# User Experience and Other People: On User Experience Evaluation Framework for Human-Centered Design

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**Abstract.** Recently, the word "User Experience (UX)" has been often used in usability-related areas such as web design and system design. Although it was defined in ISO 9241-210 and its importance has been growing, details of the notion and results of introduction of it have not been well clarified yet. In the previous paper, a new integrated evaluation framework of usability and UX, based on ISO 9241-11 and ACSI (American Customer Satisfaction Index) was proposed. Since the proposed framework does not consider influences to other people by the utilization but considers only interactions of a user with a product or service, it may be narrow-minded in a social age. Thus, this paper slightly extends the framework to consider influences to other people by the utilization in the related context of use.

**Keywords:** User experience · Usability · ISO 9241 · ISO 13407 · ISO/IEC 25010 · Evaluation framework · American customer satisfaction index

## 1 Introduction

Recently, the word "User Experience (UX)" has been often used in usability-related areas such as web design and system design [2, 6–11]. Although it was defined in ISO 9241-210 [6] and its importance has been growing, details of the notion and results of introduction of it have not been well clarified yet. In the previous paper [8], a new integrated evaluation framework of usability and UX, based on ISO 9241-11 [5] and ACSI (American Customer Satisfaction Index) [1] was proposed (Fig. 1).

In HCII 2014, one participant questioned that the proposed framework is so inclined to a user who interacts with a product or service that it neglects to consider negative influences to other people nearby by the utilization. For example, when a user uses a portable game machine, the framework explains only a degree of effective, efficiency, and user experience of the user. Even if the utilization annoys other people nearby, the framework does not consider it. Since we are in a highly social age with SNS and other media these days, it will be considerate to care influences to other people by the utilization in the intended context of use.

Thus, this paper slightly extends the framework to consider influences to other people by the utilization in the related context of use. In the following, firstly the
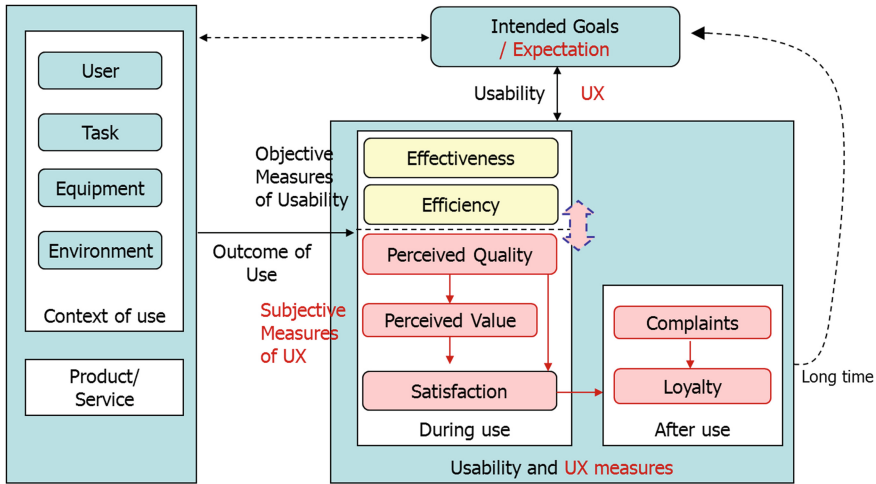
**Fig. 1.** Integrated evaluation framework of usability and UX at HCII 2014

previous framework is briefly explained, followed by issues to consider, revised framework, and conclusion.

## 2 Previous Framework

Since international standards are important in doing business worldwide, the previous framework (Fig. 1) was created based on the usability framework of ISO 9241 part11. In the creation, firstly ergonomics standards were considered followed by secondary other standards in related areas and lastly other well-known frameworks. ACSI (American Customer Satisfaction Index) was adopted to explicate satisfaction; Satisfaction in ISO 9241 part11 was replaced by the subjective measures of ACSI.

In Fig. 1, when considering usability and UX of a product or a service, tasks are conducted in a specific context of use with intended goals and expectations, and outcome of the use is measured objectively by effectiveness and efficiency and measured subjectively by perceived quality and value, satisfaction, complaints, and loyalty.

Although objective measures are still represented by effectiveness and efficiency, subjective measures are represented by UX measures derived from ACSI. Figure 1 represents both objective measures and subjective measures of UX.

While objective measures are what designers want to measure, subjective measures of UX are supposed to represent as close user's subjective evaluations as possible. Basically, there is no direct connection between effectiveness and efficiency, and the subjective measures of UX. However, if measures of effectiveness and efficiency are well designed enough to represent user's subjective evaluation of perceived quality, perceived value, and possibly other measures of UX, the connection will be tighter. When considering UX, effectiveness and efficiency need to be reevaluated by perceived quality and perceived value toward satisfaction.

With minimum changes to the usability framework of ISO 9241 part11, the integrated framework represents UX evaluation as well.

## 3   Issues to Consider

When considering influences to other people nearby in the Fig. 1 framework, there are at least two issues to take care of: one is how to treat other people nearby in the context of use area in the left half of the Fig. 1, and the other is how to measure the influences in the measuring part of Fig. 1, namely lower right of Fig. 1. In this section, these two issues are considered from the related international standards: ISO 9241 part11, part 210, and ISO/IEC 25010 [4]. While ISO 9241 part11 (measurement framework of usability) and part 210 (Human-centred design) are ergonomics standards, ISO/IEC 25010 is a part of software quality standards which defines system and software quality models.

### 3.1   Other People in "Context of Use"

As shown in the left half of Fig. 1, "context of use" consists of "user", "task", "equipment", and "environment". Since "user" appears to be most relevant to "other people" in "context of use", it is firstly investigated. There are different definitions of "user" between ISO 9241 part11 and ISO/IEC 25010. While "user" is defined as "person who interacts with the product" in ISO 9241 part11, it is defined as "individual or group that interacts with a system or benefits from a system during its utilization" in ISO/IEC 25010. Latter part of ISO/IEC 25010 definition is an evident addition to the definition of ISO 9241 part11. ISO/IEC 25010 considers "user" as not only a person who interact with a product or service but also a person who benefits from the utilization. However, other people nearby who receive negative influences do not seem to be involved.

   Other than "user", since both ISO/IEC 25010 and ISO 9241 part 210 have the same definition related to a person, namely "stakeholder", it is investigated secondly. "Stakeholder" usually means those who are affected by success or failure of a task. Since other people nearby are usually irrelevant to success or failure of a task, it is also different from other people nearby.

   Finally, "environment" is investigated. By definition, "environment" consists of "physical environment" and "social environment". Since other people nearby can be a part of "social environment", it will be possible to consider that "context of use" of Fig. 1 covers other people nearby.

   In conclusion, there are two possibilities to consider other people nearby in "context of use" of Fig. 1. One possibility is no change of Fig. 1 that considers "environment" includes other people nearby. The other possibility is to add "Other people" to "context of use" explicitly. Not to mention, the latter choice will be more explicit. The latter choice will be also appropriate when emphasizing accessibility aspect of the framework since considering different characteristics of people is very important in considering accessibility [3].

## 3.2  Influences on Other People in the Intended Context of Use

In the lower right of Fig. 1, "influences on other people" might be expressed in each of effectiveness and efficiency. However, since a factor of "influences on other people" inhibits effectiveness and efficiency, it is better to be represented as an independent measure.

When adding a measure of "influences on other people" to effectiveness and efficiency, "quality in use" in ISO/IEC 25010 is informative since "quality in use" is coined after ISO 9241 part11 with reference to usability of ISO 9241 part11. While usability of ISO 9241 part11 consists of only effectiveness, efficiency, and satisfaction, "freedom from risk" and "context coverage" are added in "quality in use". "Influences on other people" are related to these two measures. In the sense that "influences on other people" requires an extension of "context coverage", it is related. In the sense that "freedom from risk" inhibits effectiveness and efficiency, it is related as well.

In conclusion, both "freedom from risk" and "context coverage" can be candidates for the extension of the Fig. 1.

## 4  Revised Framework

Revised framework is shown in Fig. 2. "Other people" are explicitly added to "context of use". "Freedom from risk" is rephrased as "risk mitigation" since risk free is usually unthinkable. "Context coverage" is not added since "other people" is already explicitly added to "context of use".

With respect to relations between object measures and subjective measure, results of objective measures are reevaluated in subjective measures. In this sense, no matter how objective measures are calculated, subjective measures are not affected at all if the user does not perceive "influences on other people". UX measures entirely depend on the user.
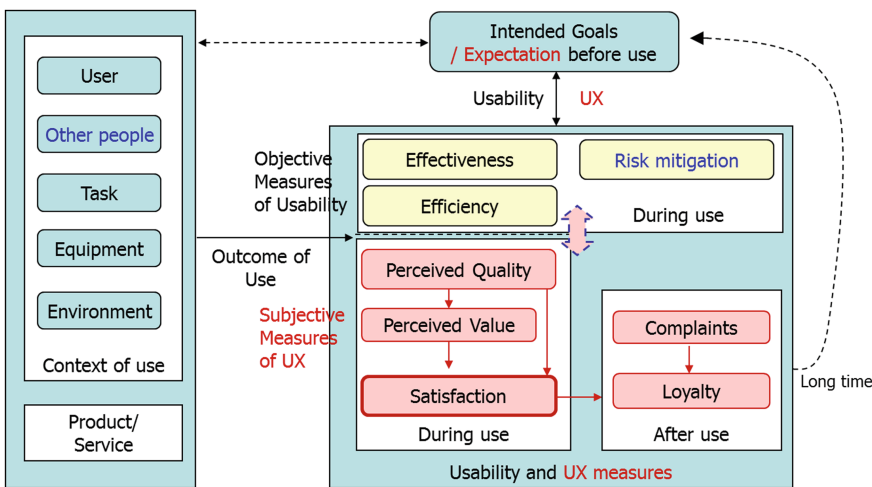


**Fig. 2.**  Revised integrated evaluation framework of usability and UX

When "influences on other people" must be considered in the subjective part, there will be two choices. First is to replace the subjective measures part with "satisfaction" only as in ISO 9241 part11 and to measure "satisfaction" by a combined measure of the user's satisfaction and other people's satisfactions. Second is to design a product or service to make the user consider "influences on other people" or to design a product or service well to prevent "influences on other people" in order that the user does not need to care about "influences on other people".

## 5   Concluding Remarks

In the previous paper, an integrated evaluation framework of usability and UX was proposed. This paper proposed a revised integrated evaluation framework of usability and UX to include "influences on other people".

Since UX is a complex notion [2, 6–11], the integrated new framework is expected to be applied to and examined against real applications. Results of this paper are also expected to be considered in the creation of UX related international standards.

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