

# What Is the Difference between Usability in ISO 25000 and ISO/IEC 9241-11?

## - The Term “usability” as Part of the Product Quality Model Used in the SQuaRE Series in Contrast to the Term Usability in ISO 9241-11-

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### Abstract

The ISO/IEC 25000 SQuaRE series of standards (System and software Quality Requirements and Evaluation) deals with quality of systems and software. In ISO/IEC 25010:2011, “usability” is described as a product quality characteristic. On the other hand, “effectiveness”, “efficiency” and “satisfaction” exist as quality characteristics within the quality-in-use model. However, the usability definition used in ISO/IEC 25010 is “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”. As usability for quality characteristics in product quality does not include effectiveness, efficiency and satisfaction. So, there is a contradiction between usability definition and quality characteristics of usability in product quality. This paper describes the meaning of the two “usability” terms, and proposes “interaction capability” as the alternative term for “usability” in product quality to eliminate confusion for the readers of the standard.

### Keywords

usability, software engineer, quality in use, product quality, interaction

## 1. Introduction

The ISO/IEC 25000 SQuaRE (System and software Quality Requirements and Evaluation) series comprises international standards for systems and software quality. There is a quality model division that is one of five main divisions and extension division. There are four quality models, including “data quality”, “service quality”, “product quality” and “quality-in-use”. Figure 1 shows the structure of SQuaRE series.

In this series, two of four quality models, that is, product quality model and quality in use model are described in ISO/IEC 25010:2011. Figure 2 shows the product quality model and figure 3

shows the quality in use model as describes in ISO/IEC 25010: 2011 [2]

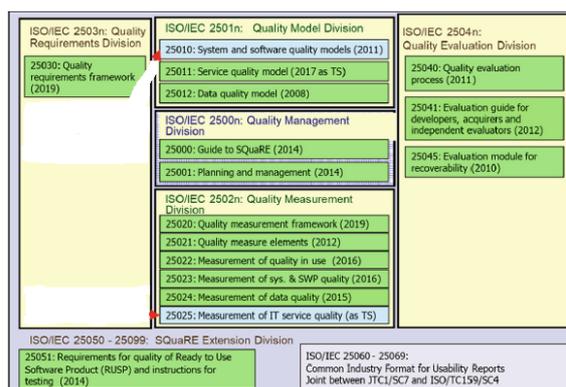


Figure 1. The architecture of the SQuaRE series [1]

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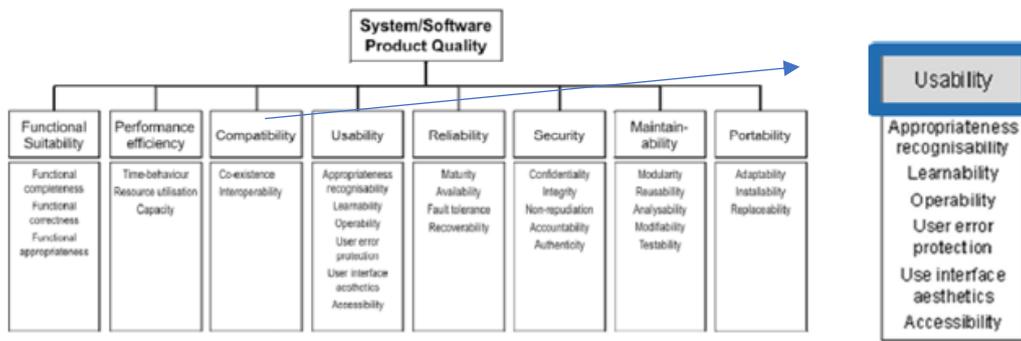


Figure 2 Product quality model including usability as a quality characteristic and its sub-characteristics [2]

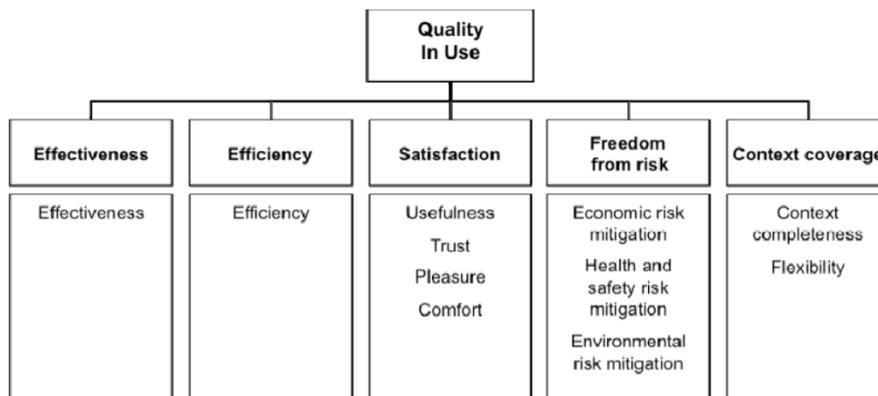


Figure 3 Quality in use model [2]

In figure 2, we find the term “usability” as one of the characteristics of product quality. On the other hand, we find the terms “effectiveness”, “efficiency” and “satisfaction” as quality characteristics of the quality in use model in figure 3. In ISO 9241-11, usability is defined in terms of effectiveness, efficiency and satisfaction. So, the same term “usability” is used in both standards, but the meanings are different.

This paper describes the difference between the definitions and proposes an alternative term to “usability” in product quality.

## 2. Meaning of “usability” as defined in ISO 9241-11

Figure 4 shows the concept and definition of usability as defined in ISO9241-11 [3].

In ISO 9241-11, usability is defined as the “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”. Figure 4 explains that the outcome of “use” in context of use is usability in terms of effectiveness, efficiency and satisfaction. In figure 4, “use” is emphasized.

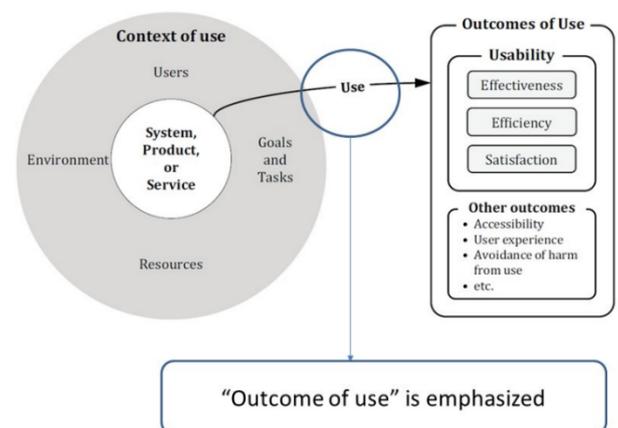


Figure 4. Usability concept (ISO9241-11, modified)[4]

There are other popular usability definitions. For example, Nielsen[5] defined usability in terms of five characteristics, including “easy to learn, i.e., learnability”, “efficient to use, i.e., efficiency”, “easy to remember, i.e., memorability”, “few error” and “subjectively pleasing satisfaction”. Jordan[6] defined usability in terms of “guessability (of interaction), “learnability” (of interaction), and so on. These definitions are both related to user system interaction. They are focused on interface design for interaction, e.g., “learnable interaction process”, “guessable button for intended operation” or “font size for minimizing reading errors”. As these definitions focus on “ease of interaction”, there is a difference between these definitions and the ISO definition used in ISO/IEC 25010 and ISO 9241-11.

### 3. Proposal for an alternative term to not confuse readers of Standards of the SQuARE series

As described in section 2, the sub-characteristics of “usability” in the product quality model as shown in figure 2 focus on “ease of interaction”, not effectiveness, efficiency and satisfaction in context of use. The authors wish to note that from an international standards perspective, inconsistency in terminology will result in significant problems:

- A) It weakens standards if they state different things about the same term especially when each of them is widely used. Double definition of terms between established disciplines is a problem. In this case it cannot be represented characteristics of product quality. Replacing "usability" with "interaction capability" would solve this thirty-year-old problem.
- B) Both ISO/IEC 25010 and ISO 9241-11 are widely used and conceptual inconsistencies between them weakens confidence of the readers. Though “usability” is only used in ISO/IEC 25010 as a term, the concept of usability is defined in ISO 9241-11.
- C) Two standards use usability as ISO 9241-11 defines it. They will both have trouble relating to ISO/IEC 25010, especially now that the product quality model and quality-in-use are in different document (25010 and 25019).

Some of the quality sub-characteristics of usability as quality characteristics of product

quality are taken from ISO9241-110 (“Interaction principles”). From this, these quality sub-characteristics are deeply related to “interaction”. So, we propose the term “interaction capability” as a replacement term for “usability” for quality characteristics in the product quality model.

### 4. Conclusion

This paper describes the meaning of two “usability” terms in ISO/IEC 25010 and ISO 9241-11. “Interaction capability” is proposed as the alternative term to “usability” for the product quality model. Irrespective of whether this proposal will be accepted for new versions of ISO/IEC 25010, we have to clarify the misunderstanding between the capability of product attributes to serve as prerequisites for usability (“interaction capability”) as defined in the software engineering area and usability itself as defined in the ergonomics area

### 5. References

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