

Usability in software development process -Proposal of Society/Stakeholder Centered Design (SCD)-

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Abstract—This paper is a proposal about Society/Stakeholder Centered Design (SCD) concept for usability of software. Traditionally, to achieve high usability, Human Centered Design (HCD) process is adopted in development process. However, this usability is mainly focuses to direct users who interacts the system, product and service directly. Recently, as workstyle using ICT (Information Communication Technology) has been changed, ICT users are not only direct users who interacts system and product directly but also indirect user who use output obtained by using ICT. This paper proposes a concept of outcome and consequence of use. This includes not only use of system, product or service but also use of their outputs. To the future, by preparing concrete examples, concept of SCD would like to be proposed. (Abstract)

Keywords-Human centered design, usability, development process, software engineer, quality (key words)

I. INTRODUCTION

In 2010, ISO9241-210 “Human-centred design for interactive system” which is an ergonomic related standard about human centered design was published [1]. This standard is put to practical use as an example which shape HCD concept. Fig. 1 shows the relationship among each HCD activity. As shown in this figure, HCD has six activities [2]. They are,

- 1) “Plan the human-centered design process” which is a decision phase of a project to apply HCD to a target system,
- 2) “Understand and Specify the context of use” which is a phase that a project get information how user uses a target system,
- 3) “Specify the user needs and the user requirements” which is a phase to extract users’ needs to a target system and to specify the needs,
- 4) “Produce design Solution to meet user requirements” which is a phase to make a prototype or production according to the specification,
- 5) “Evaluate the design against requirements” which evaluates whether the design meets the requirements,

- 6) “Design solution meet user requirements” which evaluates whether the solution meets requirements”.

In these, 2), 3), 4) and 5) are main activities in HCD process.

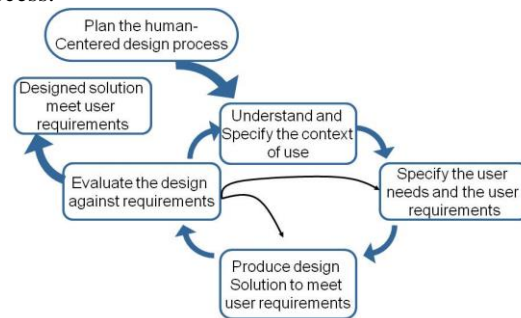


Figure 1. Relationship among each HCD activity [1].

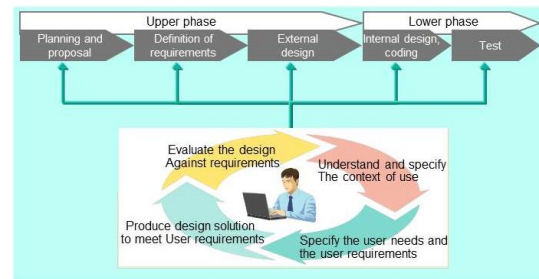


Figure 2. The relationship among HCD activities and development process

To achieve high usability, these are applied to each development process shown in Fig. 2. Like this, HCD is a method to provide system and product with high usability for users and stakeholders [3].

About usability in software engineering, Quality in use model is defined in ISO/IEC25010 [4]. Figure. 3 shows the Quality in use model. As this model is structured by referring to usability standard related to ergonomics, mainly focuses to human-system interaction interacting by direct user.

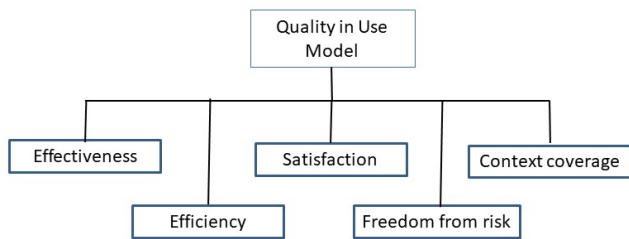


Figure 3. Quality in Use model defined in ISO/IEC 25010 [4]

II. ISSUES OF CURRENT USABILITY

Recently, as workstyle using ICT (Information Communication Technology) has been changed, ICT users are not only direct users who interacts system and product directly but also indirect user who use output obtained by using ICT. Concept of usability also has been changed. Fig. 4. Shows the recent usability concept defined in ISO9241-11[5].

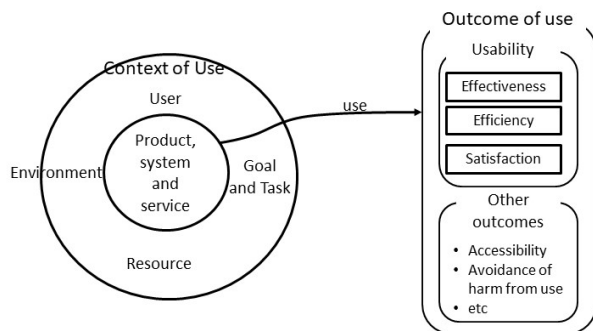


Figure 4. Usability concept (ISO9241-11, modified)[5]

This figure explains that usability is outcome of use of system, product or service in specified context of use. However, this usability still only describes outcomes from direct use.

III. PROPOSAL FOR QUALITY IN USE

Direct user means a user who interacts with product, system or service directly. For example, ATM users in banking system, customers for electric commerce system. There are other direct users, called “secondary users”. They also interact product, system or service directly, but their main task is not use a product or system or receive service, but operate and maintain of these system. Moreover, there are the other kinds of users, they are indirect users of other stakeholders. They usually use an output of products or system. For example, in case of self-driving car (level four or low), a driver is one of direct user and operators of traffic infrastructure are kinds of secondary user. As for pedestrians,

they are indirect users. Figure 5 shows the proposal concept of quality in use include other stakeholders.

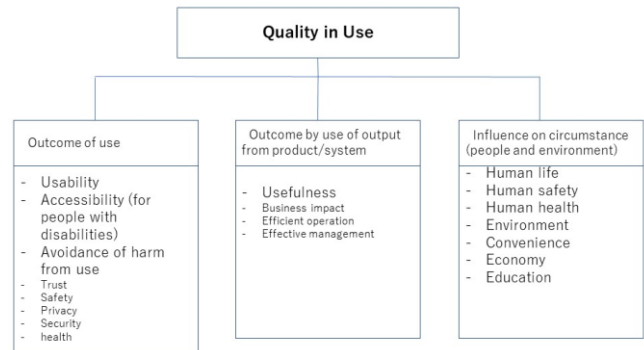


Figure 5. Proposal model of Quality in Use

This figure is still under proposal. To progress discussion, it is necessary to have the viewpoint of not only product and/or system but also data and service quality [6],[7].

IV. FUTURE THEME

In Figure 5, discussion of subcharacteristics of “Outcome by use of output from product/system” and “Influence on circumstances” are not enough.

So, to the future, we will describe subcharacteristics of consequence of use by using some example (e.g. self-driving system, traffic control system and so on).

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