Blind models as minimal artifacts

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Introduction: What Are Blind Models

As the use of and the demand for electronic products becomes more diverse, it has become ever more essential to actively involve end-users in the design of the human interface of these products through a process of user studies, iterative design, and user testing [1] [2]. Our work has shown that an important component of human interface design is to conceptualize user scenarios based on observational studies of end-users [3]. These scenarios should be articulated very early on in the design process. From these scenarios, role plays can be developed and carried out with users to gain an initial understanding about what kind of functionality and product form factors might be appropriate for enhancing such aspects of users' lives as entertainment/ recreational factors, work-related productivity, interpersonal communications, human memory enhancement, knowledge acquisition/retention, etc..

A key component in early role play studies should be an artifact(s) or object(s) that is a concrete representation of the technology vehicle through which both designers and users will ultimately achieve their desires in terms of use. Aside from drawings and 2-dimensional sketches, a 'mock-up' is the first real physical articulation, albeit rough, that a designer gets of a product design concept. Designers generally use 'mock-ups' as artifacts to represent early design concepts. However, end-users are generally not exposed to these 'mock-ups'. In this paper, we introduce a new type of 'mock-up' called a 'blind model' that is specifically meant for eliciting early product ergonomic, form factor and functional concepts from end-users. The 'blind model' is a simple geometric solid or a system of geometric solids with little or no surface features. A 'blind model' can be made of one or more combinations of clay, wood, dense foam, plastic, cardboard, etc. In one case our blind model for a handheld audio recorder was simply a large flat camera battery covered in masking tape on which our participants could draw with a felt tip marker. A 'blind model' is accompanied by an unattached set of other smaller artifacts that can be used by a subject to represent hardware controls, dials, guages, display areas, etc. Building a mockup from 'blind model' components is the first real hands-on experience that a user gets to assist the designer in articulating a product design concept.

Language Games With Minimal Artifacts

Blind models function as 'minimal artifacts' which enable us to engage in a design conversation with our users about how a future computer device might function. In Wittgenstein's [4] terms our conversation takes the form of a 'language game' the specifics of which will depend on the situation we put the user in. Since the blind model has minimal features it facilitates a language game not by mirroring the behavior of a future device but by supporting interaction and reflection about how the future device might work [5]. Our experience supports the views of Ehn and Kyng [6] who argue that the success of the language game will depend on the extent to which the game allows the blind model to remain 'ready-to-hand' [7]. In designing the situation or scenario in which users will perform tasks with our blind model we must avoid creating breakdown situations where the model could become a 'present-at-hand' collection of materials rather than a 'ready-to-hand' version of a future device.

The Blind Model Process

In our experience blind models may at first appear to be very preliminary, yet they are frequently introduced at a point where design decisions such as the location of control buttons, the size and basic form factor of the unit, and the location of a screen have all been predetermined. Typically, we have an idea about how the device will be used - wrist mounted, hand held, resting on a table top, or mounted in a wall. This information guides our construction of a rough shape that is of the approximate size we think our device will be, this is our blind model. We also make a paper or plastic shape to represent the screen and laserprint artwork of some generic buttons. An assortment of simple art supplies - paper, felt markers, clear adhesive tape, string etc is assembled. We then hold one-hour individual design meetings with people who are representative of the potential users of the product. The design meetings are videotaped for later analysis.

To start the design meeting, we explain that in the role play we want the user to work with us to design a future device. We avoid discussing technologies or engineering issues, we may simply say it is a for 'playing CD ROMs', 'capturing images', or 'capturing sounds'. The blind model is then handed to the participant in an ambiguous way and we outline some tasks to be completed with the device - 'show

me what is on this CD ROM', 'capture an image of Michael', or 'record a reminder to shop for groceries'. Our users are often initially confused! At this point we must establish the language game - we do this by encouraging any small step the user takes towards talking about the model as a real device, we hold the device the way they do and use their vocabulary when refering to the device. The user may say they would need a switch to turn the device on, we respond by asking them to choose one from our printout, or make one of their own with the art supplies and stick it onto the device. Most of our users reject our paper buttons and make their own. Our participants readily responded to these requests, frequently becoming excited about the device that they are designing because they feel ownership of the ideas.

Once the design session gets moving our participants quickly start to apply buttons and switches to the device. The 'primary' controls tend to appear first, these are the controls that need to be readily accessable. Next come the lesser used controls. We encourage the participants to move their controls around, to try different configurations, to tailor the device to their own preferences - for instance to make the device left-handed if they are left-handed.

The end point of our role play is typically marked by a breakdown situation which the user cannot successfully resolve. At this point the the user may have added so many controls that they are confused about how to operate their device, or they may have designed controls that are interdependant or moded in such a way that the device cannot perform a required task. We try to help the user to reassess their designs and resolve these issues. Frequently the language game ends at this point because we are no longer able to talk about the blind model as the device - it has become once again a 'present-at-hand' collection of materials.

Conclusion
The videotapes from our design meetings are analysed in order to determine what commonalities there were between the designs our participants arrived at. The next step in our design methodology is to develop exploratory prototypes [8]. These prototypes, which combine hardware and software technologies enable us to migrate the users' design ideas into our design and engineering process [9]. Our experience with blind models has allowed us to more fully integrate the end user into our design process.

References

1. Gould, J., How to design usable systems, in M. Helander, (Ed.) *Handbook of Human-Computer Interaction*, 1988, North-Holland: Amsterdam. pp. 757 - 790.

2. Norman, D.A. and S.W. Draper, (Eds.). *User Centered System Design - New perspectives on Human Computer Interaction*. 1986, Lawrence Erlbaum Associates: Hillsdale, NJ.

3. Laurel, B., ed. *The Art of Human-Computer Interface Design*. 1990, Addison-Wesley: Menlo Park.

4. Wittgenstein, L., *Philosophical Investigations*. 1953, Oxford: Basil Blackwell.

5. Ehn, P., *Work-Oriented Design of Computer Artifacts*. 1989, Falkoping, Sweden: Arbetslivscentrum and Hillsdale, NJ: Lawrence Erlbaum Associates.

6. Ehn, P. and M. Kyng, Cardboard computers: Mocking-it-up or hands-on the future, in J. Greenbaum and M. Kyng, (Eds.). *Design at Work: Cooperative Design of Computer Systems*, 1991, Lawrence Erlbaum Associates: Hillsdale, NJ. pp. 169 - 195.

7. Heidegger, M., *Being and Time*. 1962, New York: Harper and Row.

8. Gronbæk, K. Extending the boundaries of prototyping - Towards cooperative prototyping. in *Proceedings of 12th IRIS Conference*. 1989. Aarhus, Denmark: Aarhus University, Computer Science Department.

9. Bødker, S. and K. Gronbæk, Design in action: From prototyping by demonstration to cooperative prototyping, in J. Greenbaum and M. Kyng, (Eds.). *Design at Work: Cooperative Design of Computer Systems*,. 1991, Lawrence Erlbaum Associates: Hillsdale, NJ. pp. 197 - 218.