In use qualities from ISO/IEC 25010

1 Quality in use model

Quality in use is the degree to which a product or system can be used by specific users to meet their needs to achieve specific goals with effectiveness, efficiency, freedom from risk and satisfaction in specific contexts of use.

The properties of quality in use are categorised into five characteristics: effectiveness, efficiency, satisfaction, freedom from risk and context coverage (Table 1).

Table 1 – Quality in use characteristics and subcharacteristics

Effectiveness
Efficiency
Satisfaction
Usefulness
Trust
Pleasure
Comfort
Freedom from risk
Economic risk mitigation
Health and safety risk mitigation
Environmental risk mitigation
Context coverage
Context completeness
Flexibility

NOTE Usability is defined as a subset of quality in use consisting of effectiveness, efficiency and satisfaction, for consistency wit its established meaning.

1.1
effectiveness
accuracy and completeness with which users achieve specified goals

1.2
efficiency
resources expended in relation to the accuracy and completeness with which users achieve goals

1.3
satisfaction
degree to which user needs are satisfied when a product or system is used in a specified context of use

1.3.1
usefulness
degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use

1.3.2
trust
degree to which a user or other stakeholder has confidence that a product or system will behave as intended

1.3.3
pleasure
degree to which a user obtains pleasure from fulfilling their personal needs

1.3.4
comfort
degree to which the user is satisfied with physical comfort

1.4
freedom from risk
degree to which a product or system mitigates the potential risk to economic status, human life, health, or the environment

NOTE Risk is a function of the probability of occurrence of a given threat and the potential adverse consequences of that threat's occurrence.

1.4.1
economic risk mitigation
degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use

1.4.2
health and safety risk mitigation
degree to which a product or system mitigates the potential risk to people in the intended contexts of use

1.4.3
environmental risk mitigation
degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use

1.5
context coverage
degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in both specified contexts of use and in contexts beyond those initially explicitly identified

1.5.1
context completeness
degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use

EXAMPLE The extent to which software is usable using a small screen, with low network bandwidth, by a non-expert user; and in a fault-tolerant mode (e.g. no network connectivity).

1.5.2
flexibility
degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements

NOTE 1 Flexibility can be achieved by adapting a product (4.2.8.1) for additional user groups, tasks and cultures.

NOTE 2 Flexibility enables products to take account of circumstances, opportunities and individual preferences that may not have been anticipated in advance.

2 Product quality model (in use qualities)

The product quality model categorises product quality properties into eight characteristics (functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability and portability). Each characteristic is composed of a set of related subcharacteristics. The in use qualities are shown in Table 2.

Table 2 – Product in use quality characteristics and subcharacteristics

(Sub)Characteristic
Functional suitability
Functional completeness
Functional correctness
Functional appropriateness
Performance efficiency
Time behaviour
Capacity
Usability
Appropriateness recognisability
Learnability
Operability
User error protection
User interface aesthetics
Accessibility

Reliability
Maturity
Availability
Fault tolerance
Recoverability
Security
Confidentiality
Integrity
Non-repudiation
Accountability
Authenticity

2.1
functional suitability

degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions

2.1.1
functional completeness

degree to which the set of functions covers all the specified tasks and user objectives

2.1.2
functional correctness

degree to which a product or system provides the correct results with the needed degree of precision

2.1.3
functional appropriateness

degree to which the functions facilitate the accomplishment of specified tasks and objectives

NOTE 1 An example of functional appropriateness is: the user is only presented with the necessary steps to complete a task, excluding any unnecessary steps.

2.2
performance efficiency

performance relative to the amount of resources used under stated conditions

2.2.1
time behaviour

degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements

2.2.2
capacity

the degree to which the maximum limits of a product or system parameter meet requirements

2.3
usability
degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

2.3.1
appropriateness recognisability
degree to which users can recognise whether a product or system is appropriate for their needs

2.3.2
learnability
degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use

2.3.3
operability
degree to which a product or system has attributes that make it easy to operate and control

2.3.4
user error protection
degree to which the system protects users against making errors

2.3.5
user interface aesthetics
degree to which the user interface enables pleasing and satisfying interaction for the user

2.3.6
accessibility
degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use

2.4
reliability
degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

2.4.1
maturity
degree to which a system meets needs for reliability under normal operation

2.4.2
availability
degree to which a system, product or component is operational and accessible when required for use

2.4.3
fault tolerance
degree to which a system, product or component operates as intended despite the presence of hardware or software faults

2.4.4
recoverability
degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system

2.5
security
degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorisation

2.5.1
confidentiality
degree to which a product or system ensures that data are accessible only to those authorized to have access

2.5.2
integrity
degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data

2.5.3
non-repudiation
degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later

2.5.4
accountability
degree to which the actions of an entity can be traced uniquely to the entity

2.5.5
authenticity
degree to which the identity of a subject or resource can be proved to be the one claimed