Table 5.3. Categories of information transfer

Categories	Differentiation	Cat
Searching for information	All kinds of questions	aa
	Demands for attention ("Did you consider . . .")	ab
Furnishing with information	Ascertainment, conclusions	if
	New information	in
	More precise statements, specifications	ip
Evaluating: positive statements	Unspecific/ general positive statements, affirmations	pz
	Positive statements with regard to design aspects	pk
Evaluating: negative statements	Unspecific, general disaffirmation, rejections	na
	Negative statements with regard to design aspects	nk
Process information	Concerning further proceeding with regard to design aspects	vk
	Concerning further proceeding with regard to the organizational context	vo
Helplessness, silence	Mostly occurring after longer discussions	s
Repetitions	Iterations of just given information	w
Other	Other utterances	r

The dialogue in Table 5.4 captures a discussion of different ideas for designing a roller bearing. Both designers are experienced and have been working together for many years in a climate of high confidence. Of course, this situation is a particular case of information transfer between two specific designers and each individual case is peculiar to the persons, situation, group, and problem in question. Nevertheless, the exchange above is a typical example of information transfer processes during critical situations and it serves to reveal central influences that design representations have on the success or failure of the process to yield positive results. Analyzing different types of critical situations with respect to information transfer, we were able to detect several types of representation or patterns of communication that are positively correlated with a more or less successful result (Badke-Schaub 1998). Below we concentrate our analysis especially on critical situations of the type "solution search" because these are the "magic moments" in which new solutions are revealed and connected with "creative thinking" in design.

First we analyze the percentage of new information in the critical situations of the "solution search" type as compared to other types of critical situations because we assume that "solution search" has much to do with new requirements and therefore new information is required. Figure 5.10 depicts the relative amount of the transfer of new information in the different types of critical situations. In situations with a positive solution search (+), the designers produce the highest amount of new information, whereas in situations with a negative solution search (–), designers produce a significantly lower percentage of new information. In situations of negative solution analysis and decisions, we found an equally high percentage of new information transmitted; obviously, the communication of new information during later phases of analysis and decisions on solutions is not very useful.

Furthermore, interesting differences can be noticed concerning the category "searching for information." This category consists of two subcategories,

Table 5.4. Excerpt of a categorized dialogue in a positive critical situation of the type solution search

Time	Person	Transliteration	Cat
06:33:46	B	Okay – that means that you'll take a set-screw – thereupon?!	ip
06:33:48	C	A log next to it and an adjustment-screw.	ip
06:33:58	C	The problem is that I cannot screw it tight to fix it.	nk
06:34:00	B	What can't you fix?	aa
06:34:01	C	This angle, I do not have any space left.	if
06:34:04	B	On this other part?	aa
06:34:18	C	Yes, you see, basically I did create a little basis: this is a vertical slot and there I will make a stud.	ip
06:34:24	B	Hmm.	r
	C	Don't say Hmm". What shall I do otherwise?	na
06:34:28	C	Or perhaps a flathead-screw, one could weld it on, you are right. In any case, I need a spike.	pk
06:34:34	B	Yes, that means, you have to unfix that . . .	vk
06:34:48	C	(While outlining) Yes, here is now then . . . You have this . . . this here is this long, this slot, in which the whole can be pushed up and down. That here is only a through-hole.	if
06:34:54	B	Just let me ask you: what is that for a welded joint? Which part are you welding to which other part?	aa
06:35:20	C	Oh no, I see, stop . . . ahh, in the lower plate. I mean this one, there is this big notch, you see, and the plates are overlapping here. I did insert such a piece that has in its height this cutting . . .	if
06:35:24	C	. . . so that this is always overlapped and sealed up.	ip
06:35:27	B	And the part moves in the way you are moving the things.	ip
06:35:31	C	Right. If I push them together, then this one is always moving with it.	if
06:35:34	B	That means that backwards there is once again somewhere such a . . .	if
06:35:44	C	Right, there is once more such a shape, so that I also can move here to and from, okay? In such a way that this always overlaps and seals up.	pk
06:35:47	B	Now, how do we get that . . .?	aa
06:36:01	C	The only thing is now the . . ., that I had to screw it here, too. Okay, then, I think, if I could do it with three screws and put my bearing here, whatever bearing, and I make here a screw with a slot . . .	vk
06:36:10	C	And here below two – that looks ugly, doesn't it?	nk
06:36:17	B	How much space do you have for this angle related to the height? For example, there below is not much . . .	aa
06:36:23	C	For example, and at the head there is also not much space – you see that?	ab
06:36:31	B	Yes, therefore for the first it would be perfect, if you would screw them on this axis. So that you there . . .	in
06:36:39	C	With two screws?	aa
06:36:43	B	Yes, at first you try with two screws – like the flange-bearings, the Y-flange-bearings, they have two screws. So . . .	ip