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The Adaptation of Virtual Man-Computer Interfaces to User Requirements in Dialogs

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PREFACE

This is a shortened English version of the German report titled

"Zur Anpassung virtueller Mensch-Rechner-Schnittstellen an Benutzererfordernisse im Dialog"

by the same authors, which was first published in July 1978. It contains the results of a one year project that was carried through to get a 'diploma' in computer science.

Why do we, two years later, present this English version, though everybody might think the results are out of date by now? There are four reasons:

- *In its first part our report contains a survey of English and German literature in the area of user-oriented system design (state of 1978). We introduced a systematic representation for a variety of items which has been lacking before. For our present studies we also reviewed the newer literature and realized, that objectives and ideas have remained the same until now.*

- *The second part consists of studies of man-computer dialog and discusses dialog techniques from a very basic point of view. Our analysis on three levels of abstraction may help the designer to improve man-computer dialog from its technological side.*

- *The report in its whole represents a certain style of system design: Coming from the human side and its requirements we develop system objectives; these are to be implemented by software techniques which are thoroughly examined in respect to their impact on the user. The necessity of this design strategy is becoming more and more obvious, because systems should suit human requirements and, additionally, frustrated and reluctant users are a cost factor as important as an inefficient system.*

- *Since most of the relevant literature has been in English, we assume that our report should be interesting for non-German-speaking people, too. This was confirmed by several explicit demands for an English version.*

So finally we undertook the effort of rearranging, shortening and translating the German report without actualizing it.

Nevertheless there is one thing to be mentioned: The part of the user is a rather passive one in this report. We gathered a large number of rather 'objective' items characterizing his needs and behaviour. We then suggested to realize a flexible system with many different types of dialog available to the user and expected the user to select those dialog features appropriate to his needs.

In this kind of conception the user is already less constrained than before: he can adjust the existing system facilities to his requirements.

But recently it became obvious that a better way of designing user-friendly systems is to have the user participate actively already during the design phase. He should state his requirements before the first technical decisions have been made and not only make the best of the existing facilities.

Our studies on user characteristics and man-computer dialog can help the designer to see the variety of possible user requirements and system features. However they cannot replace user participation in the process of developing a system for some special application and user community.

W.D.
H.E.
S.M.

Hamburg, July 1980

ABSTRACT

In the beginning of the computer era only specialists worked with computer systems. Today there exists a large variety of computer users, which raises a lot of problems at the computer-user interface. Therefore it has become necessary to establish more research activities in the field of man-computer interaction. The authors of this report tried to cover some problems related to this area: they studied the characteristics of 'naive' users and their dialog with a computer in order to propose design criteria for man-computer dialog systems. To achieve this goal research was done in two directions: part one consists of an extensive list of statements about user needs and abilities at a man-computer interface which were extracted from literature in German and English. Part two gives a formal description of man-computer dialog and its content, especially for database systems. Three levels of abstraction are introduced each of which allows a different viewpoint and a different characterization of dialog and its elements. In the third part both, user characteristics and dialog description, are combined to make design suggestions for user-oriented dialog systems. They are based on a detailed discussion of what user-orientation should mean for man-computer dialog.

ZUSAMMENFASSUNG

Immer neue Benutzergruppen arbeiten heute mit Computersystemen; dabei treten verstärkt Probleme auf der Seite der Benutzer auf. Es ergibt sich somit die Notwendigkeit einer Auseinandersetzung mit den Möglichkeiten und Bedingungen, die die Schnittstelle zwischen Mensch und Rechner auszeichnen.
Die vorliegende Arbeit dokumentiert Forschungsbemühungen, die einen Teil dieser Problematik abdecken: Betrachtet werden überwiegend ungeschulte, sog. naive Benutzer und ihre speziellen Fähigkeiten und Bedürfnisse in einem Mensch-Rechner-Dialog mit dem Ziel, Gestaltungsempfehlungen für eine derartige Schnittstelle zu entwickeln.

In einem ersten Teil wird ein ausführlicher Überblick gegeben über in der Literatur existierende Aussagen zu Benutzermerkmalen und benutzerorientierten Mensch-Rechner-Schnittstellen. Der zweite Teil bringt formale und inhaltliche Beschreibungsmittel für den Mensch-Rechner-Dialog am Beispiel von Datenbanken. Zu diesem Zweck werden drei Betrachtungsebenen des Dialogs unterschieden, auf denen sich die verschiedenen Elemente des Dialogs formal charakterisieren lassen.
Im dritten Teil der Arbeit werden Gestaltungsempfehlungen zur Konzeption einer benutzerfreundlichen dialogfähigen Mensch-Rechner-Schnittstelle gegeben. Diese bauen auf den Ergebnissen der ersten beiden Teile und auf einer ausführlichen Bestimmung des Begriffs 'Benutzerfreundlichkeit' auf.

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