



DESIGNERS' INVOLVEMENT IN DESIGNING

Friedrich Glock

Keywords: design research methodology, design practices, case study

1. Introduction

The paper adopts a descriptive approach to design research. Rather than being an attempt to prescribe how designing ought to be done, an approach is suggested which aims to describe how designing is actually done.

The suggested approach conceives designing as a process of interpretation and meaning construction of more or less imprecise or vague requirements and design goals such as e.g. clients' or users' wishes, 'needs', etc. Interpretation and meaning construction involve the invocation and (in part) the generation of contexts (such as the context of use, production, etc.) [Glock, 1998]. Design work as interpretation is conceived as a social process [Bucciarelli, 1994] of interaction and conversation between designers / participants as well as a »quasi-dialog« or designers' "conversation with the materials" [Schön and Wiggins 1992] of a situation.

The task of design research in this view is to investigate how designers achieve interpretations in actual design processes in practice and to describe designers' interpretative practices. This suggests a cross disciplinary approach to design research. Sociological and socio-linguistic concepts and styles of analysis are adopted to describe design work in terms of contexts and frames. In a previous publication [Glock, 2001] I have attempted to demonstrate that the analysis of designers' use of deictic expression in design conversation provides a tool to refine the investigation of context.

The present paper focuses on a type of indexical expression in a particular form of utterances and language use which frequently can be observed in designers' conversation, namely, utterances containing first or second personal pronoun through which designers refer to themselves. In particular I attempt to describe what designers might communicate when they utter formulations such as 'I/you/we have to...', 'we are limited in space', 'we can go in here', etc.

The suggested approach requires case study methodology and ethnographic observations (video-recording) as data for a detailed analysis of how designers build meaning through routine interpretative activity involving talk, gesture, and graphic representation.

2. Examples and observations

A case study of a design project in practice has been carried out in a research organization. The goal of the observed project was to redesign the prototype of an 'electronic epi-luminescence microscope' - a device to replace the previous procedure for inspection of skin lesions in dermatology. The device takes a digital picture of skin lesions to be magnified and displayed on a monitor as well as electronically stored and amenable to future image processing and computer aided diagnosing. Meanwhile the device - in a slightly different design - is at the market and in use all over the world.

The following extracts are taken from an early design session; two engineers (A and B, both experienced engineering designers; B is new in the project) work together to design the mechanics of the device. At the beginning of the session A and B sit next to each other at the table; A present to B (the drawing of) the prototype of the device they will redesign. A describes the functioning of the

device, states components such as optical system, video camera, polarization filter and lighting and they discuss some requirements for redesign and the anticipated context of use. The following extract occurs about five minutes after the beginning of the session.

Extract 1: (9:30:22 – 9:32:00)

- A: ... *Wort, i werd des irgendwie- i zeichn des amoi auf* ((geht zum flipchart))...
... Wait ((points to flipchart)) this I'll be somehow- I'll draw this at first ((goes to flip))...
- B: *host du net gsogt des soi mittels klane Motore verstöt werdn?*
Didn't you ((A returns)) say it should be adjusted by means of small motors?
- A: *jo ... daß elegant is. Wort, geht des do so? waunn i mi do so herstö?*
yes ... ((goes to flipchart)) that it is elegant. Wait, is it ok that way? When I stand here?
- B: *jo sicher*
Yes sure ((rearranges chair, orients to the flipchart))
- A: ((zeichnet)) *i hob amoi do die, Prinzip her, des is die die Linse ... Des kauf ma auba zua ... den muß I vastön in der Richtung ...*
((draws)) I have at first here the, in principle, that's the the lens ... which I have to adjust in this direction ((draws double arrow symbol)) ...
- A: ... *daunn hob i a Polfilter, des do den muß i ... drahn.*
... then I have a polarization filter, this here ((draws)) which I have... ((gesture)) to rotate.
- B: rotate, yes
- A: ... *do is de de Haut* ((zeichnet, schreibt)) *Haut ...*
... there is the the skin ((draws, writes)) skin ...

3. Contexts and Frames

The quoted transcription (extract 1) begins as A says - 'wait'; simultaneously he points to the flipchart, stands up and, as he goes to the nearby flipchart, he announces - 'this I'll be somehow -', and seems to restart - 'I'll draw this'.

A's utterance - 'wait' marks the end of the preceding discussion of the prototype and, with the seemingly incomplete clause - 'this I'll be somehow -' announces another type of activity; he indicates that his upcoming activity is to be understood in another context and in the next clause he says or frames what he is going to do - 'I'll draw this'; the deictic expression 'this' refers to the (components of the) device.

As A goes to the flipchart, B asks the question - 'Didn't you say it should be adjusted ...'. (One requirement for redesign is that the optical system - 'it' has to be adjustable ± 0.5 mm in axial direction by means of electro motors). B's question contributes to the previous discussion and recalls a requirement. A returns to the table and confirms - 'yes ...' and as he again goes to the flipchart, he specifies - 'that it is elegant'. Interestingly he seems to separate these contexts spatially - he returns to the table to discuss requirements.

At the flipchart A says - 'wait' and asks - 'is it ok that way? When I stand here?' A's utterance - 'wait' again marks a shift in context in which the succeeding utterance is to be understood. The question addresses concerns about the spatial conditions in the session room. The pronoun 'I' refers to A as a bodily entity in the context of the session room, capable to restrict B's sight. B confirms - 'yes sure'.

4. Personal Pronoun Referents

As A starts drawing, he utters - 'I have at first here the'; when the sketch (of the optical system) is completed, he switches to an impersonal statement which verbally assigns meaning to the lines he has sketched - 'that's the the lens'. The utterance - 'I have ...', which refers to an 'I' is replaced by the impersonal statement 'that's'. Analogously - 'I have a polarization filter, this here'. A, of course, does not 'have' an actual optical system - 'we will buy that' but within the context of the transformed world of the sketch, a few lines represent the optical system and - in the transformed situation - he says - 'I have here... the (optical system)'. Notice in contrast that the personal pronoun referent in the

utterance - 'is it ok ... when I stand here?' (which is understood in the contexts of the session room) cannot equally be replaced. This seems to indicate that "(a)lthough certainly the pronoun, 'I', refers to the speaker, and although certainly the speaker is a specific biographical entity, that does not mean that the whole of this entity in all its facets is to be included on each occasion of its being cited. For he who is a speaker might be considered a whole set of somewhat different things ... Thus, the referent of 'I' in the statements: ... ('is it ok ... when I stay here?', and 'I have ... here the'; FG) shifts, although in no easily describable way." [Goffman 1974]. The ease of replacing the second 'I' in contrast to the practical impossibility of replacing the first 'I' argues strongly for there being a difference in referent. Now consider a further aspect of A's verbal utterances - 'I have ... here the ... lens', 'then I have a polarization filter', 'there is the skin'. A also sketches - 'the skin', that is, part of the context of use of the device, which goes beyond the conventions of technical drawings (see drawing in figures below). Notice that A uses formulations containing personal pronouns only for components such as the optical system, the polarization filter, which are the subjects of his/their design. Indeed, it would sound rather odd if A would say for example »there I have the skin«; a dermatologist, by comparison, might say so. Thus, it appears that designers use utterance constructions with first or second personal pronoun referents for things they are going to work on or get involved with in their design.

Consider the formulations of requirements. In the previous discussion of requirements (not quoted here) they formulated: the redesigned device 'should be easy to handle, easy to assemble', etc. In extract 1 B contributes to the discussion and uses reported speech - 'didn't you say it should be adjusted ...'. When A sketches the optical system (that is, A is engaged in another type of activity or context) he says - 'which I have to adjust'; equally, the polarization filter - 'I have to rotate'; these utterances also express subjective involvement. It appears that in different types of activity or contexts (such as discussion of the requirements (of the components) of the device, and sketching the components) different referential practices are used for formulating requirements.

One strategy to understand formulations such as - 'I have to adjust', 'I have to rotate' might be to posit an underlying form of »I have to design the mechanics which makes it possible to adjust the optical system«. But consider further examples:

In the eleven minutes between the quoted extracts they discuss, among others, the requirements for the polarization filter and the lighting, A designs a provisional handle, and then they address the design of the mechanics for the adjustment of the optical system. Immediately before extract 2 A makes a suggestion for a solution type ('with a thread') which is rejected by B; in the next quoted utterance A mentions another idea:

Extract 2: (9:41:10 – 9:41:30)

A: (6) *Kugelspindel so klane? (.) wirds net gebn. (3)(des haßt) wir san mitn Plotz a beengt, wei do obn is de Scheibn (.) und seitlich kenn ma nur do eine, zwischen de (4) ((A und D sehen die Zeichnung an; A setzt sich))*

| A, B sit, look at sketch | low voice | stands up, goes to flipchart
 (6) |Ball-spindle that small? | Won't be available. (3) |(that is) we are also limited in
 |points at pol.filter | shows with hand | moves finger at plan view
 space because this |side up (.) there is the |slice (.) ((figure 1)) and |sideways we can only
 |moves finger between light conductors
 go in here, ((figure 2)) between |the ((both look at the sketch; A sits down)) (4)

B: *du muaßt jo den Polfüta waunns'd den-den muaßt' jo a irgendwie logern ...*

You hav'got to the polarization filter when you- you also hav'got to bear it somehow ...

A and B sit and look at the sketch; after 6 seconds silence A mentions in a low voice a component of another type of solution - 'ball spindle' which he immediately discards - 'Won't be available'. A's talking in low voice appears to be soliloquizing; B does not respond. After 3 seconds silence, A makes, still in low voice, and therefore a hard to perceive utterance - 'that is', simultaneously stands up, goes to the clipboard and, in normal voice, calls further - 'also' constraints - 'we are also limited in space'. The shift in perspective between the two utterances is marked by - 'that is' as well as the sound intensity of his utterances. A shifts from suggesting and immediately discarding a (determined)

object (ball spindle) to the spatial constraints for the design of the (still undetermined) mechanics.



Figure 1.

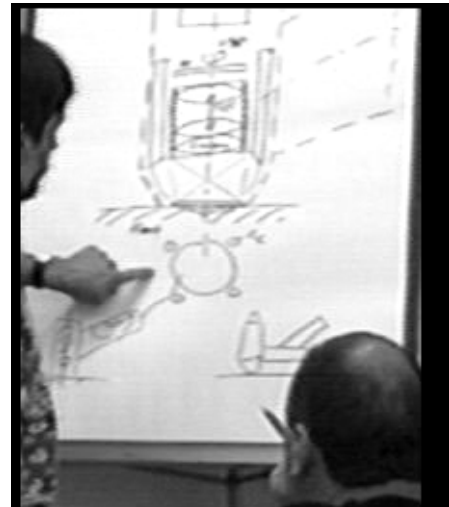


Figure 2.

5. Interpretative strategy: blurred referents - taking the role of the object

Again, one strategy for interpretation of – ‘we are also limited in space’ might understand the utterance as an abbreviation of a posited underlying form: »‘we’ have to take into account that the mechanical components to be designed ‘are also limited in space’«. But, as indicated above – ‘I have...’, the subject pronoun referents of - ‘we’ appear more directly involved and experiencing the constraint than the subject pronoun referent in a posited underlying proposition.

Of course, A’s utterance does not express spatial experience of the session room when he says - ‘we are also limited in space’; and A and B will not actually ‘go in between the light conductors’ but the parts of the mechanics they are supposed to design ‘can only’ be placed ‘between the light conductors’. The referents of ‘we’ are obviously different from “the whole of ... (the designers’ identities) in all their facets” e.g. their physical presence in the session room to which, in contrast, A referred to in – ‘is it ok ... when I stand here’ (extract 1). The referents of ‘we’ appear to be indeterminate but, nevertheless, completely unproblematic for the designers at work.

Similar linguistic constructions have been observed in scientific discourse. Ochs et al have identified a type of utterance in discourse among physicists they call indeterminate utterances. ”While the pronominal subject of these utterances presupposes an animate referent, the predicate appears to refer to the objects attributable to an inanimate referent (i.e. the object under construction)” [Ochs et al 1996].

Although such utterances cannot, of course, be literally understood as indexing events in which designers participate, the pronominal referents of ‘we’ in - ‘we are limited in space’, ‘we only can go in here’ is understood to be more directly experiencing the design space. A’s utterances imply that the referents of ‘we’ appear to be located in the (drawn design space – ‘because this side up there is the slice’ indicates the referents - ‘we are’ below - ‘and sideways we only can go in here’ indicates that ‘we are’ outside; the space addressed accords to the space where the designers suppose to place the mechanics. (Interestingly, later in the session, when they design (a solution of) the mechanics and A sketches a component, he says ‘here I can go out’; not quoted here). Through the construction of the utterance, A symbolically repositions the referents or themselves in the design space [cf.Hanks, 1992]. The pronominal referents implied by the construction of A’s utterances are set in relation to and located in the transformed situation of the drawing and seem to experience the spatial limitations of the design space from the position or perspective of the object (the mechanics to be designed); this is also where they look at and where their »work place« is. The indeterminate referents of ‘we’ suggest to refer simultaneously to both the designers and the mechanics they are going to design. “These

utterances thus seem to have a semantically schizoid, illogical character which blurs the boundaries between the animate subject ...and the inanimate object (physical entity) ... That is, the referent constructed in these utterances appears to be neither exclusively the ... (designer FG) nor the object of inquiry but rather a blended identity that blurs the distinction between the two” [Ochs et al 1996].

The frequent use of the compelling form such as ‘I/You have to’ in the observed design conversation (see also in the extracts) appears inappropriate in personal conversation between colleagues but adequate for the deterministic world of objects; this also indicates that the personal pronouns ‘I’, ‘you’, ‘we’ refer to somehow different entities than their personal identities. I suggest conceiving such constructions as referential practices, which enables designers to manifest an extreme form of subjectivity by stepping into the “object worlds” [Bucciarelli 1994]. In the activity of designing the mechanics for the adjustment of the optical system, A’s utterance - ‘we are also limited in space’, expresses involvement more extremely by empathizing with, taking the perspective or “taking the role of the objects” to be designed.

G.H. Mead [1934] has characterized the core process of social interaction as “taking the role of the other”; that is, actors refer to an (inferred or assumed) context to »design« their actions or utterances. Mead sees the core process of social interaction (as a quasi-dialog) also at work in human interaction with objects by actors “taking the role of the objects” [Mead 1938]. This view accords with the idea of designing as a social process.

This interpretative strategy is supported by mythic accounts of scientists’ flashes of insight. “It is reported, for example, that when Einstein was sixteen, ten years before formulating the theory of relativity, he ‘tried to imagine what he could observe if he were to travel through the ether with the same velocity as a beam of light’” [Whitrow 1972 quoted in Ochs et al].

6. Indeterminate constructions and framing practices

Designers, in a sense, do not act in a »real world« - engineering designers do not handle actual objects such as optical system, polarization filter, etc. - but they operate within transformed versions in various media (drawings, speech, etc.), or in “virtual worlds”. „The situations ... are, in important ways, not the real thing.“ [Schön 1983]. „(T)he officially attended activity - is itself a transformation of actual activity.“ [Goffman 1974]. Compared with, say, craftsmen in the workshop, designers at the drawing board work and act within a transformed (e.g. drawn) situation and they also employ different practices.

The transformation or “keying” [Goffman 1974] “in important ways” enables another – the designers’ - perspective, access to, “participation status” [ibid.], and types of activities in the transformed situation. And indeterminate constructions such as – ‘we can go in here’ “seem to be a referential resource especially suited to the activity of thinking through research (design FG) problems together. Indeed, it does seem, ... that ... indeterminate constructions tend not to appear outside of this activity.” [Ochs et al 1996]. The referential practice appears as an integral part of framing practices through which designers position themselves, establish a perspective and organize experience in “virtual worlds” such as drawings. [Schön 1983].

7. Integrated analysis

A’s utterances - ‘we are also limited in space because this side up there is’ ‘we can only go into here between the’ cannot be adequately understood in isolation. An adequate understanding of e.g. deictic expressions such as ‘this side up’, ‘here’ requires knowledge of context. As A says - ‘we are also limited in space’ he simultaneously stands up and goes to the flipchart, points to the polarization filter when he says ‘this side up’; both, speaking and gestures at the sketch are integrated and cannot be understood alone. A then makes an additional gesture with his hand, which might symbolize the polarization filter as the limit as well as a kind of a halt signal (the open hand marks the limit, see figure 1). The gesture appears to enact the boundary to be more directly experienced. ‘And’ there is another spatial limitation - ‘sideways we can only go in here’ and he shows four »entries« in the plan view of the sketch. At each of the spots between the light conductors he moves his forefinger - ‘go(es) in’ the »entries« from the periphery to the center (figure 2); as he says – ‘between the (light conductors)’ his finger moves the distance between the represented light conductors. To understand

such utterance constructions, it is crucial to pursue an analysis that integrates the language, gestures, and visual arrays which comprise designers' interpretative activities. While indeterminate utterances may help to displace designers into transformed object worlds, they do so as part of embodied interpretive practices. The meaning of utterances such as 'we only can go in here' is built simultaneously from the action involving A's fingers on the flipchart within the graphically defined space, and from the symbolic meanings which have already been assigned to the lines in previous interactions (see extract 1).

Indeterminate utterances and indexical gestures permeate the observed design process as part of the designers' discourse practices. It appears that designers come to their understandings and interpretations of design situations partly through symbolic re-enactment of circumstances, physical objects, events, etc. It is as if designers are able – as part of their competence - to situate themselves simultaneously on different referential levels through their talk and interaction yet never experience referential confusion as a result of this multi-leveled distribution of attention: designers attend to the situation in the session room, carry out symbolic gestures within graphic representations, and, facilitated by these graphic representations and their gestural enactments, imagine themselves as objects in the design space. [cf. Ochs et al 1996].

Finally, reconsider the first quoted utterance in extract 1. What seemed to be a false start now might be read off as an announcement of what he is going to do - 'this I will be somehow' ...

8. Summary

In the paper designing is conceived as a social process of interpretation. It focuses on an aspect of design conversation, that is, the frequent use a type of utterances in which designers refer to themselves. On the basis of records of actual design conversation I investigate the referents of personal pronouns used in these utterance constructions. An adequate understanding of these utterances requires analysis, which integrates talk, gestures and visual arrays. Comparative analysis indicates referents differ in various contexts or types of activities. Evidences have put forward for the interpretation that the investigated utterance constructions express an extreme form of involvement of designers and the referents appear as entities, which blur the distinction between designers and objects. The investigation of the referential practice indicates that designers symbolically displace themselves in transformed situations to experience the design space more directly and to take the role of the objects. The investigated referential practice appears to evoke and to be part of framing practices - that is the designers' ability - designers' employ establish perspectives, to participate and to organize their experience in the transformed (e.g. drawn) situations; practices through which they construct meaning.

References

- Bucciarelli, L., *"Designing Engineers"*, MIT Press Cambridge Massachusetts, 1994.
- Glock, F., *"Konstruieren als sozialer Prozeß"*, Deutscher Universitäts Verlag Wiesbaden, 1998.
- Glock, F., *"Design Work in Contexts – Contexts in Design Work"* Proceedings Designing in Context, Lloyd P., Christiaans H., Delft Univ. Press Delft NL, 2001, pp 199-217.
- Goffman, E., *"Frame analysis"*, Harper & Row New York, 1974.
- Hanks, W., *"The indexical ground of deictic reference"*, Goodwin, Ch., Duranti, A., *"Rethinking context"*, Cambridge Univ. Press Cambridge, 1992.
- Mead, Georg H., *"Mind, Self, and Society"*, Univ. of Chicago Press Chicago, 1934.
- Mead, Georg H., *"The Philosophy of the Act"*, Morris Ch. et al (eds.) Univ. of Chicago Press, 1938.
- Ochs E., Gonzales P., Jacoby S., *"When I come down I'm in the domain state, grammar and graphic representation in the interpretive activity of physicists"*, Ochs E., Schegloff E.A., Thompson S.A. (eds.) *"Interaction and grammar"*, Cambridge Univ. Press Cambridge, 1996, pp328-369.
- Schön, D., *"The Reflective Practitioner"*, Basic Books New York, 1983.
- Schön, D., Wiggins G., *"Kinds of seeing and their function in designing"*, *Design Studies*, Vol.13, No.2, 1992, pp 135-156.

Friedrich Glock Mag., Dr. Vienna University of Technology,
Institute for Technology Assessment & Design Argentinierstrasse 8, A-1040 Wien, Austria
Phone: +43 1 58801 18719; Fax: +43 1 58801 18799; Email: fglock@pop.tuwien.ac.at