TECHNICAL REPORT

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

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Contents

Page

Foreword iv

Introduction v

1 Scope 1

2 Terms and definitions 1

3 A general framework for usability-related information 5
3.1 Intended users and uses of usability-related information items 5
3.2 Situations in which the information items apply 6
3.3 Process independence 7
3.4 Relationship to human-centred design (HCD) as described in ISO 9241-210 7
3.5 Iteration and support for exploration 8

4 Usability-related information items 8
4.1 General 8
4.2 Context of use description 8
4.3 User needs report 9
4.4 User requirements specification 9
4.5 User interaction specification 10
4.6 User interface specification 11
4.7 Evaluation report 11
4.8 Field data report 12

Annex A (informative) **Intended users and uses of the usability-related information items** 13

Bibliography 21

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, the joint technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 25060, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

Introduction

The purpose of this Technical Report is to define a framework and consistent terminology for the specification and evaluation of the usability of an interactive system. Specifying and evaluating usability will assist those developing and acquiring interactive systems. It 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[1)] 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 International Standards that will provide a Common Industry Format (CIF) for specific information items to be used as part of a human-centred approach to 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 family is part of the SQuaRE series of International Standards (ISO/IEC 25000 to ISO/IEC 25099) 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 series. The CIF family of International Standards 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.

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 15289 and ISO/IEC TR 15504-6.

The information items for documenting usability-related information can be integrated in any process models. For the purpose of establishing process models, ISO/IEC TR 24774 and ISO/IEC 15504-2 specify the format and conformance requirements for process models, respectively. In addition, ISO/IEC 15289 defines the types and content of information items developed and used in process models for system and software life cycle management. ISO/IEC 15504-5 and ISO/IEC TR 15504-6 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/PAS 18152, respectively.

While this Technical Report 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 17000:2004.

1) Previously ISO 13407.

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

1 Scope

This Technical Report describes a potential family of International Standards, named the Common Industry Formats (CIF), that document the specification and evaluation of the usability of interactive systems. It provides a general overview of the CIF framework and contents, definitions, and the relationship of the framework elements. The intended users of the framework are identified, as well as the situations in which the framework may be applied. The assumptions and constraints of the framework are also enumerated.

The framework content includes the following:

— consistent terminology and classification of specification, evaluation and reporting;

— a definition of the type and scope of formats and the high-level structure to be used for documenting required information and the results of evaluation.

This Technical Report is applicable to software and hardware products used for predefined tasks. 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, and ISO/IEC JTC 1/SC 7 process standards.

This Technical Report focuses on documenting those elements needed for design and development of usable systems, rather than prescribing a specific process. It is intended to be used in conjunction with existing International Standards, including ISO 9241, ISO 20282, ISO/IEC 9126 and the SQuaRE series (ISO/IEC 25000 to ISO/IEC 25099).

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

2 Terms and definitions

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

2.1
accessibility
〈interactive system〉 usability of a product, service, environment or facility by people with the widest range of capabilities

[ISO 9241-171:2008]

2.2
action
user behaviour that a system accepts as a request for a particular operation

[ISO/IEC TR 11580:2007]

2.3
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]

2.4
dialogue
interaction between a user and an interactive system as a sequence of user actions (inputs) and system responses (outputs) in order to achieve a goal

[ISO 9241-110:2006]

2.5
effectiveness
accuracy and completeness with which users achieve specified goals

[ISO 9241-11:1998]

2.6
efficiency
resources expended in relation to the accuracy and completeness with which users achieve goals

[ISO 9241-11:1998]

2.7
goal
intended outcome

[ISO 9241-11:1998]

2.8
information architecture
〈human-centred〉 structure of an information space and the semantics for accessing required task objects, system objects and other information

NOTE The appropriate combination of organization, labelling, navigation schemes and retrieval mechanisms within an information space will facilitate task completion and efficient access to content.

2.9
product
part of the equipment (hardware, software and materials) for which usability is to be specified or evaluated

[ISO 9241-11:1998]

2.10
satisfaction
freedom from discomfort, and positive attitudes towards the use of the product

[ISO 9241-11:1998]

2.11
stakeholder
individual or organization having a right, share, claim, or interest in a system or in its possession of characteristics that meet their needs and expectations

[ISO/IEC 15288:2008]

2.12
system
combination of interacting elements organized to achieve one or more stated purposes

NOTE 1 A system may be considered as a product or as the services it provides.

NOTE 2 In practice, the interpretation of its meaning is frequently clarified by the use of an associative noun, e.g. aircraft system. Alternatively, the word system may be substituted simply by a context-dependent synonym, e.g. aircraft, though this may then obscure a system principles perspective.

[ISO/IEC 15288:2002, 4.17]

2.13
task
activities required to achieve a goal

[ISO 9241-11:1998]

NOTE The term “task” is used here, as in ISO 9241-11, in its widest sense, rather than in reference to the specifics of use of the dialogue system.

2.14
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]

NOTE The definition of usability in this Technical Report is similar to that used to define “quality in use” in ISO/IEC 9126-1:2001.

2.15
usability objective
stated level of usability expressed in terms of effectiveness, efficiency and satisfaction in a specified context of use which can be verified

NOTE Usability objectives can be stated as user requirements, in which case the level to be achieved is a usability requirement, or they can be stated as desired “target levels” depending on their use in design and evaluation.

2.16
usability inspection
evaluation based on the considered judgment of evaluators who examine the usability-related aspects of an interface with respect to specified criteria

NOTE 1 The inspectors can include usability specialists, developers, end users or other types of professionals.

NOTE 2 The evaluative criteria can include good practice and/or documented principles, guidelines, requirements or standards.

NOTE 3 The evaluation can be conducted with or without the help of referenced documents.

NOTE 4 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.

2.17
usability testing
evaluation that involves representative users performing specific tasks with the system to enable the measurement of efficiency, effectiveness, and/or user satisfaction

2.18
usability walkthrough
usability evaluation in which one or more evaluators step through a scenario playing the role of a user and identifying usability problems associated with successful completion of the scenario

NOTE The evaluators can include usability specialists, developers, end users or other types of professionals.

2.19
user
person who interacts with the interactive system

[ISO 9241-110:2006]

2.20
user experience
person's perceptions and responses that result from the use and/or anticipated use of a product, system or service

NOTE 1 User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use.

NOTE 2 User experience is a consequence of: brand image, presentation, functionality, system performance, interactive behaviour, and assistive capabilities of the interactive system; the user's internal and physical state resulting from prior experiences, attitudes, skills and personality; and the context of use.

NOTE 3 Usability, when interpreted from the perspective of the users' personal goals, can include the kind of perceptual and emotional aspects typically associated with user experience. Usability criteria can be used to assess aspects of user experience.

[ISO 9241-210]

2.21
user requirements
usage requirements
requirements for use that provide the basis for design and evaluation of interactive systems to meet identified user needs

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

NOTE 2 User requirements specify the extent to which user needs and capabilities are to be met when using the system. They are not requirements on the users.

NOTE 3 In software-engineering terms, user requirements comprise both “functional” and “non-functional” requirements based on user needs and capabilities.

2.22
user interaction
exchange of information between a user and an interactive system via the user interface to complete the intended task

NOTE 1 Adapted from ISO 11064-5:2008, 3.20.

NOTE 2 User interaction specifications focus on user interactions without considering implementation details.

2.23
user interface
all components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system

[ISO 9241-110:2006]

2.24
user interface element
entity of the user interface that is presented to the user by the software

NOTE 1 User interface elements can be interactive or not.

NOTE 2 Both entities relevant to the task and entities of the user interface are regarded as user interface elements. Different user interface element types are text, graphics and controls. A user interface element may be a visual representation or an interaction mechanism for a task object (such as a letter, a sales order, electronic parts, or a wiring diagram) or a system object (such as a printer, hard disk, or network connection). It may be possible for the user to directly manipulate some of these user interface elements.

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

NOTE 4 User interface elements are also referred to as “user interface objects”.

[ISO 9241-171:2008]

2.25
user need
factor or condition necessary for a user to achieve desired results within a specified context of use

NOTE 1 Factors and conditions include the presence of a specific quality, quantity, information, process or service as well as particular social, organizational and physical environments.

NOTE 2 User needs often represent gaps (or discrepancies) between what should be and what is.

3 A general framework for usability-related information

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

3.1 Intended users and uses of usability-related information items

The set of 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 (in alphabetical order):

— Business Analysts;

— Corporate purchasers (Procurers);

— Developers (any individuals designing and developing user interface and technical system);

— Managers (in terms of sponsors and project managers);

— Product managers;

— Requirements Developers;

— Suppliers;

— Usability and Accessibility Specialists.

Usability-related information items can also be of use for the following types of users (in alphabetical order):

— Editors of magazines;

— Marketing Specialists;

— Quality Managers;

— Retail Shop Owners;

— Union Representatives and staff councils.

3.2 Situations in which the information items apply

Use of the framework to communicate usability information assists the intended users in accomplishing their tasks in various situations described below.

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 a RFP;

— Competitive comparison across versions of one product;

— Conformance testing and certification of a product.

Development Situation:

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

— Analysis;

— Design;

— Implementation;

— Testing.

Maintenance Situation:

— Monitoring usability aspects throughout the life cycle of a product;

— Re-validation of a product;

— Identifying the suitability of a product in relation to other products;

— Evaluating the usability of a combination of different products;

— Evaluating the usability of a product in various physical and organizational contexts.

Contractual Situations after contracting:

— Solving product-related problems after purchase.

3.3 Process independence

No formal process for processing the information items is given. Although the framework is not intended to prescribe an ordering of the information items, they are presented hierarchically from the general to the specific. For example the high-level user requirements are generally identified early in the process and as the process continues the user requirements become more specific. Usability related information items are not static thus the framework supports iteration as a principle of human-centred design.

3.4 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 (previously ISO 13407) 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.

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.

c) Produce design solutions to meet these requirements

Potential design solutions are produced by drawing on the description of the context of use, derived user requirements, the results of any baseline evaluations, the established state of the art in the application domain, and the experience and knowledge of the participants. These design solutions can lead to identifying further user requirements. The process involves designing the user experience, user tasks, 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.

d) Evaluate

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 users 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 expert evaluation using a checklist of usability and accessibility guidelines or requirements, and user 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.

3.5 Iteration and support for exploration

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 Technical Report are revised and refined as often as new insights for the interactive system under development are to be taken into account.

4 Usability-related information items

4.1 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. The following information items are candidates for inclusion in common industry format standards.

4.2 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.

The context of use description for an interactive system includes

— the overall goals of the system,

— the stakeholder groups who either use the interactive system or are affected by its output throughout the life cycle of the interactive system,

— the characteristics of the users,

— the task goals and task characteristics,

— information processed during tasks,

— technical environment (hardware, software and materials),

— physical and social environments.

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

The inclusion of the sources from which the context of use information was derived and the way the data were collected allows assessment of the relevance and validity of the data.

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

4.3 User needs report

The user needs report includes the following:

— identified, stated, derived and implied user needs across all identified user groups (cognitive, physiological, social);

EXAMPLE 1 Tourists who do not speak English need to obtain a travel ticket from the current location to any destination on the travel network at the cheapest available single or return fare.

EXAMPLE 2 The maintenance staff of a ticket machine need to be able to refill it with change cash or ticket paper more often than once a day.

— the user needs derived from or modified on the basis of other stakeholders that have been identified to be relevant within the context of use description;

EXAMPLE 3 In an ordering process, buyers need to identify themselves to ensure legal accountability expected by those responsible for financial regulations.

EXAMPLE 4 In a warehouse, the security guards need to identify the category of vehicles that come in to allow the dispatchers to direct vehicles to appropriate loading docks as soon as possible.

EXAMPLE 5 Supervisors need users to produce records of all their interactions with the customer.

— the results of the user needs analysis relating the described context of use and its development constraints to the tasks of each user group who are affected including any resulting human-system issues or risks.

EXAMPLE 6 The interaction is designed to minimize the possibility that the user makes any mistakes in specifying the date, destination, ticket type or number of tickets, and to minimize the possibility that the credit card or part of the tickets or change is left in the machine.

User needs are an intermediate deliverable that links the context of use data to the user requirements. The user needs report provides the rationales that serve as the basis and/or validation for both the user requirements themselves and any further design decisions taken.

Inclusion of the sources of the user needs and associated rationales is recommended. The way the data were collected might be included, where appropriate.

4.4 User requirements specification

The user requirements specification includes the following:

— reference to the context of use description intended for the design;

— requirements derived from the user needs and the context of use; for example, there might be a requirement for a product to be used outdoors;

— requirements arising from relevant ergonomics and user interface knowledge, standards and guidelines; for example, there might be a requirement for a computer display to conform to ISO 9241-303;

— usability requirements and objectives including measurable effectiveness, efficiency and satisfaction criteria in specific contexts of use; for example, there might be an objective that 90 % of the intended users can successfully divert an incoming call to voicemail or for the aesthetic design of a web page to achieve a given user satisfaction score;

— requirements derived from organizational requirements that directly affect the user; for example, a call centre system might require a customer to be responded to within a specific time frame.

NOTE 1 Depending on the needs of a development project, the usability requirements and objectives can be a separate information item. Detailed usability requirements and objectives can also be included in the user interaction specification and user interface specification.

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.

User requirements place limits or restrictions on actions and responses, attributes or qualities of an interactive system. User requirements do not prescribe specific solutions or functions. They establish measures or qualities for determining acceptability, conformance or merit of any interactive system.

The user requirements specification includes information on the prioritizations, dependencies, status, relationships and tradeoffs among individual requirements.

It is important for user requirements to be unambiguous and verifiable, consistent, meaningful, traceable and up to date to all those who use them, e.g. customers, suppliers, developers, and those responsible for procurement.

NOTE 2 Information about specifying quality requirements in general can be found ISO/IEC 25030.

4.5 User interaction specification

This specification specifies how users will accomplish tasks with the system at a high level rather than describing what the system should look like. The user interaction specification provides the basis for the design of the user interface, not the design of the user interface itself.

The user interaction specification contains

— Workflow design: the overall interrelationship (including sequences) between tasks and system components on an organizational level, including responsibilities and roles.

— Task design: all tasks broken down into sets of sub tasks and allocation of sub tasks to the user and the system and associated requirements.

— Dialogue model: for each task, the appropriate information exchange between user and system including sequence and timing as well as associated interaction objects and high-level selection of dialogue techniques.

— Task specific detailed usability objectives.

NOTE Depending on the needs of a development project, task specific detailed usability objectives can be referred to in a separate information item or can be included in the user interaction specification.

— Information architecture: from the user's perspective.

NOTE Task is defined as “the activities required to achieve a goal” in ISO 9241-11. Information on task design can also be documented in a separate "task analysis report" that serves as input for the “user interaction specification”.

4.6 User interface specification

The user interface specification provides the basis for the construction of the user interface.

The user interface specification contains the following:

— the task objects and system objects needed to accomplish one or more tasks and the user interface elements that they are composed of;

— their properties, behaviours and relationships;

— the dialogue techniques employed for specific tasks (e.g. menus, form based dialogues, command dialogues, combinations of those);

— views of task objects and system objects for specific tasks, users and user groups.

NOTE The user interface specification is not the final user interface. It describes the basic components of the user interface and can include demonstrations ranging from illustrations to functional prototypes. The user interface specification is often refined during the user interface design rather than being fully specified in advance.

4.7 Evaluation report

Evaluation is a systematic determination of the extent to which an entity meets specified criteria.

The purposes of evaluations include the following:

— improving the usability of the object of evaluation;

— defining a baseline (the data used as a reference with which to compare future evaluation results) for usability for the whole product;

— comparing products;

— comparing a product with (one or more sets of) predefined requirements (e.g. the requirements of two different user groups);

— enabling decisions on redesign or replacement of an existing product;

— identifying failures in the development process.

NOTE Depending on the context of use, evaluation of usability can include accessibility.

Therefore, evaluation reports fall into the following categories according to the purpose of the evaluation:

— reporting usability problems, derived user requirements and recommendations for improving the usability of the object of evaluation;

NOTE These recommendations can relate to redesign, replacement or process improvement.

— reporting a baseline for usability for the whole product;

— reporting differences in usability across a set of products (two or more products);

— reporting conformity with user requirements (conformance test report).

There are a variety of evaluation techniques including user based testing and expert evaluation [see ISO 9241-210 and ISO/TR 16982].

Depending on the purpose of the evaluation, the evaluation report can include

— product identification,

— evaluation objectives,

— predefined user requirements,

— methods used,

— participant descriptions,

— findings (positive and defects),

— unsatisfied user requirements,

— emergent user requirements and recommendations,

— data obtained from the evaluated interactive system,

— data analysis (e.g. cause and effect).

The content of evaluation reports can vary based on the objectives of the evaluation.

NOTE ISO/IEC 25062 defines a common industry format for reports of evaluations based on user performance and satisfaction.

4.8 Field data report

The field data report provides data on actual usage of the product (versus intended usage of the product) as input for upcoming product releases and identifies emergent user requirements. Sources of field data can include observation of use, user satisfaction surveys, usage statistics and help desk data.

The field data report contains the field data and its sources including 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 If field data reports focus on the effective treatment of findings from preceding evaluations, they are also referred to as “follow-up evaluation report”.

Annex A
(informative)

Intended users and uses of the usability-related information items

ISO/IEC 25060 provides a mechanism for all users to communicate about the usability of the product. Examples of situations where information items from the framework can be used are contained in the following list.

Intended users (in alphabetical order)	**Situations that rely on usability-related information items**			
	Purchase situation	Development situation	Maintenance Situation	Contractual situations (after contracting)
Business Analysts	• Specifying requirements as the basis for a comparison between potentially suitable products (Context of use description, User needs report, User requirements specification) • Deciding on “make or buy” based on specified requirements (User requirements specification, Evaluation report) • Conducting comparative evaluations of products based on specified requirements (User requirements specification, Evaluation report)	• Specifying user requirements for a product to be developed (Context of use description, User needs report, User requirements specification) • Specifying usage scenarios for a product to be developed (User requirements specification, User interaction specification)	Identifying requirements for improving an existing product (Context of use description, User requirements specification, Evaluation report)	• Reporting unmet requirements (new requirements) discovered in use (Field data report) • Communicating unmet requirements to a contractor as part of treating defects (Evaluation report, Field data report)

Intended users (in alphabetical order)	**Situations that rely on usability-related information items**			
	Purchase situation	Development situation	Maintenance Situation	Contractual situations (after contracting)
Corporate purchasers (Procurers)	• Collecting requirements as the basis for a comparison between potentially suitable products (Context of use description, User needs report, User requirements specification) • Conducting comparative evaluations of products based on specified requirements (User requirements specification, Evaluation report) • Calling for proposals (RFP) for the supply of custom systems (User requirements specification)	-	-	Communicating unmet requirements to a contractor as part of treating defects (Evaluation report, Field data report)

Intended users (in alphabetical order)	**Situations that rely on usability-related information items**			
	Purchase situation	Development situation	Maintenance Situation	Contractual situations (after contracting)
Developers (any individuals, designing and developing user interface and technical system)	-	• Designing and developing user interfaces based on specified user requirements for the product to be developed (User requirements specification, User interaction specification, User interface specification) • Specifying functional use cases based on usage scenarios (User requirements specification, User interaction specification) • Specifying system requirements based on user requirements (User requirements specification, User interaction specification) • Developing systems based on user requirements and corresponding system requirements (User requirements specification, User interaction specification, User interface specification)	Improving an existing product (Context of use description, User needs report, User requirements specification, User interaction specification, User interface specification, Evaluation report, Field data report)	-

Intended users (in alphabetical order)	**Situations that rely on usability-related information items**			
	Purchase situation	Development situation	Maintenance Situation	Contractual situations (after contracting)
Managers (in terms of sponsors and project managers)	• Deciding on "make or buy" based on specified requirements (User requirements specification, Evaluation report)	• Estimating required resources for a development based on specified requirements (User requirements specification, User interaction specification, User interface specification) • Assessing the progress of a development project based on the extend implemented requirements (User requirements specification, User interaction specification, User interface specification, Evaluation report)	-	• Communicating unmet requirements to a contractor as part of treating defects (Field data report) • Negotiating with contractors about whether required changes are due to unmet requirements or new requirements (User requirements specification, Field data report)
Product managers	• Making comparisons for selecting components to be purchased for products based on specified requirements (Evaluation report) • Assessing the need to revise a component to meet or exceed attributes of competitive products (Evaluation report)	• Estimating required resources for a development based on specified requirements (Context of use description, User needs report) • Assessing the progress of a development project based on implemented requirements (User requirements specification, User interaction, User interface specification)	Assessing the need to revise a product to meet or exceed attributes of competitive products (Evaluation report, Field data report)	-

Intended users (in alphabetical order)	**Situations that rely on usability-related information items**			
	Purchase situation	Development situation	Maintenance Situation	Contractual situations (after contracting)
Requirements Developers	• Specifying user requirements for a product to be developed (Context of use description, User needs report, User requirements specification) • Specifying usage scenarios for a product to be developed (User requirements specification, User interaction specification)	• Specifying user requirements for a product to be developed (Context of use description, User needs report, User requirements specification) • Specifying usage scenarios for a product to be developed (User requirements specification, User interaction specification)	Identifying requirements for improving an existing product (Context of use description, User needs report, User requirements specification, User interaction specification, User interface specification, Evaluation report, Field data report)	-
Suppliers	Providing evidence that products meet specified requirements (User requirements specification, Evaluation report)	Applying user requirements for components or products to be developed (User requirements specification)	-	-