

User-Centered Design Activities for PCs

KAWASHIMA Koji, TSUJI Mami

Abstract

The scenarios of PC use are diversifying and multiplying due to the advancement and diversification of IT devices. Therefore, the “usability” requirements from users are also always changing today. Under such circumstances, to develop PCs truly from the viewpoint of users by employing the concept of “user-centered design (UCD)” has become indispensable.

This paper introduces the efforts being made by NEC Personal Products for providing customers with PCs which is “very-easy-to-use throughout total PC life” based on such “user-centered design” process. Some actual case studies of improvements are also reported.

Keywords

user-centered design (UCD), usability, easy-to-use, user interface (UI)
graphical user interface (GUI), voice of customer (VOC)

1. Introduction

The technique based on “user-centered design” places users at the center of planning and development, and enables the design process to be performed continuously from the perspective of users. This process is more indispensable for the PC than for all other kinds of products. This is because PC designers and all associates around them are especially advanced PC users who have very high knowledge of PC, and these people have difficulty in realizing that the views and behavior of many users toward the PC are quite different from their own. As a result, while they are aware of the need to offer easy-to-understand explanations, they sometimes tend to ignore basic principles thinking that these are common knowledge or use special technical terms and jargon thinking that these are universally used.

After the launch of Windows 95/98, the PC suddenly expanded its usage scenarios until its saturation level in Japanese households has reached near 80% today.

Nowadays, even those people that are not at all interested in the computer or software use PCs to enable their lives to become more affluent and enjoyable. They do this by using the Internet for ordering “home delivery services,” obtaining local news and information or as a tool for communicating with family and friends (**Fig. 1**).

These changes have led to a significant increase in the importance of the “usability” of the PC compared to the days in which it was a special tool for computer buffs. In particular,

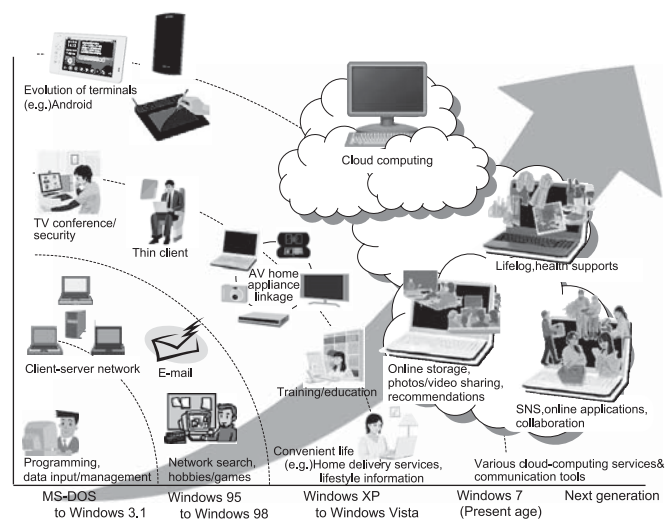


Fig. 1 Changes in usage following the dissemination of PCs.

the priority given to “usability” has been rising in terms of “allowing even those people that have avoided IT devices to start using them with ease.”

Furthermore, the advancements and diversifications of IT devices and the release of new user interfaces are rapidly changing the concept of “usability” that users hold regarding the PC.

This paper reports on the progress of our current efforts in improving “usability” based on “user-centered design” that aims to provide PCs that are “reliable, simple and comforta-

ble.” Some actual case studies of related activities are also discussed.

2. Efforts toward “User-Centered Design” at NEC PC

In the history of development of NEC PCs, “usability” has always been one of the critical issues for us.

2.1 Checklist Use and Improvements

Subsequent to “ISO13407: Human-Centered Design Process for Interactive Systems” giving guidelines on the “human-centered design process” in 1999 and the same guidelines being standardized by JIS as JISZ8530 in 2000, the PC design department of NEC started in earnest to organize a full-scale commitment to “usability.” It was around this time that the prototype of the Usability Guidelines that we still use to check the “usability” of PCs and software was drafted, e.g. “does the product take universal design into consideration?” It was also at this time that the planning/design and quality assurance departments began to foster “usability experts” in each department and developed the process for continuous improvement by isolating various issues from the “voice of customer (VOC).”

2.2 Improvement Verification and Construction of the Feedback Process

In 2005, we established the process for verifying the entire product before shipment by checking if it accurately reflected all the improvements. In 2007, we started to enhance the whole process for promoting total improvement from the planning stage onward by strengthening the feedback to the planning department, which controls the most upstream process in the planning and design of products.

We also enhanced the operations so that the information on the voice of customer (VOC), opinions from various departments and the progress of the resulting improvements could be shared in the feedback process on the planning and design phases. This activity has deepened our understanding of the improvements from the viewpoint of the customer (user-centered design) and has thereby enabled lateral deployment for preventing the occurrence of similar issues with other products (Fig. 2).

User tests and usage situation surveys in the homes of users have been carried out on a per-department basis previously.

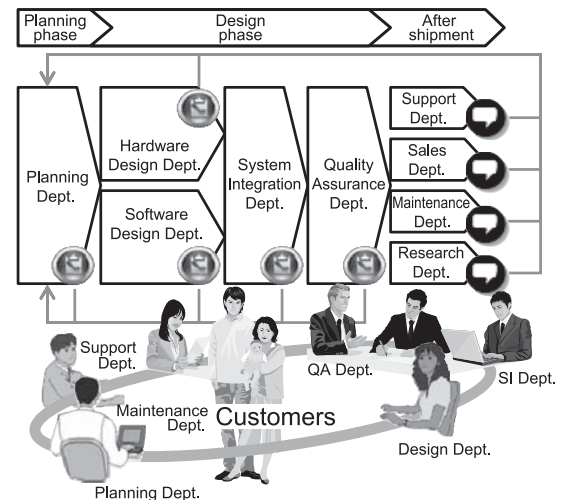


Fig. 2 Feedback process for usability improvement.

We changed the styles of some of the methods so that they were performed by attendance of all of the associated departments. This solution has made it possible to advance improvements by identifying the problems for the customer from multiple viewpoints and aspects.

2.3 Improvement for Customers “throughout the PCs Useful Life”

Applying the efforts as described above to the entire process has added “new perspectives,” e.g., where the real problem lies or which is the most radical solution, to our review and has changed the way that we deal with issues. For example, when we get VOC that the manual renders hard to understand, we will not simply improve the description of the manual. Because such a viewpoint also helped us to get at and verify the real issue that lies behind the VOC, we could consider at first why customer needed to refer manual.

Therefore, in 2009, we expanded the range of efforts related to “the usability of customers’ PCs throughout their “total PC life” and began improvement activities with efforts linked across the departments. Assuming that the issue was “to improve the manual” as in the above example, we observed the general behavior of the customer’s PC operations to find where any software issue was located as well as which were the issues that required correction. This strategy was in order to offer total improvements for their total PC life, not only the improvement of the content of the manual, but that of the

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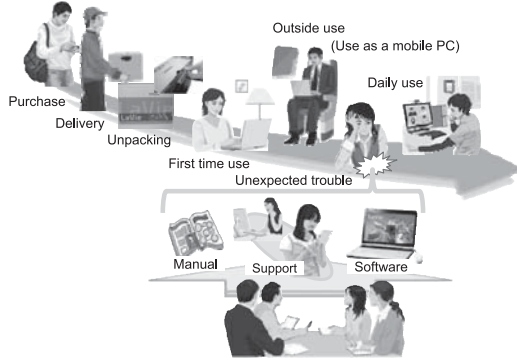


Fig. 3 Understanding “Customers Behavior throughout the PC Life.”

software usability and/or telephone support operation, etc. as alternatives (Fig. 3).

The next section reports on a case study in which multiple departments collaborated on improvements in a corporate-level effort.

3. Case Study of Backup Software Improvement

Backup is a work intended to safeguard against data loss from unexpected issues or a PC malfunctioning due to a virus infection. Previously, our PCs bundled multiple kind of backup software products with various functions designed to meet the various needs of users. Usability improvements were attempted individually for each software. In the manuals for these PCs attempts were made to offer the highest possible ease of understanding by compiling tables of characteristics of all the backup software, flow charts and the details of actual display screen to show procedures.

Nevertheless, these improvements still posed diverse problems from the perspectives of usability of beginners and novice users’ total PC life.

The problems included “there are too many software to be selected,” “there are so many steps that I cannot advance anymore,” “don’t use difficult terms” and “I don’t know how to explain to your call center people.”

A separately carried-out questionnaire also showed that the utilization ratio of backup software was as low as about 30%, maybe due to the reasons described above.

The “Otegaru Backup (Easy Backup)” is the software we developed to solve the issues listed above (Fig. 4).

This new software integrates major backup functions of previous multiple software products into a single piece of



Fig. 4 Screen from “Otegaru Backup.”

software and simplifies the procedure steps significantly in order to enable “backup with a single click” that will not cause issues for the user. We developed this software by repeating studies from in the design stage on how the “software,” “manual” and “support” departments should collaborate under the process with a “user-centered design” concept. Customers were thereby provided with solutions to the issues that needed to be solved by the members of associated departments from a common viewpoint.

The ease of understanding is implemented in functions other than the single click operation, for example by exercising ingenuity in the software display (GUI) in order to enable intuitive control.

The improvements referred to above have not only made the backup software easy to use, they also brought a “user-friendly” effect. When customer talks to call center for inquiry, it is easy to understand “how to do” with a confident and stress-free mind thanks to the easily understood operation.

The rigorous selection of backup software and simplification of the operating procedures have also made it possible to reduce the number of manual pages, a strategy that has led to energy cost reductions.

4. Case Study of Eco-Related Improvements

The deepening of understanding of “user-centered design” and permanent awareness in “customer” behavior concerning their total PC life” are increasing the sensitivity of the issue-awareness of the various departments.

In the following, we introduce cases of improvements that were achieved with activities based on issue-awareness as described above so that more people may appreciate the NEC

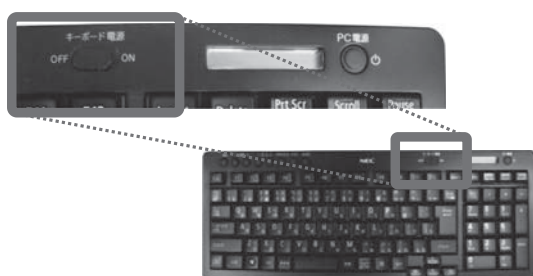


Fig. 5 The keyboard power switch position after improvement.

slogan of “friendly to humans and the earth” via their PCs.

4.1 Power Switch of the Wireless Keyboard

The wireless keyboard supports the freedom of enabling use anywhere that the user likes and it is powered by dry cell batteries. The design department provided the wireless keyboard with an ON/OFF switch in order to extend the battery life by turning the keyboard off when the PC is not in use. The switch was located on the back panel in consideration of the design and operability.

However, a survey of usage circumstances in user households made it clear that users switched the keyboard on and off much more frequently than we had anticipated. Based on this finding we changed the keyboard switch position from the back to the front panel (Fig. 5).

This improvement has eliminated the troublesome work of turning the keyboard upside down and thereby making it possible to turn it ON/OFF in the usual positioning.

Based on another customer observation that it is the eco-consciousness of the users that causes them to switch the keyboard ON/OFF frequently, we designed the new keyboard to be powered by commercially available “AA”-size NiMH batteries that are repeatedly rechargeable thus making it unnecessary to dispose of the used batteries.

4.2 Ingenuity for Enjoying the Eco Mode

When an NEC PC is set to the “Eco mode,” the power consumption can be expected to be reduced by 10% to 29% in the idle condition.

To facilitate and promote the use of the environment-friendly Eco mode, our design department decided to enable mode switching via a “one-touch button.”

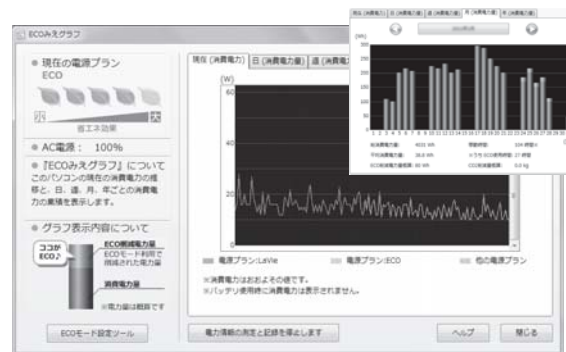


Fig. 6 Screen from “Eco-mie Graph.”

From user interviews and surveys that have been conducted up to the present, we also became aware that “immediate response” and “comparison” were very important factors for enabling the PC user to continue such low-profile tasks effortlessly and with fun as well.

Therefore, in the software included in the Lavie L notebook PC called “Eco-mie Graph (Visualized Eco Graph)” (Fig. 6) we incorporated features for enjoying “power saving.” These included “visualization” of the power-saving effect by pressing the ECO button and a comparative display of the change in power consumption compared to previous values.

5. Conclusion

This paper reported on our efforts for “usability” improvement and on actual cases for which we engaged in improvements that are “friendly to humans and the earth,”

In the future, too, we intend to continue our efforts to improve “usability” by means of the process under the “user-centered design” concept so that we can deliver PCs that are “reliable, simple and comfortable,” for the benefit of as many customers as possible.

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*Authors' profiles are as at June 2011. Names of companies and departments may change after July 2011.

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Authors' Profiles

KAWASHIMA Koji

Manager
CS Strategy Group
PC Operations Unit
NEC Personal Products, Ltd.

TSUJI Mami

Assistant Manager
CS Strategy Group
PC Operations Unit
NEC Personal Products, Ltd.

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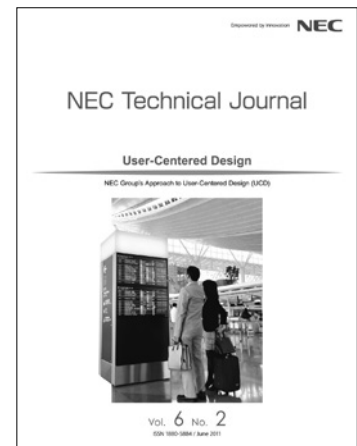
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