
UX, Usability and ISO Standards

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Abstract

The paper explores the relationship between UX and current approaches to usability in ISO standards, and how the ISO approach could potentially be extended to incorporate UX in guidance for product developers.

Three approaches to usability are identified:

1. System Usability: Meeting organizational goals for user performance, safety and satisfaction resulting from interaction.
2. User Experience (satisfaction): Meeting user pragmatic and hedonic goals related to the experience and outcomes of interaction.
3. Product usability: providing product attributes to support system usability and the user experience.

Keywords

Usability, UX, user experience, quality in use, satisfaction, standards

ACM Classification Keywords

H5.2 User Interfaces: Interaction styles, theory and methods.

Introduction

What is user experience? A typical definition is "Every aspect of the user's interaction with a product, service, or company that make up the user's perceptions of the

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whole" [14]. Many authors have differentiated usability and user experience. For example, Baekdal [1] contrasts the usability of a long straight highway with the user experience of a mountain road. But what is the real difference between usability as practiced and user experience?

Approaches to usability

One view of usability that is popular among product developers is that it is the attributes of the user interface that makes the product easy to use. This is consistent with one the view of usability in HCI, for example in Nielsen's [12] 1993 breakdown where a product can be usable, even if it has no utility:

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system acceptability
  social acceptability
    practical acceptability
      cost
      compatibility
      reliability
      usefulness
        utility
        usability
  
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Another popular definition of usability is that from ISO 9241-11 [6]: "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 difference between these two views of usability is in their scope. Nielsen's breakdown refers to the usability of the product: i.e. whether a product has characteristics that make it easy to use (in a particular context of use).

The ISO definition is in terms of the results of using the product: effectiveness, efficiency and satisfaction are measures of the whole system (product, user, task and environment), not just of the product. It includes user satisfaction, defined by ISO as "Freedom from discomfort, and positive attitudes towards the use of the product".

This ISO view of usability has been extended in the definition of quality in use in ISO 9126-1 [10] to include "safety": adverse consequences of use (including not only health and safety, but the potential business and financial consequences of errors in usage). One apparent difference is that ISO 9126-1 emphasizes the importance of identifying implicit needs to avoid adverse consequences, for example for the health and safety of the user to avoid RSI.

This perspective of usability is closely aligned with business goals: effectiveness, efficiency and safety have a direct impact on profitability for systems used by organizations [2]. Satisfaction is critical for discretionary use, especially of web sites.

A product with design features that jeopardize effectiveness, efficiency, safety or satisfaction creates a risk that it will not meet its business objectives.

While ISO 9241-11 is not very specific about goals, the 9241-11 measures can be interpreted from the perspectives of different stakeholders. This may lead to a conflict of interest, for example where users, staff and managers may have different goals.

One reason for the popularity of this definition with usability professionals, is that when interpreted from

the perspective of the organisation's goals it provides a business rationale for the importance of usability which is more compelling than mere ease of use.

UX and usability

Usability can also be seen from the inside out as meeting the user's goals, rather than the organisation's goals, which takes usability back closer to its original meaning. From this perspective the key element in the ISO definition is satisfaction. However, as Hassenzahl points out, current approaches to satisfaction typically assess primarily the users' perception of effectiveness and efficiency, so that if users perceive the product as effective and efficient, they are assumed to be satisfied [4].

But there is evidence that fun or enjoyment is an aspect of user experience that also contributes significantly to overall satisfaction with a product [3].

So in order to encompass the overall user experience, UX needs to be concerned with satisfying both pragmatic and hedonic user goals.

The pragmatic user goals are:

- Acceptable perceived experience of use (pragmatic aspects including efficiency).
- Acceptable perceived results of use (including effectiveness).
- Acceptable perceived consequences of use (including safety).

Hassenzahl identifies three hedonic goals [5]:

- Stimulation (i.e. personal growth, an increase of knowledge and skills).
- Identification (i.e. self-expression, interaction with relevant others).
- Evocation (i.e. self-maintenance, memories).

To these I would add:

- Pleasurable emotional reactions to the product (Norman's visceral category [13]).

This suggests that if ISO intends usability to cover the whole user experience (as suggested in the revised draft of ISO 13407 [8]), it needs to encompass both usability from an organizational perspective and usability from a user perspective.

The importance of usability measures

The most common reasons for measuring user experience in product development are to obtain a better understanding of users' needs and to improve the product in order to provide a better user experience.

But it is also important to establish criteria for usability goals at an early stage of design. As suggested by Whiteside et al [15], these criteria should if possible be based on:

- An existing system or previous version
- Competitive systems (with good market share and/or acclaimed user interface)
- Carrying out the task without the use of a computer system

It is important to consider the potential adverse consequences of not meeting the goals. For instance in Cockton's example [3] of designing a van hire system,

from a business perspective, what are the potential consequences of:

- Not offering exactly the type of van preferred by a potential user group?
- The user mistakenly making a booking for the wrong dates or wrong type of vehicle?
- The booking process taking longer than with competitor systems?

For a consumer product or game, what are the potential adverse consequences of a lack of pleasurable emotional reactions or of achievement of other hedonic goals?

These high level requirements may feed back into detailed user interface design requirements to maximize the quality of the user experience and to minimize the likelihood of adverse consequences. The criteria should also be considered for usability testing with users during design, depending on the potential risks to the project if the objectives are not achieved.

Measuring User Experience

In a product development environment, pragmatic aspects of user experience have been successfully measured with psychometric questionnaires (although not so far acceptable consequences of use).

Questionnaires would also appear to be the most reliable way to measure the achievement of hedonic goals [5].

Existing satisfaction questionnaires are often also used for summative purposes, either for comparing satisfaction with a previous version, or to find out whether a requirement for satisfaction has been met.

Users answer existing satisfaction questionnaires in relation to their expectations. The same would probably be true hedonic questionnaires, which would make comparisons across products meaningful.

Implications for International Standards

I am involved in the development of the revision of ISO 13407 [7], and am co-editor of the definition of a new quality model for usability as part of quality in use [11], and of the revision of the standard for usability methods [9]. I believe that as all these standards are intended to support product development, they should broaden their scope to incorporate aspects of UX.

I look forward to further inspiration from the workshop on how this could be achieved.

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