptions.

5.3 User needs report (ISO/IEC 25064)

A user needs report identifies user needs within the context of use so that they can be analysed as a basis for a comprehensive set of valid user requirements. Identifying user needs provides opportunities for new or improved solutions and any further design decisions taken.

While user needs can be collected at any time without necessarily being linked to a specific project, it is especially important to document them in a user needs report for purposes of development or redevelopment of systems, products or services.

The user needs report is applicable to software and hardware systems, products or services. User needs reports are relevant for existing and new products, services and systems, although the extent to which use needs are reported depends upon the type of system, product or service involved.

ISO/IEC 25064 currently provides requirements for the following information item content of a user needs report:

— title page;

— executive summary;

— introduction;

— initial indicators of the need for system, product, service or improvement (if appropriate);

— methods and procedures;

— identified user needs;

— identified management or other stakeholder needs;

— identified performance deficiencies, problems or potential improvements;

— consolidated user needs;

— recommendations;

— report annexes (supporting information);

— system, product or service description, objectives, constraints.

NOTE Annex A identifies typical representations used for information items contained in user needs reports.

5.4 User requirements specification (ISO 25065)

A user requirements specification contains the user requirements that have been determined for an interactive system. Specifying user requirements in a consistent manner will assist those developing and acquiring usable interactive systems.

User requirements are documented in the user requirements specification. These information items are developed as part of the stakeholder requirements definition process described in ISO/IEC/IEEE 15288. The user requirements specification provides the basis for design and evaluation of interactive systems to meet the user needs. User requirements are developed in conjunction with and form part of the overall requirements specification of an interactive system.

The two types of user requirements described in ISO 25065 are:

— user-system interaction requirements for achieving intended outcomes (including requirements for system outputs and their attributes);

— use-related quality requirements that specify the quality criteria associated with the outcomes of users interacting with the interactive system and can be used as criteria for system acceptance.

ISO 25065 provides requirements for the following information item content of a user requirements specification:

— identification of the interactive system for which user requirements are specified;

— constraints on design;

— (a reference to) the context of use for the interactive system;

— goals and the tasks to be supported;

— user requirements:

  — user-system interaction requirements;

  — use-related quality requirements;

— user interface design guidance to be applied.

NOTE Annex A identifies typical representations used for information items contained in user requirement specifications.

5.5 User-system interaction and user interface specification

A user-system interaction and user interface specification provides a specification of how to interact with the interactive system and the functionality and components of the interactive system to meet user requirements for tasks to be supported.While the specification can be created and iterated at any time within the life of an interactive system, it is especially important for development or redevelopment of systems, products or services.

A user-system interaction and user interface specification is a structured collection of information about the interactive system that can be used by:

— users and other stakeholders as a basis for:

  — agreeing on how tasks are to be completed using the interactive system;

  — understanding how to perform tasks with the interactive system;

  — evaluating the suitability of the interactive system;

  — identifying needed changes to the interactive system as early as possible;

— development teams as a basis for:

  — constructing the interactive system;

  — internal evaluation of the interactive system.

A user-system interaction and user interface specification focuses on:

— specifying each task to be supported and its subtasks;

— specifying the interaction with the system through the user-interface (including navigation and dialogue);

— specifying the components of the user-interface and their structure.

The user-system interaction and the user interface components themselves are not independent of one another, and therefore both form part of this specification.

This specification integrates user-system interaction and the components of the user-interface by:

— focusing on how they work together when serving the tasks of users supported by the interactive system;

— specifying individual interfaces and their content chunks composed of user-interface elements;

— specifying connection paths between the content provided to allow the user to navigate throughout the interactive system.

Information item content within this specification that focus on user-system interaction includes:

— tasks and subtasks to be supported;

— interaction sequences for each task and subtask and for navigation that are composed of a sequence of interaction steps;

— individual actions by the user or the system within interaction sequences that can be combined and used in various interaction sets and interaction sequences;

— individual controls and data items that are composed into meaningful individual interfaces and content chunks to serve the individual interaction steps;

Information item content within this specification that focus on user interface components includes:

— user interface elements (e.g. push buttons, check-boxes, lists, entry fields) that implement the individual controls and data items that the user interacts with;

NOTE 1 ISO 9241-161 describes a number of visual user interface elements.

— content chunks (e.g. the delivery information within an e-commerce order) structure sets of user interface elements according to the needs of completing interaction sequences;

NOTE 2 Using the same content chunk wherever applicable within a user interface can provide consistency for both users and developers.

NOTE 3 Some content chunks are presented to users as tools, while others might not be distinguishable from other user interface elements in an individual interface.

— individual interfaces (e.g. a screen or panel that contains an e-commerce order form) that are composed of content chunks and user interface elements in some physical relationship with one another.

NOTE 4 Annex A identifies typical representations used for information items contained in user-system interaction and user interface specifications.

5.6 Types of evaluation reports

5.6.1 Evaluation report (ISO/IEC 25066)

ISO/IEC 25066 describes the CIF for reporting usability evaluations. It provides a classification of evaluation approaches and the specifications for the information item content to be included in an evaluation report based on the selected evaluation approach(es). The intended users of the usability evaluation reports are identified, as well as the situations in which the usability evaluation report can be applied.

NOTE 1 Evaluations always consist of data collection and the analysis of the collected data, which is presented in an evaluation report.

NOTE 2 Data collection can be reported separately from an evaluation report in a field data report.

The usability evaluation reports in ISO/IEC 25066 are applicable to software and hardware systems, products or services used for predefined tasks (excluding generic products, such as a display screen or

a keyboard). The information item content is intended to be used as part of system-level documentation resulting from development processes, such as those in ISO 9241-210 and ISO/IEC JTC 1/SC 7 process standards.

ISO/IEC 25066 describes the contents of usability evaluation reports produced for a broad range of usability evaluation objectives.

The content of an evaluation report depends on the type of evaluation approach used. Usability evaluation is a systematic process using one or more of the following types of evaluation approaches:

a) inspection to identify usability defects and potential usability problems;

b) observation of users (including usability tests and observations of use);

c) user surveys.

Different types of usability evaluation typically lead to different test reports. Table 1 gives examples of titles for usability evaluation reports for each type of evaluation.

Table 1 — Types of usability evaluations and titles for reports

Types of usability evaluations	Inspection to identify usability defects and potential usability problems	Observation of users		User surveys
		Observing user behaviour to identify actual usability findings	Measuring user performance and response	
Examples of titles for reports	Usability inspection report	— Qualitative usability test report — Field data report	— Quantitative usability test report (ISO/IEC 25062) — Field data report	User survey report

The report formats specified in ISO/IEC 25066 can serve as a basis for a conformity assessment regarding usability.

NOTE 3 Annex A identifies typical representations used for information items contained in evaluation reports.

5.6.2 Quantitative usability test report (ISO/IEC 25062)

The purpose of ISO/IEC 25062 is to facilitate incorporation of usability as part of the procurement decision-making process. Communicating information about the quantitative results of usability tests supports judgements about whether the object of evaluation has sufficient usability for the target organization. Examples of decisions include purchasing, upgrading and automating. ISO/IEC 25062 provides a common format for human factors engineers and usability professionals in supplier companies to report the methods and results of usability tests to customer organizations. Since the procurement environment is the intended audience, ISO/IEC 25062 is more prescriptive in the format and the required elements.

ISO/IEC 25062 is an example of a user observation report for performance measurement in accordance with ISO/IEC 25066:2016, Annex A.

5.6.3 Field data report

The field data report provides data on actual usage of the product (rather than intended usage of the product) as input for future product releases. It identifies use difficulties and use errors and innovative ways of using the interactive system in the actual context of use, enabling the identification of emergent user requirements.

Sources of field data can include observation of use, user satisfaction surveys, usage statistics and help desk information.

NOTE 1 Continuous field data analysis can serve as a source for ongoing release planning and improvement of an interactive system.

NOTE 2 Field data reports can be used as inputs to evaluation reports and can provide insights for updating other CIFs.

The field data report contains the data obtained from the field along with its sources, the actual context of use, the means of collecting the data, the reasons for its collection and any identified user needs and derived user requirements.

NOTE 3 Annex A identifies typical representations used for information items contained in field data reports.

Annex A
(informative)

Typical representations for information items within a CIF

Table A.1 lists typical representations for information items contained in each of the CIFs.

NOTE These representations will possibly not contain all of the contents of a particular CIF.

Table A.1 — Examples of typical representations for information items within a CIF

Common industry format (CIF)	Typical representations for information items within a CIF
Context of use description (ISO/IEC 25063)	— User group profile — Table of tasks, goals, ressources and environment for each user group — Persona — As-is scenario — To-be scenario — User journey map (as is) — User journey map (to be) — Task model
User needs report (ISO/IEC 25064)	List of user needs for each user group
User requirements specification (ISO 25065)	List of user requirements for each supported task and its subtasks
User-system interaction and user interface specification (no standard currently available)	— Use scenario — Storyboard — Specification of task objects and executable functions — Sketch — Wireframe — Wireflow — Low-fi prototype — High-fi prototype

Usability evaluation reports, including:
— usability inspection report (ISO/IEC 25066)
— qualitative usability test report (ISO/IEC 25066)
— quantitative usability test report (ISO/IEC 25062)
— user survey report (ISO/IEC 25066)
	— List of
	  — usability defects
	  — use problems
	  — use errors
	— Reported usability measures and ratings

Table A.1 *(continued)*

Common industry format (CIF)	Typical representations for information items within a CIF
Field data report	— Observed use difficulties and use errors for each supported task and its subtasks — Observed and/or reported risks and harms resulting from use

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