DOCUMENT SUMMARY

This foundational research paper introduces the concepts of apparent usability (how easy an interface looks to use) versus inherent usability (how easy it actually is to use). Through an experimental analysis of different screen layouts for a cash dispenser, the authors found that users' perception of usability is more strongly correlated with the aesthetic quality of the interface than with its actual usability features. The study concludes that interface design must consider aesthetic appeal as a critical factor in user acceptance and perceived functionality.

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FORMATTED CONTENT

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 lady) 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 subjects 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.

A 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.

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. (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 (123 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. (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:** 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 **inherent usability** with the rating value of the **apparent usability**. Values obtained were unexpectedly low in many cases.

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.

Our next study will focus on the determinants of the **aesthetic** evaluation of the interface.

REFERENCE

1. Kashimura, K. and Kurosu, M. The structure of the screen design and the cognitive process (3). Paper presented at 58th Japanese Psychological Association, 1994