4.2.6 Usability

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Usability is defined by ISO/IEC 25010:2011 SQuaRE -- System and Software Quality Models as the degree to which a product or system can be used by Stakeholder (i.e., specified users) to achieve specified goals within a specified context.

Goals

The goals are[1)]:

1. **Effectiveness** - The accuracy and completeness with which users achieve specified goals
2. **Efficiency** - The resources expended in relation to the accuracy and completeness with which users achieve goals.
3. **Satisfaction** - The comfort and acceptability of use.

- **Note:** See also

Sub-Characteristics

This characteristic is composed of the following sub-characteristics[2)]:

- ***Appropriateness Recognizability*** *- Degree to which users can recognize whether a product or system is appropriate for their needs.* (1)
- ***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.* (1)
- ***Operability*** *- Degree to which a product or system has attributes that make it easy to operate and control.* (1)
- ***user_error_protection*** *- Degree to which a system protects users against making errors.* (1)
- ***user_interface_aesthetics*** *- Degree to which a user interface enables pleasing and satisfying interaction for the user.* (1)
- ***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.* (1)

See:

- ISO/IEC 25010:2011 SQuaRE -- System and Software Quality Models
- https://iso25000.com/index.php/en/iso-25000-standards/iso-25010/61-usability
- ISO/IEC 9241-210:2019 Ergonomics of human-system interaction

Metrics

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Usability as a characteristic is often considered a subjective quality and left to “interpretation”, however, there are metrics which use to quantify these sub-characteristics. Before we delve into the definition of the specific metrics, it is important to understand why we need metrics rather than just rely on intuitive evaluations.

A core reason to collect Usability Metrics is to provide a data about stakeholder's understanding about a product's usability rather than the developer's understanding of usability. When the two understandings (i.e., interpretations) converge everyone is happy and a way forward can result. That result may be to either continue in the same direction or to have a reassessment of the user's needs.

The metrics must quantify that the system meets the goals of the overall system:

1. The Effectiveness Metrics of the communication between the system and the users
2. The Efficiency Metrics of the users use of the system to accomplish their work
3. The Satisfaction Metrics of the users that the sub-characteristics of the system are met.

Ultimately, the primary objective of usability metrics for evaluating a system or product is properly engineered (i.e., neither under- or over-engineered).

- 4.3.6.1 Effectiveness Metrics
- 4.3.6.2 Efficiency Metrics
- 4.3.6.3 Attitude / Satisfaction Metrics

DDS Specifics Metrics

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1)
Justin Mifsud, Usability Metrics – A Guide To Quantify The Usability Of Any System, Accessed 18 November 2020, https://usabilitygeek.com/usability-metrics-a-guide-to-quantify-system-usability/
2)
International Organization for Standardization (ISO), Usability, ISO25000, Accessed: 17 November 2020, https://iso25000.com/index.php/en/iso-25000-standards/iso-25010/61-usability

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