

Context Coverage in “Quality in Use Model”

Shin'ichi fukuzumi

RIKEN

Center for Advanced Intelligence Project

Tokyo, Japan

Shin-ichi.fukuzumi@riken.jp

Abstract—In ISO/IEC 25010, Quality in Use is mainly focused to the use of operators who interact with product and system directly. However, as workstyle using ICT (Information Communication Technology) product, system or service has been changed, object of quality in use are also changed to not only direct users with simple direct interaction but also many stakeholders and society which are influence on indirectly by someone use the product, system and service. When the concept of quality in use has changed, the issue about dealing with previous quality characteristics occurred. This paper focuses on context coverage which is one of quality characteristics in previous quality in use model and discuss the position of this characteristic. As proposal, this characteristic shall be removed because context is prerequisite for “use”. And as another proposal, this characteristic should be moved to product quality because coverage can be represented as a specification.

(Abstract)

Keywords- usability, software engineer, quality in use, context coverage

I. INTRODUCTION

Importance of usability has been considered in not only ergonomics area but also software engineering area[1]. Quality model in SQuaRE (System and software Quality Requirement and Evaluation) series which are dealt with in ISO/IEC JTC1SC7 defined effectiveness, efficiency, satisfaction freedom from risk and context coverage as elements of “Quality in Use”[2]. Figure 1 shows the Quality in Use model defined in ISO/IEC 25010.

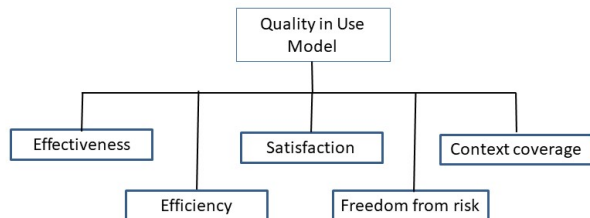


Figure 1. Quality in Use model defined in ISO/IEC 25010 [2]

In this figure, effectiveness, efficiency, satisfaction, freedom from risk and context coverage are quality characteristics of Quality in Use Model defined in ISO/IEC 25010[2].

On the other hand, ISO 9241-11: 2018[3] which is one of human-system interaction standards in ergonomics area describes the concept of usability shown in Figure 2. As usability definition is “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” in this standard, this figure explains that outcome of “use” under identified context of use is usability which elements are effectiveness, efficiency and satisfaction. In this figure, “use” is emphasized.

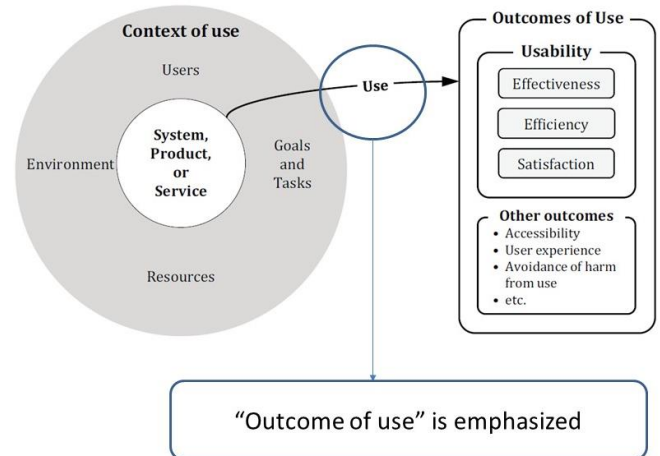


Figure 2. Usability concept (ISO9241-11, modified)[3]

Comparing these two figures, it turns out that there are common elements, i.e., effectiveness, efficiency, satisfaction. As describes above, usability is parts of outcome of “use”, it can be found that Quality in Use model is also focused on “use”, that is direct interaction. In case of this, freedom from risk means influence on economy and health by using and context coverage means whether product, system or service can be used or not under initially explicitly identified context of use.

II. CONTEXT COVERAGE

Recently, as workstyle using ICT (Information Communication Technology) product, system or service has been changed, object of quality in use shall be included not only simple direct interaction but also many stakeholders and society which are influence on indirectly by someone use the

product, system and service. That is, ICT product, system or service users are not only direct users who interacts system and product directly but also indirect user who use output obtained by using ICT product, system or service. When object of quality in use is wider, the model has to be changed. Figure 3 shows the proposal quality in use model which expanded object range.

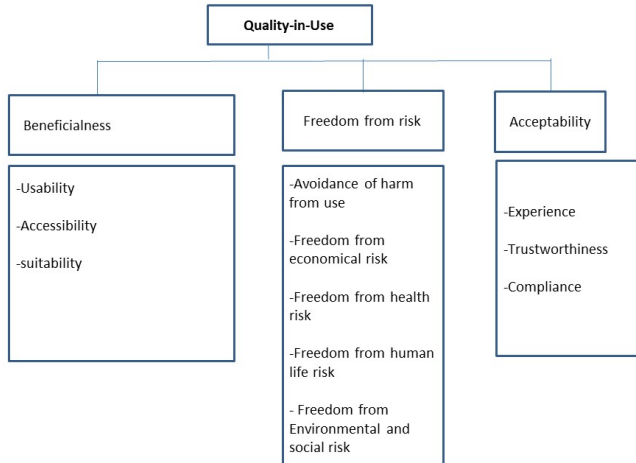


Figure 3. Proposal Quality in Use model [4]

This proposal model covers almost quality characteristics/subcharacteristics defined in previous model [2]. However, only context coverage does not appear. The reason describes below.

In ISO/IEC 25010, “context coverage” is defined as follows,

“degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in both specified contexts of use and in contexts beyond those initially explicitly identified”.

And this quality characteristics has two subcharacteristics. Their titles and definitions are as follows,

- context completeness: degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use
- flexibility: degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirement

From these definitions, context coverage means whether target ICT product, system or service can be used or not under assumed context of use.

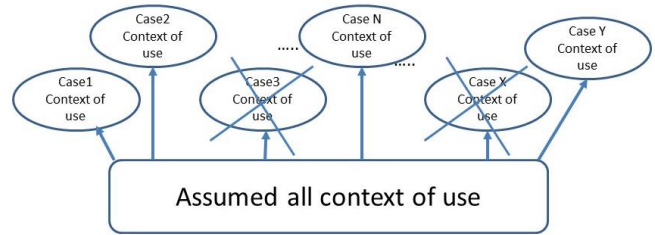


Figure 4. Imagine of context coverage

Figure 4 shows the imagine of context coverage, that is, the relationship between assumed all context of use (N) and each context of use which really can be used. In this figure, case 3 and case X are context which really cannot be used. So, degree of context coverage is $(N-2)/N$. However, as proposed quality in use model is focuses on affect and influence by use, contexts which can not be used are out of target. This means that assumed contexts are prerequisite. If context changes and target ICT product, system or service could not be used, quality in use could not be discussed because “use” is a prerequisite in quality in use. When considering “use”, a context of use is predefined. So, when context changes, the context is predefined context of use.

III. FUTURE DISCUSSION

Though context coverage does not include in the new proposal quality in use model, its concept is important for previous model users. To solve this issue, one idea is to add this quality characteristic to product quality model. Whether ICT product, system or service can be used under assumed context or not is dependent on their specification. So, context coverage can be one of quality characteristics or subcharacteristics in product quality.

REFERENCES

- [1] Fukuzumi, S., Hirasawa, N., Wada, N., Komiyama, T. and Azuma, T.: Proposal of Quality in Use in software Quality, Human-computer Interaction design and user experience, pp431-438, 2020.
- [2] ISO/IEC 25010: Systems and software engineering -Systems and software Quality Requirements and Evaluation (SQuaRE) — System and software quality, 2011
- [3] ISO9241-11: Ergonomics of human-system interaction –Part11: Usability for definition and concept (2018)
- [4] Fukuzumi, S. and Wada, Noriko: : Quality in Use -Case Study for Evaluation-, Human-Computer Interaction. Theory, Methods and Tools, Thematic Area, HCI 2021, Held as Part of the 23rd HCI International Conference, HCII 2021, Virtual Event, July 24–29, 2021, Proceedings, Part I, Editors: Kurosu, Masaaki (Ed.) pp.343-350, 2021.