

Chapter 13

Website Usability: A Re-Examination through the Lenses of ISO Standards

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ABSTRACT

The original conceptualization of usability was ease of use, this was later expanded into a multi-dimensional construct in ISO standards and usability literature. Such an expansion is seen as an improvement, since cross-study comparison or benchmarking cannot objectively be done without a common set of usability components being defined. The current issue lies in how these components are operationalized, measured and validated. Although ISO standards ties usability to contextual situations, recent research has started to also recognize psychographic and demographic variations within the same context. The purpose of this study is to review web site usability as it relates to ISO standards (more specifically ISO 9126, ISO 9241 and ISO/IEC 25010) and existing usability studies. Implications for researchers and practitioners are provided.

OVERVIEW

This paper specifically addresses web usability from the perspective of how easy a system is to learn, remember and use (Rosen, Purinton, & Lloyd, 2004). The system features should emphasize subjective satisfaction (Cheug & Lee, 2005), low error rate and high task performance

(Calongne, 2001). Usability is an important component of a variety of products and services from instruction for lawn mowers to websites. In the case of physical products usability is often measured by does the product do what it claims to do? Does the product work as advertised? Are the instructions clear? Do the instructions make sense?

DOI: 10.4018/978-1-4666-8619-9.ch013

In the online context usability addresses not only “ease of use” and “efficiency”, but it is also concerned with Human Machine Interfaces (known as Graphic User Interfaces – GUIs within modern operating systems or web sites). Although early studies have primarily focused on the ease of use aspect of web site usability (e.g., Nielsen, 1999), later studies have embraced international standards and uniformly recognize a multi-dimensional form of usability. The advent of online retail has forced organizations to consider consumers in a new light. Organizations work hard to ensure a pleasant experience for the user. Shoppers want sites that are valuable and easy to use. Features that aid the users can help retain visitor interest (Sockel, Falk, Warren, & Chen; 2007). Sockel et al warn organizations to exercise caution and not rely solely on GUI to boost online sales. Interfaces can be imitated, the long-term competitive edge is less salient compared to factors, such as customer confidence and relationship services (Kotha, Rajgopal, & Venkatachalam, 2004).

DEFINITIONS OF USABILITY

The term “usability” has evolved from a simple concept of *ease of use* to a construct with multiple dimensions that was adopted as part of the ISO/IEC Software engineering - Product quality model 9126. The ISO/IEC 9126 is an international standard for the evaluation of software quality. The standard was developed by The ISO (the International Organization for Standardization) and the IEC (International Electrotechnical Commission). The two organizations ISO and IEC were established by “member organizations” for the purposes of providing agreement and a level of uniformity on technical issues (ISO/IEC 9126, 1991). The fundamental objective of this standard is to address some of the well-known human biases that can adversely affect the delivery and perception of a software development project.

The 9126 standard defines six software quality characteristics that minimally overlap (Functionality, Reliability, Usability, Efficiency, Maintainability, and Portability). Together these characteristics provide a baseline for description and further refinement of software quality (ISO/IEC 9126, 1991 p 1).

The construct of Usability is often defined as a set of attributes that bear on the effort needed for use, and on the individual assessment of such use, by a stated or implied set of users. It is generally accepted to have five sub-classifications: understandability, learn ability, operability, attractiveness and usability compliance.

This user interface centric view was later expanded in ISO 9241-11 (1998) which defines usability as “the 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.” This expansion of usability into a wider system view was later adopted and renamed to “quality in use” in ISO 9126-1 (2001) (Bevan, 1999).

ISO/IEC 25010, a more recent international standard that brings previous standards together, combines the following two models to capture software quality: Quality in Use Model (See Figure 1) and Product Quality Model (See Figure 2). The Quality in Use Model has five elements (effectiveness, efficiency, satisfaction, freedom from risk and context coverage) relating to the outcome from the actual use. Three of the five elements were adopted from the ISO 9241-11’s definition of usability. The Product Quality Model of ISO/IEC 25010 has eight elements that are concerned with the characteristics provided by a product, service or system. Of the eight elements in the product quality model, operability replaces usability of ISO 9126-1 to capture a broader meaning (Lew, Olsina & Zhang, 2010) that includes Appropriateness, Recognizability, Learnability, Operability, User error protection, User interface aesthetics and Accessibility.

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