

**Getting the Design Job Done:**  
**Notes on the Social Organisation of Technical Work**

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## **SYNOPSIS**

We argue that a start on the systematic analysis of the social organisation of design activity can be made by identifying three main 'dimensions' of the design process. We call these the dimensions of (a) design-in-organisation, (b) design-in-interaction and (c) design-in-sequence and try to give some content to these distinctions through illustrations from a case study. Design-in-organisation draws out the multifarious ways in which working on a given design problem is suffused by considerations generated by the organisational environment of the activity. Design-in-interaction turns attention to the ways in which working on the design problem is embedded in the interpersonal relations of the participants. Design-in-sequence refers to the working out, in step-by-step activities, of the design problem.

## **KEYWORDS**

Design, Collaboration, Organisations, Interaction, Sequence, Sociology

## **INTRODUCTION: PRACTICAL REALITIES OF DESIGN**

In the second part of this paper we pay close attention to the detailed situation of small group of software designers meeting together to solve a problem in design, and we focus, in the end, upon a very brief extract from the transcription of their talk together. To preface that discussion we should say something about our motivation for looking, in this concentrated way, at this situation and about the manner in which we attend to it.

Like many others we are interested in understanding 'the design process', though we do not have a background in one of the 'design disciplines' which are concerned to improve the process of design whilst being engaged in it. Our disciplinary basis is in sociology which almost inevitably means that it is as important to us to carry on the internicine struggle with our professional colleagues as it is to understand design work. Indeed, in many ways, the attempt to understand design is a means of carrying on sociological controversies. However, the readership of this paper will probably have only the most limited interest in and tolerance for sociological infighting and we will, therefore, avoid that as much as possible and say only the absolute necessary minimum about sociological matters as is required to give some idea of what we are trying to do.

We have been attempting to find out about design by making field studies of designers at work and have, so far, been able to observe activity on three projects involving the design and development of photocopying and printing equipment and we are now beginning to reflect upon the studies we have made to date. The brief extract of transcription which we use here (and which is appended in the paper) records only a few moments from a six hour meeting, and that meeting comprises only one of many meetings and other work episodes that we observed/recorded. The particular meeting and the situation involved in it has no special significance, providing a rather arbitrary point at which to begin to reflect upon the materials already collected and the organisation of the activities that they embody.

hold, we can only report what was done in the design ventures studied and attempt to understand how whatever was done was involved in

Sociology, as already signified, is internally disputatious, and there are many angles from which it approaches its topics. Indeed, it is so disputatious that there is even argument as to which topics are appropriately sociological. There are certainly sociologists who question whether the kind of close attention to even the small details of face-to-face transactions which we subsequently – albeit briefly – provide is appropriate business for sociologists, but they merely manifest thereby the diversity of views about what sociology might be and the extent of the distance between some of them. There are sociological precedents for the kind of discussion which follows. We draw, in fact, upon an approach which may already have some meaning to readers who are aware of the influential work of Lucy Suchman /3/ or who have taken an interest in the possible utility of 'conversational analysis' as a source of models for interface design /2/. Both Suchman and conversational analysis ultimately derive from ethnomethodology, a sociological strategy instigated by Harold Garfinkel /1/.

Ethnomethodology is difficult to explain clearly and concisely, even to those with some familiarity with the sociological issues involved. We will, therefore, avoid attempting an exposition of it and will simply say something about the way in which it orients us toward the study of design.

The primary orientation is to design in practice. Since our orientation is sociological rather than from one of the design disciplines, the concern is primarily descriptive, concerned with determining what in fact takes place over the course of organising and carrying through design tasks. Without the (necessary) preconceptions about what is good or bad and irrelevant or essential that those in the design disciplines

getting the design tasks realised.

The study of design in practice must (for us) equate with the study of design as work, for design problems and tasks as phenomena that we can observe are the constituents of someone's work load, having their essential place within 'the day's work' and 'the project's life'. The fact that designing is a work activity is, we take it, utterly uncontroversial, one of the most familiar of facts for anyone engaged in design, though the way in which work tasks are organised by those carrying them out to get the designing done is not something which is typically at the forefront of their thoughts when they come to reflect upon design.

Ethnomethodology encourages us also to look upon the work of designing as a matter of managing contingencies and exigencies. Suchman's work, by describing the ways in which persons in practice make use of designed artifacts, has brought out for design the extent to which activities are 'situated' and their actual course is worked out 'on the spot' and 'relative to circumstance'. We are now doing no more than applying that point to design itself through a discussion of (just a few of) the contingencies and exigencies that the designers we studied had to contend with in getting even one small part of their design work done<sup>1</sup>.

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<sup>1</sup> Related papers drawing upon the same studies are Wes Sharrock and Bob Anderson, 'Organisational innovation and the articulation of the design space', paper prepared for a volume on 'Design Rationale' edited by Thomas Moran and John Carroll, 'Working toward agreement' in Graham Button, editor, *Technology in Working Order*, Routledge, forthcoming, 'The user as a scenic feature of design space', in press, *Design Studies* (1993), Graham Button and Wes Sharrock, 'The Mundane Work of Writing and Reading Computer Programs', in Paul Ten Have and George Psathas (Eds.) *Situated Order: Studies in the Social Organisation of Talk and Embodied Activities*, forthcoming, and Graham Button and Wes Sharrock, 'Occasional Practices in the Work of Implementing Development Methodologies, Environments and Languages': In J.A. Goguen, M. Jirotko and M. Bickerton (Eds.) *Requirements Engineering*, forthcoming.

We should stress that our objective is to understand design as 'working designers' encounter and practise it, and that, therefore, as sociological outsiders to the design community, we are attempting to find out things which are already known to the working designer. It is not, therefore, our expectation that those with a practical familiarity with design work will feel that they are being told about orders of phenomena hitherto unknown to them. On the contrary, it is our hope and expectation that the situation we describe will be recognisable to them as a possible situation of the sort that working software designers can encounter and would have to deal with.

Our subtitle talks about 'the social organisation of technical work' and it is on this particular point that a great deal of sociological 'infighting' could take place. Many sociologists are agreed that the conduct of 'technical work' is a suitable topic for sociological treatment; however, they are seriously divided over how that topic is to be handled. The case materials are here set out to display the extent to which even 'getting started' on tackling a technical task-in-hand – that of identifying and fixing a problem in the interfacing of two software systems – is embedded in an organisational and interactional environment, the extent to which the participants' very understanding of what they are trying to do, of why they are trying to do it, and of how they are going about it involves their awareness of the socially organised character of the work they are doing. There is certainly no suggestion on our part that the 'social' considerations at work in the design process are at work unbeknownst to the designers, as though they were intent upon 'technical' matters to the exclusion of 'social' considerations. Our point is, in fact, to the contrary, that the socially organised character of their technical deliberations is something to which the designers are sensitive

and responsive in a routine and (for them) a routinely unremarkable way. That their technical doings are carrying out the day to day work of an organisation and that, as such, they are subject to organisationally furnished procedures and methodologies, sited within the organisation's internally differentiated structure and its division of labour, overseen by the organisation's supervisory, monitoring and reporting arrangements, and interwoven with the multiplicity of serial and parallel activities making up the work of an ongoing project are all things which are, for them, absolutely a matter of course. We hasten to add that any or all of these features of their working setting may be, for designers, a perceived source of their experienced troubles. Those involved in technical work, like those in other kinds of work, must characteristically manage situations in which, to quote Harold Garfinkel's words:

'some action must be taken; that the action must be taken by a time and in pace, duration and phasing that is coordinate with the actions of others, that the risks of unfavourable outcomes must somehow be managed, that the actions taken and their products will be subject to review by others and must be justified to them; that the election of courses of action and the resultant outcome must be justified within the procedures of "reasonable" review; and that the entire process must occur within the conditions of, and with ...motivated compliance to corporately organised social activity' /1/2.

Thus, the orientation here is to the ways in which the practical

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<sup>2</sup> Garfinkel's remarks actually pertain to the position of survey researchers but their generalisability to a multiplicity of work situations ought to be apparent.

understanding and management of social (of organisational and interpersonal) circumstance is an integral feature of the actual, in practice, conduct of technical work. Whilst it may serve the legitimate and useful purpose of (for example) design disciplines to consider technical matters in abstraction from social settings it cannot be so for sociologists, at least for those of them who are interested in design in practice, for, in practice the battery of concerns enumerated by Garfinkel will be necessarily involved in 'getting the job done'.

### DESIGN IN THREE DIMENSIONS

For purposes of presentation, we differentiate our account of the situation under investigation into three 'dimensions' which we term, respectively, 'design-in-organisation', 'design-in-interaction' and 'design-in-sequence'. The purpose is to isolate various orders of consideration which, in the situation, are, of course, interrelated. Thus, 'design-in-organisation' seeks to spell out some of the ways in which the meeting is informed by an assortment of considerations which, though they may not be directly, in-so-many-words spoken of during the meeting provide for those involved a frame of reference for their current conduct, understandings which they take into meeting. Thus, the facts that the software writing is an internationally distributed operation, that there are serious software problems in test which are further threatening the project's schedule, that there are tensions between the managers from different sites are all matters upon which the participant's depend for their comprehension of the urgency of their task, of its specific objectives and of (some of) the difficulties that achieving those objectives will have to circumvent. Under 'design-in-



interaction' we glance at some of the things involved in the designer's interchanging with each other, for their problem solving is a matter of their working on it together and their respective participation will have to be managed relative to the roles they can play in working toward a solution. That they come from different sites in the same organisation, from different groups within the project structure, and have diverse responsibilities within those groups are all matters that must be 'managed' amongst them, as must the facts that they stand in different positions of relative authority and different relations of mutual familiarity, and that all have extensive but variable familiarity with the problem in hand. The notion 'design-in-sequence' picks up on the unavoidable necessity that design work be carried on in 'real time' and is constituted therefore by step-by-step operations. In this instance, the work is done primarily through talking and the problem is to be dealt with (in the first phase of its investigation at least) by being 'talked through' and it is, therefore, as a series of turns at talk that its organisation is accomplished.

Our materials were collected in the Development and Manufacturing division of a large multi-national corporation and those being used here record the activities of software designers involved in the design and development of an electronic distributed laser printer. The project is in its intendedly final year and the project team is attempting to put a sufficient number of the early build machines into sufficiently stable configurations to enable them to enter the next stage of formal testing.

The software for the project is being developed at two sites. One is in the UK, the other on the West coast of the USA. The division between them is (crudely) that the UK end is writing the software that

will run the electro-mechanical operations of the output terminal (the IOT) whilst that which will manage the production of the images to be printed and the sequencing of jobs (the ESS) is being written in the US.

### DESIGN-IN-ORGANISATION

The integration of the two software systems has become a serious problem for the project as a whole, the interactions between the two very frequently causing 'lock ups' in the operations of test machines, these problems now comprising a very substantial and still expanding proportion of the project's problem list. The problems in interfacing the software are such that measures are being taken to address these specifically, and members of the US team have been brought over in the UK site to work on some solutions. Jay has come over for a week to familiarise himself with the test operations being conducted in the UK and to examine the integration problems at first hand. Jay's work is to pave the way for the arrival of Sarah, a software writer with responsibility for the interfacing, and who has arrived in the UK only the evening before and is to spend the coming week working on the integration problems.

Some acrimony is entering into the relations between the two sites, with one of the software managers from the US sending accusatory e-mail memoranda to the manager of the 'systems group' at the UK end. The memoranda imply some critical views of the working practices of the local site and suggest that the problems which are being experienced are artifacts of the local test procedures. Reciprocally sceptical views of the working practices and software designs of their American counter-

parts have word-of-mouth circulation in the UK site. However, these exchanges between team members do not result in the parties to the meeting we are examining being at loggerheads with one another. Just prior to the commencement of the talk recorded in our transcript Jay advises the others that the US management are effectively asking the UK team to compromise their work standards in order to simplify project problems for which the US team are themselves responsible and suggests that they should resist all such compromise.

Attending the meeting along with Jay and Sarah are Mick, who is in charge of the system integration on the project, Steve, who is software manager for the project, and Max, who is Sarah's counterpart, the software writer involved in the interfacing from the local end. Although this is the first meeting which brings these parties together to consider the problem there have been previous meetings involving permutations of some of this group's membership. Jay meeting with Mick, for example. Pertinent documents have been circulated. Importantly for the way this meeting goes, Jay has written memos in which he seeks to summarise the critical problems as he sees them. He has picked out as particularly critical the 'clear stack command' and it is upon this that the meeting focuses.

As can readily be imagined, the work of printer designers and developers is much concerned with the movement of paper along the paper path through the machinery, with achieving as near continuous a flow of sheets as is possible, overridingly concerned to ensure that the sequencing of operations will not generate paper jams or failures of paper to feed and to figure out how the machine is to respond when such exigencies do occur. The software commands which regulate

paper movement must relate to those regulating the imposition of the printed image and this means that the output terminal is sending signals to the job management software. The latter is sending out sequences of commands to the output terminal which are 'stacked', which requires, in the event of either a paper jam or a failure to feed, the projected work should be aborted and that 'recovery' operations be set in train – hence, the 'clear stack' command.

The designers we are writing about are patently workers in an organisation, and in the previous paragraphs we have been outlining some of their work circumstances. The purpose of this is, in the first instance, simply to suggest that in order to give a description of what they are doing, to portray their activities in a way which conveys even a portion of the sense that those activities have for their perpetrators, it is indispensable that we should make reference to the ways in which these designers are (again *inter alia*) positioned within hierarchies of decision making, command and responsibility, who are attached to within departmental and project structures of loyalty, and are located within an ongoing flow of work. The work that they are doing is pervaded by these and other organisationally furnished considerations, and the practical management of that work requires that the designers be attuned to the extent to which they can count on one another's cooperation, to which they can dispense with having to inform and update each other, to which they can independently determine what they need to do, to which they can have final say in the definition and solution of a problem etc. etc.. The full specification of what their problem actually is cannot be made independently of organisational relevances of the sort sampled here.

It is, after all, organisationally relevant considerations which enter into the determination of the very sense in which it is 'their' problem. It is 'their' problem in the sense that these are the people who are responsible for fixing it, that these are the ensemble that, by virtue of their interlocking responsibilities, constitute a prospectively adequate group for the solution of the problem. They comprise such a group, first of all, by being composed of parties from both sites, their mutual presence in the same room and around a table providing an opportunity for the talking face-to-face, in detail and for a protracted period. This very situation is an intended corrective to what they (and others in the organisation) have diagnosed as causes of the present problem, many of which have to do with site interfacing. As already suggested, there are issues of mutual credibility between the two sites, with the managers at the US site being unconvinced that the problems being reported from the UK test operations are real problems, many of these not manifesting themselves on the (relatively few) machines being run in the US. Thus, the presence of Jay is partly a matter of getting someone from the US site to see for himself the actuality of these problems and to confirm that they are being rightly diagnosed. There is perceived to be a divergence of priorities between sites, with the IOT/ESS interfacing problems being a lower priority in the States than the UK and with the detailed working out of the ESS end of the interface being postponed whilst other tasks are done and with the IOT software being dependent for its further detailing upon decisions about the ESS. In any case, the most direct and frequent contacts between the two sites are not necessarily between those who know the relevant and necessary specifics of the software, whilst those who do have an intimate acquaintance with the software and its operational problems have irregular, infrequent contacts and cannot, in any case, freely determine what they will work on or how

long they will devote to any task. Thus, bringing together those who already know the problems manifest in the UK testing well, with someone from the US end who is now convinced they do know what they are talking about, and bringing together those with reciprocally detailed knowledge of the ins and outs of the sequencing of machine operations and software commands comprises an optimal group for finding a fix. It is now their problem to make progress in IOT/ESS integration at the level of sequencing software commands.

There are other ways in which the character and ownership of the problem are specified. The ESS/IOT interfacing is everyone on the project's problem. The large and rising rate of ESS/IOT integration problems being scored in testing and being displayed in the aggregations of project problems makes the project's rate of problem solving look bad and means, further, that progression of the project-as-a-whole towards its scheduling targets and milestones is delayed pending resolution of the ESS/IOT integration. The problem which those around the table are trying to tackle is not, then, their private problem but one in which many others have a legitimate interest, are waiting to see if, that and how it is resolved, including those who have put their time and resources into making the meeting possible and who will want to know that their investment has been worthwhile. The ESS/IOT integration is their problem in that they will carry the can if failure to fix it results in further schedule slips and launch delays.

It is not, of course, just that the problem has a thoroughly organisational character but that the solution will also have one. The solution for which they are seeking is one which will have to be organisationally realistic. There is not unlimited time to find a fix: Jay and Sara are there

for the remainder of the week and cannot be spared for longer from other work – after all, though this is a big and prominent problem it is only one amongst a number on the workloads of all those involved. It is, of course, the case that candidate solutions have implications for other people's work and it would be naive in the extreme if these were sought without regard for such things as (a) the sense of urgency with which others throughout the organisation regard their search, (b) the implication of the decision for the organisational processes in force at their work site, (c) the availability of other people's effort in follow up activities such as e.g. software auditing a proposed solution or (d) the ramifications of solutions through other features of the design and through the project's organisation. Further, though those around the table are well placed to search for and identify a solution and have to satisfy themselves that they have found one it is also the case that it has to be a solution into which others not present at the meeting can buy.

In sum, 'the problem' is an organisationally embedded phenomenon, its identifiable character as the specific problem that it is integrally involving a plurality of organisational considerations.

## **DESIGN-IN-INTERACTION**

The designers in the meeting are not only working within the context of an organisation, they are also actively working with each other. They are in direct real time communication with one another and directly working in collaboration on the task. Thus, although their treatment of technical issues is going to be a matter of talking, drawing and

writing their way through the identification, analysis and resolution of a technical problem together.

It is, after all, the taken for granted requirement of the meeting that the parties to it are working toward an agreed solution. Thus, the management of the task of reaching a solution is done relative to the negotiation of agreement, and this negotiation will be formulated relative to what the parties respectively know about the organisational background to their gathering and about each other within the organisation. For example, some speak as managers, others are 'mere programmers', and they are all speaking simultaneously to some people whom they know relatively (if not very) well and whom they see all the time as well as to others whom they hardly know at all and may just have met for the first time.

Let us develop this last issue because it comes up at the beginning of the transcript. Some of the parties are from one work site and some from another and the extent to which people have prior acquaintance can affect the predictability of their reactions. With people you do not know so well you may wait to see how they are going to play things, whilst dealing with familiars can mean that their entirely predictable responses can be counted on. There is, on the one hand, the risk of unwittingly saying the wrong thing, and on the other the possibility of being able to press someone's button with deadly accuracy.

What might, then, seem to be the innocuous attempt to get the meeting going with a proposal for procedure seems to offend Jay, and actually triggers off a complaint from him that they are talking as if they are ignoring his work: lines 9-10 of the transcript:



'I thought that was what I spent all weekend doing.'

Thus, just how to start the meeting involves, if we can put it that way, interactional delicacies.

In reacting the way that he did, Jay might accordingly display himself as someone not sure of his place in these proceedings. In ethnomethodology it is routine to observe that to understand what people say is to see how they say it. A simple illustration of what this means can be given by the example of someone coming home from a party who is asked 'Were there many there?' and who answers 'Millions'. We do not understand such a person to be telling us they have just come back from the most enormous party ever held, with literally millions of people there: we understand them, rather, to be telling us that the it was quite big for a party. We understand how the answerer was speaking, that he or she was speaking hyperbolically. In the same way we understand what the parties to the meeting are saying by seeing how they speak, and one aspect of that is by attending to what we term 'the voices' that they use. Thus, we understand Jay to be speaking as one who has already done a lot of work specifically on this problem, someone brought in to help with the problem though it is not actually his and he is awarded a particular position of 'overseer' of the discussion: transcript lines 49-53:

Mick: 'and we're very grateful to Jay for being here tuh go through and make sure we don't miss anything on that be our mentor.'

Jay contrasts with Sara who speaks as someone just off the plane, who does not know anyone here terribly well and who is, in the first instance, here to listen. Mick speaks as the one facilitating the meeting, as the one to whom it falls to make initial proposals as to how it should

run, what it should aim to achieve, when to move on, when to make lists on the flipchart, who should do the writing and so forth. Stan's presence is as the one who is talking out of a detailed and thorough knowledge of the IOT software and the mechanical operations and sequences of the output terminal, with Max being the one who will have to write any software that the meeting agrees to produce and needs, at least, to hear what is being said and decided about what he will need to do though he may himself have nothing much to say.

These (amongst other) considerations constrain the way in which the talk and the activities that the talk carries out are to be understood. The social identities (in the form of the voices which are mutually available to the participants by virtue of what they already know about each other or can pick up in a few moments informal conversation around a coffee machine) provide bases on which parties make and understand each other's contributions to the occasion, affecting whether – for example – a) they will be heard as speaking on the basis of sure knowledge or without necessarily being sure of what they say, b) speaking for themselves alone or for more than one of us, i.e. for those of us on the IOT or for those of us working on IOT software, c) speaking as one who is only concerned to see a solution in principle and happy to leave working out the details to someone else or as one who is eventually going to have to work out the detailed software and who wants to know just what a candidate solution might get them into.

Clearly the capacities of people to speak and be understood in these ways will shape the course of their technical deliberations, will shape their reciprocal understandings of what is being said via their grasp of how the other is speaking. Thus, Jay's complaining reaction to Mick's

opening proposal to list a series of problems is that of someone whose proposal that the 'clear stack command' is the problem be understood as being a conclusion for the group. His is not one proposal amongst others, one of a set of competitively or cumulatively proposed possible problems between which the meeting must now choose or which it must prioritise but as the one which, without further discussion, should provide further discussion's point of departure. In other words, Jay's proposal is one not to be argued with, save at the price of slighting his prior efforts. The entry into and the identification and examination of the technical constituents of their problem will be achieved and managed subject to the kind of exigencies of interaction considered above. The things people say in such an assembly, though these speak of the workings of a machine or simulate the sequence in which software commands are issued are, of course, treated by others involved as apt or irrelevant, as showing that one has been listening carefully to what has been said before or has not really been paying attention, as supporting one person's prior position or subverting another, as testifying that the other person truly does know whereof he or she speaks or as exhibiting that person's misunderstanding for all to see.

## **DESIGN-IN-SEQUENCE**

We have so far collected together a number of considerations in order to give a sense of what 'designing-in-organisations' and 'designing-in-interaction' could mean in terms of the activities of what ethnomethodologists are prone to call 'the local cohort' doing (at least this part of) the design. The relationship between these different considera-

tions is, of course, itself a matter which is decided through the exigencies of conduct, and it is to these that we now want to turn to count as comprising the issue of design-in-sequence.

We intend by this phrase to build upon the fact which everyone seems to take for granted, that design is very much a step-by-step matter, with design methodologies being concerned with the kind of steps they should be – for example, 'extracting requirements', 'writing specifications' etc.. The assortment of considerations we have been adducing so far can be thought of as considerations which will be distributed throughout the meeting, and just where they will figure and how they will matter, not to mention how they will inter-affect one another is utterly dependent on the exigencies and details of the sequence-as-it-actually-turns-out.

We can make all this much more concrete by turning to the transcript. We can track through the opening sequence as it unfolds and see that just what the nature of 'their problem' proves to be emerges from the contingencies which shape the sequential development of their talk together and that, at particular points in the developing sequence, the parties have to handle organisational and interactional matters.

To begin with, just prior to the point we pick up the talk Jay has revealed the problem to be located in one particular area and proposed that this is what they need to talk about. As we have noted, Mick adopts what is, in this organisational setting, the very recognisable role of a meeting facilitator and his remarks:

Transcript lines 1-5: hhmhh Okay (1.5) whatre the recommendations as

tuh the way we tackle them= fuh we got more than one prob::lem. (1.5)  
So:.(.) I'd like to (2.0) > kind of like < make a list of them on the  
board.

comprise an equally recognisable attempt at tackling the problem by developing an orderly procedure for the meeting. In this organisational environment the conduct of meetings is a 'formatted' affair, and it is incumbent on parties to begin meetings called to resolve problems by formulating a process through which the problem will be tackled, part of this being the identification of things that are to be achieved by the end of the meeting. Listing the problems and ticking them off as they are dealt with is one such standard procedure.

How 'the problem' should be talked about and understood immediately causes problems, with Jay's proposal identifying 'one main problem' being in apparent competition with Mick's 'we got more than one problem', which results in Jay's complaint (lines 9-10). We now have to wait and see – and the participants have to talk their way to the point at which they find – whether Jay's proposal does identify 'the problem' as opposed to (say) Jay's misconception of it. It turns out that Jay's proposal does identify their problem. Stan's endorsement of it (lines 12-13): 'I think others are rel- like I said the other day they're relatively trivial, minor and urh.'

accepts Mick's contention that there is a number of problems but also agrees with Jay by differentiating between 'the primary problem' and other, less significant ones and Jay (lines 20-22) reinforces Stan's differentiation as one which he has independently, previously made. The talk now cycles to Mick who concedes (line 23) 'Okay fine', and

summarises what now proves to be the agreed problem situation: 'So we've got basically one action item up.' Then, after some comment from Jay which we cannot hear/understand it is Mick's turn to say in so many words what the one action item is:

(lines 26-8): 'basically it adds up to the clear stack command and all its ramifications.'

Is this finally an acceptable formulation? Jay (lines 31-3) offers what we take to be an intendedly more exact statement of the problem as he has already identified it:

'I think its the entire::(1.5) command accepted (2.00) arh successful unsuccessful .. clear stack .. the interaction involved'.

There is partial agreement that 'clear stack' command is part of the problem but Jay's remark specifies (some of) what Mick's 'all its ramifications' might amount to.

We cannot in this paper follow out the further development of this meeting, but even this sketchy consideration of the talk in which the participants are working out what 'the problem' is and how further talk about it is to be organised points to the issue of the 'sequential potential' of matters under discussion, and particularly to their potential to develop into something other than anyone initially bargained for. In this case, what is projected as an acceptable procedure for allowing everyone to contribute to identifying the problems turns into a disagreement over whether 'the problem' has already been identified and what it specifically involves. The detailed examination of this sequence reinforces our

general point that it is in and through design-in-sequence that the handling of organisational and interactional matters are handled relative to the achievement of an adequate solution to their technical problem.

## CONCLUSION

We have been outlining the broad direction in which we are approaching the analysis of design activity and have here been placing emphasis as some of the important ways in which this activity consists in working with others. We have drawn attention to the way in which such working together is suffused with the character of the social world in which it takes place. This is an easy thing to say, but we have tried to show that in their activities designers and developers orient to the social structured nature of what they do, and how they do so: they design in organisations, in interaction, in sequence.

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## APPENDIX

Excerpt from Transcription of ESS/IOT meeting.

1. Mick: ...hmmh Oka:y (1.5) whatre the recommendations as tuh
2. the way that we tackel them=fuh we got more than one
3. prob::lem (1.5) So::(.) I'd like to:: (2.00) > kind of line <
4. make a list of them on the board.
5. ( ) U[hrm
6. ( ) [ Mhm
7. Mick: ( ) so that we can uhr (0.5) hhh then tick each off
8. when we think the (0.5) we've tackled them ( [ ) solution
9. Jay: [( ) I
10. thought that was what I'd spent all weekend do:::ing.
11. Mick: Yep (0.5) Okay.
12. Stan: I think that the:: (2.0) primary problem that we have and
13. that's the one we've really got (.) tuh hammer out (.) and er
14. I don't think that I don't see any point in goin on from there
15. until we er (0.5) e::r as I suggested before=before we've
16. come up with a desig,, and done at least some
17. implementation= tuh see how it works out (1.5). There's no
18. point in going on till all the other ones come off that one
19. particu[lar ( )
20. Jay: [ I think the others are rel- like I said the other day
21. they're relatively trivial minor (1.0) minor and urhm (2.0).
22. urh
23. Mick: Okay fine. So we've got basically one action item up ( )
24. urhm (.) out of that list (.) of course Jay whi[ch is
25. Jay: [( )



26. Mick: ( ) I've got it over on my desk if we need to. Basically
27. it adds up to the:: clear stack command and all its
28. ramifications
29. (2.0)
30. Yep?
31. Jay: I think its the entire:: (1.5) command accepted (2.0) arh
32. (2.0) successful unsuccessful fe::d clear stack (.)
33. Mick: Mmh
34. Jay: =the interaction involved.
35. Stan: Uhrm
36. Jay: Wh what the (.) entire sequence really is [ ( )
37. Max: [ ( )
38. Mick: This one.
39. (4.0)
40. Jay: Yuh. That was ( ) and operate of clearing stack ( ).
41. Mick: .hhh Okay. (2.5) Taking that then as wh- wh- as the
42. objective for today is to work out what we're going
43. (0.5) urm basically as quickly as practical but without
44. rushing it for the sake of it.
45. Stan: Urm
46. Mick: And then implementing that change
47. Stan: Absolutely.
48. Mick: Testing it and then recon- reconvening (0.5) we're
49. basically and we're very grateful fer Jay being here
50. being here (.) tuh go through and make sure we don't
51. miss anything on that (.)
52. Jay: Yep.
53. Mick: Be our mentor [hh
54. Stan: |hehh

55. Mick: And (1.5) if we don't complete any of the other tasks
56. before he goes back I think that would be perfectly
57. acceptable.
58. Stan: Uhm
59. Mick: Everyone else happy with that (2.5) Right. (1.5) Who'd
60. like to kick off then.