Apparent Usability vs. Inherent Usability

Experimental analysis on the determinants of the apparent usability

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ABSTRACT
Correlational analysis of the evaluation data on the apparent usability with the inherent usability measures revealed that the apparent usability is strongly affected by the aesthetic aspects rather than the inherent usability.

KEYWORDS: usability, screen layout

INTRODUCTION

Interface designers are making efforts to increase the efficiency of the operation, to make the interface easy to understand, and to increase the safety of data from mis-operations. But such efforts are hard to be understood unless the user actually uses it. That is to say, such inherent usability is meaningless for the user if the product is not appealing enough for them to buy it. This is the reason why we started to study the determinants of the apparent usability. We think that the products should be apparently usable as well as inherently usable.

1. GENERATION OF LAYOUT PATTERNS

From among various aspects of the graphical interface design, we selected the screen layout for the study of the apparent usability. As a first step, we have to collect variations of the layout pattern. The way we adopted was to let the subjects generate their own layout using the same graphical elements. The sample screen was taken from the cash dispenser which has ten numeric keys, special numeric keys (thousands and ten-thousands), the Yen key (as a delimiter), the cancel key, the correction key, the main display and the sub display (the figure of a lady0 as graphical elements.

Twenty-six subjects, including 9 GUI designers, 6 industrial designers, 8 engineers and 3 secretaries, participated in the experiment and were asked to locate those elements on the computer screen as they might think optimal in various senses. The hard copies of the screen were used as stimuli in the evaluation research.

2. EVALUATION RESEARCH

Twenty-six layout patterns were then evaluated in both the functional aspect and the aesthetic aspect. Total of 252 subjects were asked to rate these two aspects on the ten point rating scales, i.e. how much they look to be easy to use (apparently usable) and how much they look beautiful. The subjets included 156 students of the design school and 96 students of the psychology course of the university. Because both groups of subjects showed high correlations in their judgments (0.679 for the apparent usability and 0.783 for the beauty), we merged the data to use in the analysis that followed.

Fig. 1 shows the configuration of 26 layout samples on the plane with the beauty (abscissa) and the apparent usability (ordinate). Relatively high correlation (0.589) was obtained between these two scales which suggests that the apparent usability is somewhat related to the aesthetic aspect of the layout pattern. Four typical sample layouts are shown in Fig. 2. The upper right sample was rated highly usable and highly beautiful, and the lower left sample was rated less usable and less beautiful.

3. DETERMINANTS OF APPARENT USABILITY

What we have done next was to find out principal determinants of the apparent usability. As for the determinants, we listed out factors that the interface designers are considering to enhance the inherent usability.

From the hearing session with the interface designers, following strategies were found or, at least, seemed to be effective in the actual design process. The list also shows the measurement methods adopted in the analysis (in parenthesis).

1. Cognitive efficiency strategy
1.1 Glance sequence
The main display should be placed at the upper left corner, because the user may start to look at the screen from there then may go down right. Because the main display is showing information that is necessary for the subsequent operation, it should be seen by the user first in the total operation sequence. (The distance between the center of the main display and the top left corner of the screen in cm.)
1.2 Familiarity
The numeric keys should better be arranged as on the telephone keypad (1 2 3 keys at the top row) rather than the keys on the calculator (7 8 9 keys at the top row), because the former has much familiarity for the ordinary user. The horizontal alignmen is not recommended because of the inefficiency of the hand motion and the possible existence of the parallax caused by the thick glass cover. (Type of the key pattern. <Nominal scale>)
1.3 Grouping
Keys should be grouped according to their functions. This is based on the concept of the perceptual grouping of the Gestalt psychology. (Number of key groups.)
2. Operational efficiency strategy
2.1 Operation sequence - 1

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Special numeric keys should be arranged as the ten- thousands key first and the thousands key next to it, based on the consideration of the order of operation. (Type of sequence. <Nominal scale>)

2.2 Hand dominance

Numeric keys should be placed at right on the screen. (The distance between the center of the key 5 and the right edge of the screen in cm.)

2.3 Operation sequence - 2

The Yen key should be placed at the lower right corner of the screen. (The distance between the center of the Yen key and the lower right corner of the screen in cm.)

3. Safety strategy

The cancel key should be placed far apart from the main key block to avoid the mistouch. (The distance between the center of the cancel key and the center of the key 5 in cm.)

Correlation coefficients and coefficients of contingency (for the nominal scale) were calculated for each strategy measures of the ineherent usability with the rating value of the apparent usability. Values obtained were unexpectedly low in many cases as follows.

1.1 Glance sequence	0.000
1.2 Familiarity	0.730
1.3 Grouping	0.075
2.1 Operation sequence 1	0.113
2.2 Hand dominance	-0.127
2.3 Operation sequence 2	-0.306
3. Safety strategy	0.137

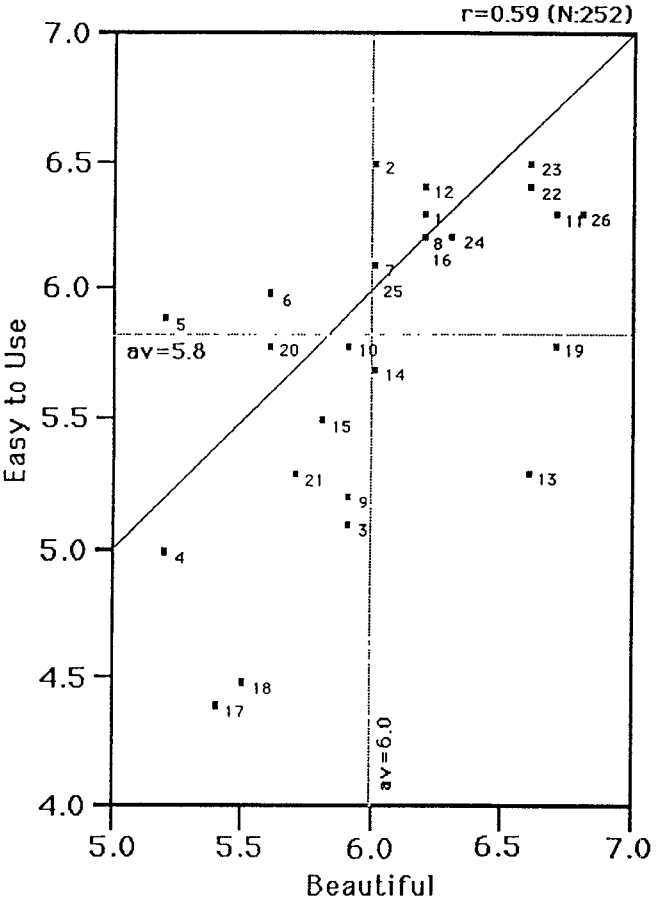
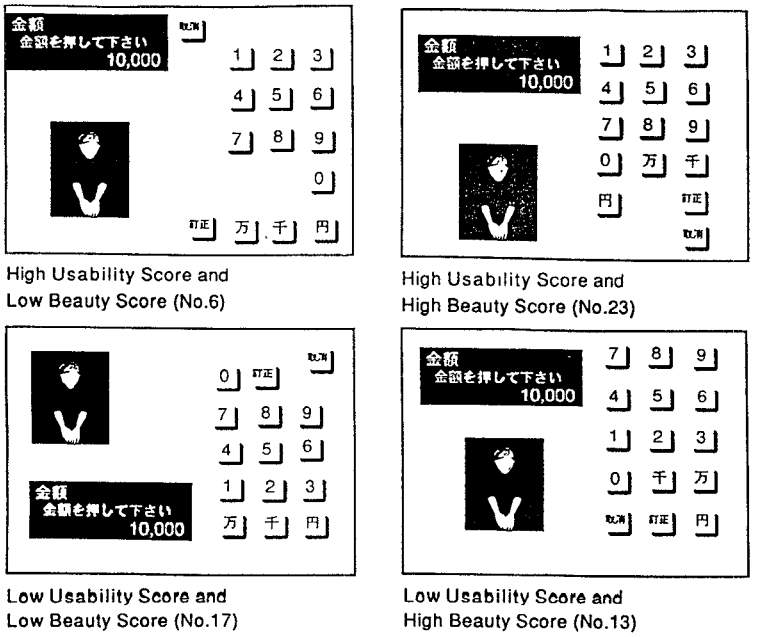


Fig.1 Correlation between two kinds of judgements for 26 layout samples.

CONCLUSION

These results show that the apparent usability is less correlated with the inherent usability compared to the apparent beauty which showed the correlation coefficient of 0.589. This suggests that the user may be strongly affected by the aesthetic aspect of the interface even when they try to evaluate the interface in its functional aspects and it is suggested that the interface designers should strive not only to improve the inherent usability but also brush up the apparent usability or the aesthetic aspect of the interface. Out next study will focus on the determinants of the aesthetic evaluation of the interface.



High Usability Score and Low Beauty Score (No.6)

High Usability Score and High Beauty Score (No.23)

Low Usability Score and Low Beauty Score (No.17)

Low Usability Score and High Beauty Score (No.13)

Fig.2 Typical sample layouts.

REFERENCE

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