thing she wanted to do was to start solving problems that nobody else thought existed, because she knew from bitter experience that problems would probably be created if she did. Also, to see one of the marketing managers at the same time would kill two birds with one stone.

She thought perhaps John would be a good one to start with; he sounded from what Ian had said as if he would be quite interested and quite ready to talk. But could she do that before seeing Ian again? Probably not – she was not sure yet exactly what she would be talking to Alan and John about. So she picked up the telephone and rang Ian. His secretary (what was her name – she must try and make friends with her if she was going to be able to get hold of Ian when necessary) said that he was away till the end of the week, and was really hopelessly busy next week. So she tried Alan instead. He was a bit surprised to hear from her, but Ian had mentioned that she would be around some time. Yes, he could see her the following Monday in the afternoon. So Jenny told him that she was wanting to talk to John as well, afterwards, if possible. "I'll see what we can do" said Alan, "John's right here in my office. I'll pass you over to him." John said he was tied up in a meeting all afternoon, but would be free at lunch time, and could have a chat with Jenny then. But who was she? Because if she was coming to look at the office supervisor's job, he was not at all the person to ask about it, and anyhow he felt it was only fair to admit that he thought it was a mistake to promote somebody from Head Office. Jenny tried to give a brief description of what she was coming down for, but felt very much at a disadvantage with talking to someone who was on the telephone in somebody else's office, and also felt that she had got off on the wrong foot. But she had her two appointments for next week.

3

Helping Clients Talk about Their Problems

In the previous chapter we have argued that problems belong to people and are not objective entities. If this is the case then we are totally dependent upon the client being able to tell us about his problem if we are to be able effectively to help him, or manipulate him to our own point of view. The starting point for working with problems is, idealistically, an empathetic understanding of the problem as the client sees it. One of the most powerful ways of achieving some empathy is through the careful act of listening to the language, descriptions, theories and beliefs that are expressed during introductory discussions with the client. Listening in this way is not an activity which can be undertaken in the everyday sense the word implies, but rather it demands well-developed skills and a great deal of concentration. The description of the problem, as it is heard by the problem-helper, is the basis for model building, analysis, negotiation and help as the problem which is constructed from initial listening is negotiated into a form explicit to both client and helper and to which both feel a sense of ownership.

However, it seems all very well to argue that a helper should listen carefully to the problem as the client sees it; but what if the client finds it difficult to articulate his concerns? The previous chapters mentioned some of the reasons why this may be so. Those that are most often given are to do with the 'politics of helping' in organizations and to do with client – helper expectations. The client does not want to declare particular aspects of the problem to someone from another department, or to declare concerns which seem to him to be personal rather than 'organizational'. The client reckons that the helper is a number cruncher and therefore will not be interested in the more evaluative and qualitative aspects of the problem, so he talks only about those aspects which he believes to be amenable to number crunching. Whatever expectations both persons have about one another's role they will both usually see constraints which derive from the culture of the organization about how problems are described. There is another reason which many helpers often come across – and that is the client quite simply finds it difficult to find the words which satisfactorily express his concerns.

This chapter is about a number of techniques which we have found helpful to

both client and helper in making the problem explicit to both of them so that each is understanding mostly the same view of the problem. None of the techniques is the best or worst, their usefulness will be contingent on the particular circumstances of the problem-solving activity. Neither should they be regarded as separate strategies, they are amenable to being appropriately synthesized into an approach which suits your own style and inclinations.

Any techniques which have been helpful in facilitating problem construction between problem-owner and -helper are also likely to be useful when a person wishes to collect the idiosyncratic views of individuals in a group. We have often used the following techniques, or variations of them, when we have been concerned to involve several members of a project team in constructing a 'group problem'. Alternatively we have found them useful for encouraging participation when apathy has been prevalent and the client has wanted greater involvement from his 'team'.

The techniques are not introduced in any special order and are collected together in one chapter mostly because they pan out to a sensible chapter length. Thus Chapter 4, which considers specifically 'cognitive mapping', should be treated as a continuation of this chapter in that its purpose is the same.

RAMBLING

Probably the most obvious method for getting to know about the view a person has of a problem is to give him the time and space to 'ramble' around his subject. This can be an enormous strain on the listener for it is difficult to concentrate and difficult not to interrupt. The client will wander down several alleys that seem to bear little relationship to the problem as it was labelled at the start. Nevertheless by concentrating on collecting impressions of the more general parts of the client's 'world-taken-for-granted' it will be possible to see something of what he sees and to discover something about the spectacles through which he makes sense of people and events. In the same way as interrogation methods often depend upon allowing the prisoner to ramble so that they inevitably give away 'too much' of themselves, it seems possible that if the helper simply gives a client time and space then he will manage to communicate much of his problem.

Although it is not the most usual circumstance, there are times when the client is pleased to ramble freely. It seems to be more usual for the client to have some difficulty in stating his problem. Often we may conclude that if a problem can be stated easily then it is not much of a problem and probably doesn't need the help of a consultant – characteristically problems are confusing, unclear and difficult to state in a way which seems to capture them adequately. Clients often feel an immense sense of frustration after describing a problem, for it sounds to be simple but he knows this not to be the case, it has just not been possible to tell it as it feels.

A significant disadvantage, for the helper, of having a client talk openly and freely is that the helper thinks he knows 'what it's all about' rather too quickly and consequently moves to the negotiation part of problem construction without understanding the problem. How often have you experienced a friend or colleague hear you talk about a problem and quickly see it as simple and so offer solutions? Implicitly such interactions demonstrate arrogance on the part of the helper by their implied suggestion of stupidity on your part. This is, of course, not always the case, for sometimes a friend can 'see the wood from the trees'. But the danger is still large enough to care about – the operational researcher, for example, stands a good chance of presuming he knows the client's problem from 'terms of reference' and then going away from the client to solve it – as if to suggest that the direct experience and involvement of being the decision-maker is to be discounted in the problem-solving!

When you feel confident you 'know' what the client is talking about and feel intuitively confident about the imaginative leaps you make to save time in problem construction, then is the time to be wary. Most persons' experience of being on the end of such confident helpfulness is that they 'only wish he'd just listen for a minute'. Such confident help is characteristic of the sort of 'disabling help' we referred to in the previous chapter. Our experience in these circumstances suggests that the helper must take more than usual care to discipline his early role to that of 'empathetic' listener rather than pseudo-empathetic activist.[1]

Once talking freely, the client is not likely to need structured encouragement to discuss his problem. The effective role for the consultant, at this early stage, is that of passive listener – in the sense of being non-evaluative, actively modelling what is being said, and trying to discern the significant groups of ideas that each signal a problem within the client's 'mess'.

The sense of passivity captured in the last sentence is important, for passivity does not mean giving no feedback of any sort – the client will be likely to think you're bored, thinking about something else, can't understand a word that he's saying, and so on. This will particularly be the case if he is himself confused and bothered about the whole event. Thus it is important to present some feedback – for example, non-verbals such as nodding, saying "I see", etc.

ANOTHER ASPECT OF EMPATHY

Films, television and Woody Allen have introduced us all to stereotypical images of the American psycho-analyst. One of the projected features of the activity of the analyst is the apparent 'nothingness' contained in his vocal interventions. The analyst seems to merely repeat back to the client what has just been said.

There is, however, practicality in this process, for encouraging a client to

[1] Egan (1975) discusses in more detail the nature of empathy.

elaborate and construct his problem. As the client dries up and seems unable to easily articulate his thoughts (often because he believes the listener would not be interested) he is encouraged to further continue by the listener feeding back the last thing said: "you have been saying that there are a lot of problems with the supervisors . . .". By tailing off in feedback the client will normally warm to his subject once again. It works well because it is common for a person to pause as he continues to think about his subject and then feel embarrassed after the pause; or simply because a pause is commonly used by other people as their opportunity to say something. The consultant controls his desire to make a few 'important' points but rather indicates an interest in further elaboration. This contrasts with the passive role of responding to silence with silence – the client often construes this as disinterest rather than the giving of time and space.

A practice not dissimilar from that described above is commonly used by behavioural science consultants and follows a similar script: "that's very interesting I wonder whether you could say a little more about that". It is less constraining of the client than naming the topic which sometimes tells him too much of the slant you think he should be taking. While this type of intervention is not designed to enable doziness on the part of the listener, nevertheless it is a deliberate strategy which is useful if you should drop off to sleep for a few minutes. It is intended to invite further elaboration (on a topic you do not wish to name) in a 'friendly and positive' way.

INTERVIEWS

So far we have not mentioned the sort of interviewing where the interviewer runs through a list of questions devised in advance. Our reason comes from our wish to emphasize the importance of empathy for the early stages of problem construction, and our belief that structured interviews of a question/answer nature are not good for allowing the client to present the problem 'as he sees it'.[2] This should not be taken as an overriding point of view – there are often circumstances where careful interviews will be successful.

A variation on traditional interview methods is to invite the client to phrase a question to ask himself which will facilitate his telling you aspects of the problem that are particularly significant, but which he would normally only think about rather than articulate. This is particularly helpful when 'illegitimate' political data is important. The sort of question that seems to have worked well in these circumstances goes something like:

> "If you were to fall ill and be away from the office for a couple of months what would you need to tell your temporary replacement about the issue in order that he would act 'sensibly' in your absence? We may assume this replacement to be a person you trust and to be as generally and technically competent as yourself – indeed it might even be yourself!"

This type of question usually helps the client 'get at' his thinking about those aspects of the issue which are difficult to articulate and yet are important. Typical content will elaborate the political environment of the client, and the highly subjective judgements which could not be supported by 'hard facts' but nevertheless are a crucial reflection of experience and wisdom.

[2] This belief is congruent with most current views on the conduct of interviews in social research.

INTERSUBJECTIVITY

A device which is particularly useful when a problem belongs to a project team is the use of cards for establishing the structure of ideas mentioned by several members of the team.

The process involves the consultant in conducting brief interviews with each team member and trying to record the ideas (constructs) that seem most salient in that person's general description of the problem. From the total list of ideas obtained from all members about forty are chosen so that the cards selected are representative of all contributions. Each idea is written onto a separate card and then all the cards introduced to each member of the team. The team members are then each invited to organize the cards in any way which seems to be appropriate to them. Most people choose to set them out on a table or desk where special distances represent some sort of interconnectivity; some people put them in piles or groups; some people set out their relationship one to another as if they were dominoes; and others go through them talking about the importance and relevance, or not, of each idea.

The point of the exercise lies not so much in what each person has done with the cards but rather with the commentary which usually goes with the organization of the cards.[3] It is this commentary which provides the basis for problem identification from the merging of different perspectives. It is thus possible to gain structure in problem identification without losing individuality – a form of 'intersubjectivity' can emerge.

MORE STRUCTURE

A body of theory known as the Theory of Personal Constructs has been very significant to our way of understanding how people make sense of events.[4]

[3] Our experience, so far, has indicated that this technique invariably leads to animated commentary (see Eden and Wheaton, 1980). Our initial feelings, that it would appear to be a silly and pointless game, have not yet been supported by field experience.

[4] Although Kelly originally published two volumes of his theory of personal constructs in 1955, the first three chapters of this work have been published under the title *A Theory of Personality* (1972). These chapters are the most fundamental expression of Kelly's philosophical and psychological views about the nature of man.

Applications of the theory were originally developed for use in psycho-therapy, but they can sometimes be helpful in providing a structure for the client in his attempts to articulate and understand a problem he faces. This comes about because the structured nature of the process helps provide both the problem-owner and -helper with cues and prompts for constructing the problem.

The basis for making sense of our world is taken to lie in our use of experience by seeking similarities and differences. This simple notion led to the practice of introducing to therapy patients three 'elements', selected at random from a list of about twelve elements. Each element is an object (or can be treated as an object) by the patient – thus in most therapeutic circumstances the elements are usually people who are significant in the patient's life. In an organizational setting elements could be different projects, products, market sectors, or elements (problems) of the issue the client is addressing (those elements being jointly identified during initial discussions), and in some instances the elements might be other people such as members of a project team, fellow executives, etc.

Similarity and differentiation is elicited[5] from the client by:

(i) writing the name of each element on a separate card;
(ii) presenting the client with a random selection of three cards;
(iii) asking the client to state "in what way would he regard two of them as similar and yet different from the third?";
(iv) make a note of the descriptive dimension (or 'construct' used to compare the triad of elements. The description of similarity is regarded as one side (or 'pole') of the construct and the description of differentiation as the other pole;
(v) another three elements is randomly selected and the client again asked to compare them. In some cases the client struggles to see any way of comparing the elements - if this is the case then the triad should be ignored and another selected. Often the opposite occurs; the client can elaborate at length on the similarities and differences – here the client should not be constrained (the object is to help elaboration and problem construction) but rather each descriptive dimension used should be noted and an attempt to establish both poles of the construct should be made.

The process should be continued until the client is able to continue problem construction/description without the help of structure; or until about the same number of constructs as elements have been elicited. For example:

> The client reports a problem which has been labelled 'inadequacy of information system'. During initial discussions with the client we can identify some possible elements which are related to the problem (see below); however, the client seems unable to articulate his concerns and thus a structured method seems as if it could be helpful.

Possible elements:

1. Current weekly computer printout.
2. Informal knowledge gathered over a drink or lunch.
3. Regular reports from our staff.
4. Current monthly computer printout.
5. Interactive terminal in own office.
6. Interactive terminal in general office.
7. Weekly team meeting.
8. Information services person in department.
9. *Ad hoc* team meetings.

The consultant randomly selects a triad,[6] say,

> *ad hoc* meetings,
> current monthly computer printout,
> weekly team meetings.

The client's reply was

> "information at meetings is relevant to the issue at hand and not full of other extraneous data – most of the printout is irrelevant" (i.e. 9 and 7 have been differentiated from 4).

We would note the constructs as

> "relevant to the issue at hand . . . irrelevant to the issue at hand",
> "not full . . . full of extraneous data".

Another triad, say, 2, 9 and 7

> "weekly meetings are formal whereas the things I get to know at lunch or at *ad hoc* meetings are much more subjective but very useful"

giving the constructs

> "formal (data) . . . subjective (data)",
> "very useful (data) . . . (not so useful data)".

Here some parts of the constructs (those in parentheses) have been implied by the consultant, and might be checked later if there is time. And so the process continues.

It is possible to continue to a more formal activity by using the elements and constructs to form a grid, and then ask the client to rate numerically the relevance

[5] For a description of how this process, called the Repertory Grid test, was originally devised see Kelly (1955) or Bannister and Fransella (1971).

[6] A table of random numbers is useful here, such as the last digit of telephone numbers in a directory. Intuitive random numbers are notoriously non-random.

of each construct to each element. The reasons this might be done are: it may be helpful to explore the clustering and separation of elements and constructs; or, you may be unable to think of any other way to keep open a dialogue with the client.

A grid is completed by asking the client to consider every construct against every element and rate, on any scale, the appropriate way the construct is used, thus:

CONSTRUCTS	relevant – irrelevant				
	!	not extraneous – extraneous			
	!	!	formal – subjective		
ELEMENTS	!	!	!	very useful	not so useful
weekly printout	9	7	1	4	etc.
lunch, drink meetings	3	4	9	4	etc.
regular reports	2	2	6	3	etc.
–	–	–	–	–	etc.
–	–	–	–	–	etc.

The client has shown a belief that the weekly printout is mostly irrelevant (rated 9) whereas lunch meetings are fairly relevant (rated 3).

Standard cluster analysis methods can be used[7] to group constructs that are used in a similar way and thus might have a similar meaning, and group elements that seem to have similar attributes. However, the usefulness of a cluster analysis is dubious: its results are often difficult for a client to understand and seem to be hardly worth the fairly laborious undertaking of completing a matrix. Nevertheless, there is no general rule, and experience of using grids with oneself as the 'client' is the only satisfactory way of knowing how to make the judgement about when it is appropriate to use them with a client.

The above example uses data from a project which was designed to investigate the attitude of senior managers of a large company to the provision of decision-making information. After a small number of open-ended interviews the grid was designed and submitted to all the participants. The results of analysis were used as the vehicle for an extremely successful discussion on the effectiveness of the computer-based information system. As a consequence of the analysis and the discussion the information sciences department were able to effect substantial

[7] The cluster analysis is manifestly easier if it is undertaken by a computer. There are several packages for understanding the whole of a Repertory Grid process, from triading to analysis. See Jones and Eden (1980) and Armstrong and Eden (1979) for examples of using grid methods in an organizational setting. See Easterby-Smith (1980) for a general summary of grid methodology as it applies to training and organizational development.

changes to the provision of management information. Neither this department nor the managers believe that their attitudes would have been aired without the control and structure given by the grid as the method for eliciting the dimensions of thinking about the usefulness of information.

DISCOVERING GOALS AND OBJECTIVES

A natural extension of grid methods, which can provide a structure for learning more about the reasons why a person is anxious about a problem, is to try and elicit data about what is important to the person[8] as it relates to the problem. The approach may provide insights about the aspects of the situation which are worrying and also preferences about an alternative possible future as it is imagined by the client.

Recent decisions that the client believes he has made relating to the issue under discussion are taken as elements in a triading process for eliciting 'good/bad' outcomes. The triad question is "in what way did two of these three decisions produce outcomes that are different from the third?"

Having elicited about twelve different constructs, which are descriptive dimensions for outcomes, the client is next invited to answer, for each outcome, the question "why is the outcome you describe either preferred or not preferred?" The answer to this question is generally a further outcome – the question is continuously repeated until the client 'dries up'. Typically each question elicits an outcome which is a more general description and closer to being an 'ideal' preference – that is, an outcome which is desired in an idealistic but not practical sense. In principle the consultant is attempting to identify the idiosyncratic network of goals, objectives and ideals which are relevant to the issue.

As with the use of the repertory grid it is possible to extend this structured problem construction aid and explore the relationship between outcomes by producing an 'implications' grid – that is a grid where both column and row contain the same items, in this case outcomes. The grid is then completed by asking "does outcome 'k' have any implications for the achievement of outcome 'j'?" The replies can be rated, but may include negative ratings in those cases where one outcome is believed to have negative consequences for another. Drawing a diagram of this network of outcomes and feeding it back to the client can be a helpful step in problem construction.[9]

Related to the principle of 'acting stupid' are some common techniques used by social researchers in organizations. The researcher affects 'not to know what

[8] A formal basis for distinguishing ideals, objectives and goals can be found in *On Purposeful Systems* (Ackoff and Emery, 1972, pp. 50–57). Their relationship to problem construction is discussed by Eden and Sims (1977).

[9] For a more detailed discussion of this technique and its relationship to ideas about 'value systems' see Eden, Jones and Sims (1979). For an example of its use in a local government setting see Eden (1978).

is going on' and pleads complete naivety about the circumstances of the client. Often this can be achieved by just simply being about the organization – persons will usually approach the researcher in order to try and find out what he is doing, but in the act of inquiry will delight in explaining 'what is really going on round here'. Clearly such techniques can be damaging to the internal consultant who is supposed to know something, but can be effective for the outside consultant/researcher.

COMMENT

The techniques introduced above are rarely used singly or in totality; their main purpose is often to 'get things going'. After many years of using all these techniques they inevitably have a general impact on the style of interviewing a problem-helper uses in practice. Often the different techniques become an implicit part of the script used to help a problem-owner articulate his problem. We should, however, reiterate our belief that confidence in their applicability and practicability comes mostly from having used them on oneself. In most cases it is possible to gain some view of them without needing to persuade a colleague to try the method out with you at the receiving end – some insights are possible by being consultant to yourself.

Case Study

Jenny wondered whether to take her baby tape recorder with her, but decided it was too early – Alan and John could well feel threatened and so she might find at the end that her interviews consisted more of neat, tidy, insipid and carefully worded statements. She decided that she would be better off simply letting them talk and then putting her own notes on to a pocket dictating machine immediately after the meetings. This would mean that she could devote all her energy to looking interested and encouraging them to talk freely. After John's annoying mistake about what she was going there for she was also determined to make sure she set out her ideas about her possible role at the beginning of each interview. There was at least some advantage in Ian's not having said much to either of them about what she was to do, it meant she had more freedom to interpret her specified task in the way she thought would be most advantageous.

These first meetings could well set the tone for the rest of the project and so she spent a good while pondering on the best style for approaching Alan and John. "If only I'd had a chance to have a natter to Ian over lunch or a drink I'd have a better idea of what tactics to adopt" she mused. However, she was passing Leakey tomorrow and thought it worth dreaming up an excuse for calling and trying to have a 'gossip' with Linda, Ian's secretary.

In the event a chat with Linda proved to be extremely valuable. "Of course Alan's a bit of a boffin – wanders round in tatty clothes and spends half his life on the shop floor getting his new ideas built." "He's here till all hours of the night." "I've been with Ian Brown for several years – he's wonderful – he'll sort Alan out. It's not that he doesn't respect him; he just wishes he'd be more commercial." "John's a nice person. He might have been the marketing director but he's not really aggressive enough", said Linda, proud to be the font of knowledge about the company. "Just the kind of information I needed", thought Jenny.

She now felt a little more prepared when she met John for lunch. Linda was quite right; he did seem to be a nice polite man who was anxious to be helpful. Apparently, after the telephone conversation she had had with him when he was in Alan's office he had gone to check up on her and Linda had said that she was doing something for Ian which needed John's help, so he was treating her with care. She told him that she thought her role was to build a computer model of the market in order that a new product strategy could be developed.

"Why does Ian want a computer model of the current market if he's thinking about new products? Surely he needs a bit of standard market research?" he stated rhetorically. He had put his finger on the niggle that Jenny had. She remained silent hoping John would go on to answer the question. "Anyway, I'm not sure what I can do to help", he added. She decided the best way of progressing was to get John talking about his own product range so that she could get a feel for the market. It is rarely difficult to get someone to talk about his own field. John talked for most of the lunchtime, Jenny needed to provide little encouragement except for playing back a statement of John's every now and again to set him rolling once more. John was thorough, articulate and seemed clear in his own mind about the nature of his customers, the market segment he was satisfying, the size of the market, and what the future held. In one sense she was getting too much hard data given that she didn't have her notebook. John definitely gave the impression that his area was so well planned and straightforward that it was not likely to be of particular interest in Jenny's project, but he "would be very pleased to help in any way – good new products were clearly crucial to the future of the company". They separated at the end of lunch on friendly terms. Jenny felt that he probably would help – in a sort of 'proper' manner, but that he would be surprised if she needed to come back to him.

When she got to Alan's office she found him kneeling on the floor with what appeared to be hundreds of parts to what she presumed must be a new Leakey tap design. His office was chaotic in a sort of orderly way. "Bloody marvellous this new valve of mine," he said, "can't understand why Ian wants to stop work on it." These were his first words! "Sorry, but it's so bloody ridiculous", he added as explanation.

Alan continued alternately to enthuse about some of his design interests and to grumble about Ian's reluctance to let him go ahead and put them all into practice, as he always had under the previous marketing director. Jenny realized he was not really a client! It was beginning to dawn on her that Alan was being involved in the project 'for his own good'. Whichever way she looked at it she

was going to have to try and gain his confidence and gradually persuade him to be a client of her work. She could make this meeting a time to let him tell her about his problems and for her to demonstrate some understanding of them, and maybe even sympathy.

"I know Ian wants me to act as the main link between you and him so that it doesn't tread on the toes of any of the marketing managers, but the trouble is that I am very pressed for time. I hope you can get this model finished as soon as possible so that I can get on with the real work. These ideas I'm working on at the moment are the future of the company." "So that's how Ian explained Alan's involvement in the project", thought Jenny.

Jenny suggested that if the two of them could pool their different skills and knowledge then the project could be completed fairly rapidly – he with his knowledge of the products and the way the company worked and she with her modelling experience. Her current thoughts were that she would produce a model which could explore the prospective contribution each of the current products could make to the future cash flow of the company, a mixture of forecasts at the macro and micro level combined with costs and demand schedules.

"To get things moving could you tell me about what's going on at present around the current product range?" Jenny invited in as open a way as she could think of. Alan accepted the invitation and started talking about where "the real future of the company lies", which in his view was the industrial products division managed by Peter Williams. It turned out that Alan tended to ramble a lot and seemed, to Jenny, to wander on to all sorts of irrelevant topics. He was articulate but difficult to listen to. Jenny was taking extensive notes and found herself particularly interested in some of the topics that kept cropping up. She started to think about how she could best demonstrate her interest in what he was saying; she was nodding a lot and doing all the usual non-verbals but felt she needed to give a good demonstration that she was taking in what he was saying. The trouble was she wasn't sure she could feed back her listening because of the disconnected nature of his commentary. She decided it was time to try 'the cards' as a method of bringing some structured elaboration and getting some more definite interaction between the two of them.

She did not find it difficult to select from her notes some central concepts. He had talked about all of the following:

valves for water flow . . . non-aqueous valves
major breakthrough
bog standard work
using engineering and foundry . . . plastics
making good products better
exciting, challenging work
research on fluid flow
good engineering

where the future lies
totally new market
importance of price
good industrial design
the real purchaser
has to be sold hard
the end user
link with University
the mainstay of the company
developments in materials
luxury products

These were linked to

Ian's old division
John's division
Peter's division
builders merchants
architects
water boards

She scribbled these onto some postcards and said, "You've been extremely helpful in the last hour or so, and given a lot of useful data. I'm afraid I'm not too sure how everything fits together. I've been putting some of the things you seem to think are central on to these cards and I wonder whether you could lay them out on your desk in the way that seems to make some sense to you. If you think there ought to be others that I've missed let's add them in, and if you could explain things as you do it I would find that helpful."

As he looked through the cards he seemed pleased that Jenny had picked up some of the things he thought were important – most people had seemed to miss the significance of some of these things he said.

After he had looked through them once and said a bit about several of them (which enabled Jenny to put on the cards his 'rather thans'), he set about organizing them. "Am I doing this right?", he asked a few times, and Jenny had to work hard to persuade him to do what he liked with them. She began to wish she had after all brought her tape recorder; by now she reckoned it wouldn't have interfered with Alan. Gradually Jenny felt able to join in by asking questions through her moving the cards. Indeed the final displays were two by Alan – one setting out the cards according to how things were now and a second showing a picture of things to come, and one by Jenny which was her attempt at displaying the sorts of things that her model could help him think more about.

Alan seemed pleased by the time she left, and, more important, she felt she had developed a rapport with him that did not leave him feeling she was there to 'do him down'. In her mind the model was beginning to change its form slightly.

She wondered whether it would be more fruitful if she was to construct a series of possible versions of what the company and its product range might look like in the future — these would be static models but with financial and market share predictions. Although Alan was aggressive at the beginning of the meeting she found herself beginning to like him and be wary of his sharp thinking behind the rambling style was a quick mind.

At the end of the meeting they had agreed to meet again after Jenny had had time to put together a few ideas about where to go next. Even though he seemed more favourably disposed at the end of the meeting she was worried about his frustration over the developments being frozen. This frustration was bound to keep messing up their relationship. She thought that it might be worth thinking of a way of persuading Ian to unfreeze at least one of his projects. Maybe if she talked to Alan about it next time she could do something about this and do it so that she finished up with some credit with Alan.

4

Interactive Modelling

This chapter considers direct interactive modelling as a semi-structured approach to helping a client construct his problem. It is more sophisticated than the approaches discussed in the last chapter, although it has similarities with a structured interview method and uses the model building process as the means for devising 'appropriate' questions. We shall first consider a specific example as a means of introducing the model-building process known as 'cognitive mapping'. In the later part of the chapter we deal specifically with the general topic of the practice of mapping and give some general examples of particular aspects of the mapping process.

PROBLEM CONSTRUCTION USING MAPPING

Cognitive mapping is a modelling technique which intends to portray ideas, beliefs, values and attitudes and their relationship one to another in a form which is amenable to study and analysis. The role of the consultant in the early stages of the relationship is to help his client access 'theories' which have been developed through experience.[1] By modelling in this way we are exploring beneath the surface of words: we consider what a phrase means to that individual — what he intends to convey about his world. We shall see later that the principles implicit in cognitive mapping are not arbitrarily related to pragmatic model building but rather are a practical development of the implications of Personal Construct Theory — a psychological theory about how people construe their world.[2]

Here we shall convey the essence of mapping as it is used for developing constructive dialogue with the client. The first step is straightforward — a piece of paper about A1 size mounted on an easel is used and in the centre a label for the problem is noted. In Chapter 2 we discussed how problems are found in groups and how an agreed label is usually what is noted as the problem. For example,

"production output dropping quickly"

Next ask the client to think about the satisfactory alternative to this circumstance.

[1] Wittgenstein (1953) suggested that "the aspects of things that are more important for us are hidden because of their simplicity and familiarity".

[2] See Kelly (1972).

The client is to be encouraged to think in terms of his own circumstances rather than some 'official' point of view. In one sense the client is being asked to consider what the alternative situation might be which would mean that he was not hassled by the problem, rather than necessarily that which would be regarded as the best situation. For example,

"production output dropping quickly . . . steady output"

It is sometimes difficult for the client to provide an answer to this question: when this is so the consultant may find that the alternative image becomes apparent as the discussion continues. In the example above we may suppose that the official line would have been 'output rising', but personal views indicate 'steady output'. In the second chapter we discussed politics and its importance for how problems are defined. In all organizations there will be good reasons why the client will want to feed you with all sorts of splendid sounding opposites such as 'output improving'. Little will be gained by trying to force a client to admit that he is not psychologically committed to an officially acceptable target. Nevertheless it is also possible that a high trust relationship will allow for a more open admission of the problem as it is seen by the client. Whichever is the circumstance it is still important for the consultant to know how the client sees things, even if the explicit discussion and model displayed to the client and his colleagues contains politically acceptable features.

The next step is to develop ideas through addressing the question "why does this matter to you? Why are you worried about it?" For example, see Figure 4.1.

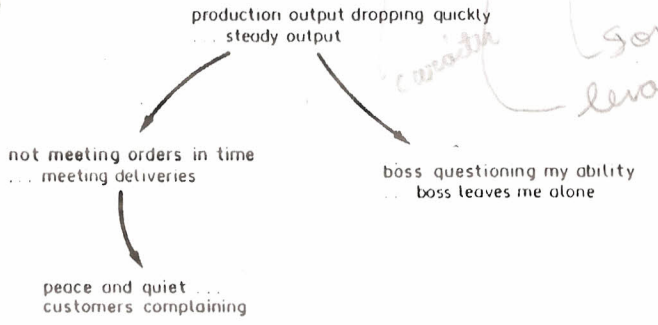


FIG. 4.1.

This is a model which could be constructed in response to an answer: "well, I'm mostly worried about it because it has resulted in the boss questioning my ability, I would feel much happier if he just left me alone. . . . I suppose it's also a problem because we're not meeting orders on time and so it's broken the peace and quiet that exists when customers aren't ringing and complaining about delivery."

Psychological Opposites

In the map developed so far we can see the ideas relating to contrast and similarity being expressed by noting psychological opposites for each concept. The concepts have then been related to one another using arrows to show the belief that one idea influences the other. The significance of opposite poles in indicating meaning was discussed in the previous chapter in the context of repertory grids. The idea is that our constructs develop as we discriminate between aspects of our world in order to understand and manipulate events for our purposes. For example, as someone uses the word 'respect', the way in which they use it, what they contrast with it, provides the meaning in that context. It may be, say,

"respect" rather than "treat with contempt"
"respect" rather than "ignore"
"respect" rather than "dislike"

Each pair of descriptions represent different psychological, rather than logical, opposites and thus different meanings – in the same way as we have just used 'logical' as the opposite of 'psychological' to help you, the reader, better understand our meaning. Similarly, in the example above, we understand differently the construct poles "boss questions my ability" with "boss leaves me alone", and "boss questions my ability" with "boss favours me". In the first case we might begin to see someone who probably wants a quiet life; in the second someone who is ambitious – that is, we are theorizing a connotative link between the clients' "leave me alone . . . favours me" and our construct "quiet life . . . ambition".

Causality

In the model constructed above we have included the client's statements that indicate psychological opposites and we have included the implications of causality by using arrows. However, an obvious extension of the arrow (or directed graph) nomenclature is to include that which we hear about the nature of the causal relationship. Following the usual practice for drawing directed graphs[3] we can assign to each arrow a +ve or −ve sign to show the direction of relationship. Thus if the first pole of one construct leads to the second pole of another construct then we assign a −ve sign to the arrow. If the first pole leads to another first pole then a +ve sign is used. These assignations are best made by considering relationships in pairs, and not by considering a string of beliefs.

These mapping methods are demonstrated further by following the example

[3] See, Harary, Norman and Cartwright (1965) for a detailed discussion on directed graphs; and see Axelrod (1976) for an application of simple directed graphs, or influence diagrams in political science.

of problem construction. After asking for reasons "why the problem matters", and allowing the client time to ramble fully in answer, the next question considers descriptions about how the problem arose. The question is posed: "what reasons come to mind as explanations for ('production output dropping quickly')?" For example, as in Figure 4.2.

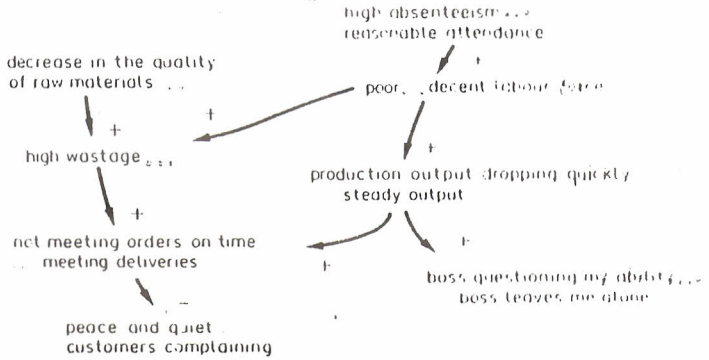


FIG. 4.2.

Once this stage has been reached the problem is beginning to take shape in an explicit model which clients can generally easily understand. They begin to be assured that you, the consultant, are listening to them — for the evidence of your attempts at empathy is before them. The model is not only evidence of careful listening. As we remarked earlier the client will often say 'illegitimate' things using non-verbal forms of communication. He will not want this sort of communication to be reflected in the map but will be anxious for some indication that you have 'heard' what he has said.

Although the content and structure of the model may appear obvious and possibly trivial, it is easily appreciated that the meaning of the problem to this particular individual is becoming more specifically known. Indeed, even though the number of concepts contained in the model is small it is possible to imagine how the meaning of apparently the same problem (one with the same label) for another person in the same organization could be significantly different. The difference can be simply identified using the same approach and comparing model content and structure. So, for example, a model may contain some of the same constructs but differ in the structure of relationships (arrows) which link them — that is their meaning is significantly different. For example, see Figure 4.3. In this sketchy map we can see that there are some similar concepts to those in the map shown below. However, the differences significantly change the meaning of the problem labelled 'production output dropping quickly'.

After the initial discussions have reached the stage given by the above model, and the client has witnessed the model gradually grow, it is likely that each idea on the map leads the client's thinking backwards or forwards to further elabora-

[illegible] For example, see Figure 4.4.

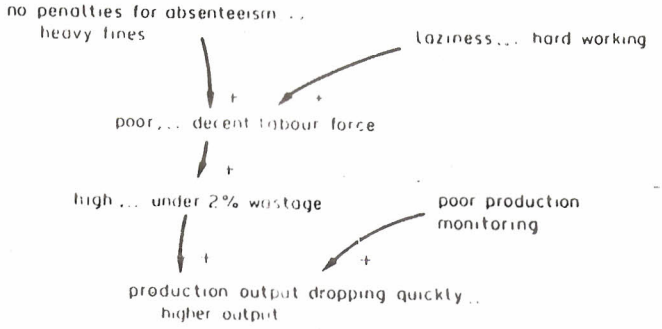


FIG. 4.3.

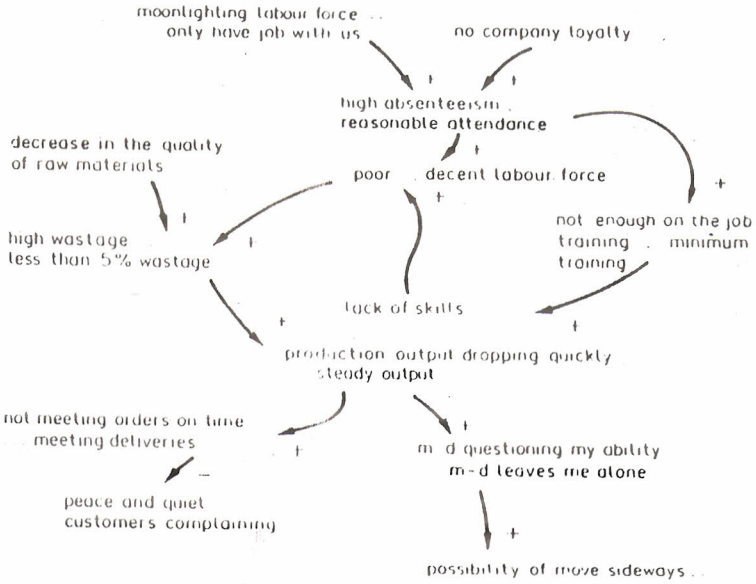


FIG. 4.4.

If the client seems reticent to expand his description of the problem it is now very easy for the consultant to directly invite the client to consider the "why does it matter?" and "why is it like that?" questions for every concept on the map. In practice the consultant will invite elaboration around those concepts which seem most significant; significant in the sense that encouraging articulation might reveal imaginative explanations and consequences which might be worth considering as a part of a portfolio of possible solutions.

It seems that the opportunity and encouragement to articulate thinking, and see it reflexively in a model which relates ideas as well as noting them, can release

anxiety about the issue and open up creative opportunities. The deliberate notice taken of opposite poles of constructs contributes to the possibility of creative thinking. Indeed what is happening here is that the nature of the issue is gradually changing as articulation and modelling take place.

COGNITIVE MAPPING TECHNIQUES

Using the context of mapping as a means of encouraging the client to talk the previous section has introduced the broad principles of mapping. For the remainder of this chapter we shall consider some of the specific issues of mapping. A 'cognitive' map is so called in order to lay emphasis on the idiosyncratic aspects of the model constructed – it is not supposed to be a scientific model of an objective reality in the way some influence diagrams are (for example, those used by System Dynamics modellers[4]), but rather be a representation of a part of the world as a particular person sees it – it can never be shown to be right or wrong, in an 'objective' sense. At all times it is important to consider whether the map is adequately representing the beliefs (implied or explicitly stated) of the client, or yourself. A belief should be clearly attributable and owned by one or other of these two persons rather than its being a muddled version of something the client said and which has then been half-heartedly modified so that it is not owned by either person. Indeed, at the stage of the model we have so far reached the consultant is concerned with modelling so that the beliefs represented are owned by the client.

The Stated or Implied Belief?

The impression is that cognitive maps are totally dependent upon language they can be, but we believe that such a constraint is damaging to the potential for satisfactory problem construction. During any dialogue each person uses a range of techniques to inform the other; the most obvious of these is the use of language, but there are also other methods of a non-verbal nature. Some of these unintended mannerisms, or rhetoric, or other behaviour are designed to add drama and entertainment; but many will be deliberately meaningful intonations, emphasis by gesture, or emotive overtones. It is sometimes possible for the consultant to find or invent a verbal construct that partly signifies that client's non-verbalized meaning. The consultant should not resist doing so – there is no reason why a cognitive map must be constrained to constructs the client states explicitly, it is more important to portray meaning which is owned by the client. One aspect of mapping mentioned earlier can be useful in the tentative growth

[4] Diagrams using arrows in this way appeared in *The Limits to Growth* (Meadows *et al.*, 1972). However, the use of directed graphs to help managers consider important causal relationships has been discussed by Roberts (1976) and Stearns (1976, 1978).

of the model – the connotative link. Consider, for example, the different ways in which a radio writer will attempt to transmit meaning compared with a television writer.

In many interactions the consultant will have with his client the client will be trying to tell the consultant about the 'illegitimate' aspects of the problem. Because such aspects as internal politics of the type discussed in Chapter 2 are illegitimate parts of a problem the client is often unable to state them linguistically; however, the client will still try to sound warnings, grind his own personal axe, and emphasize particular features of the problem by using a battery of non-linguistic methods of communication. This means the client is able to truthfully say "I never said that!" but at the same time influence the consultant. In these circumstances the consultant will be foolish to ignore this type of data and yet will not wish to record it in the model to be displayed to the client but will certainly wish to make it a part of his own model of how the client views the problem. At the same time the client will need some sort of confirmation that the consultant has 'heard' the illegitimate communication. We have referred elsewhere to this transaction as "bluff and double bluff" in the consultant–client relationship.

Connotative Links

Conversation often requires that a series of different phrases are used as if they have the same, or linked, meaning. Alternatively, attributes of a construction are given to help the listener understand more clearly the image the speaker is trying to transmit. A person may say, "a good teacher is excited by his subject and yet is also organized and informal, whereas other teachers just do it for a job and seem chaotic and often severe in their relationship with students."

Within this statement there are no clear causal beliefs, and yet the linking of ideas, constructs, is important for understanding the particular image the person is trying to build of a good teacher. We can usefully depict the elements of the statements by using links between bi-polar constructs, as shown in Figure 4.5.

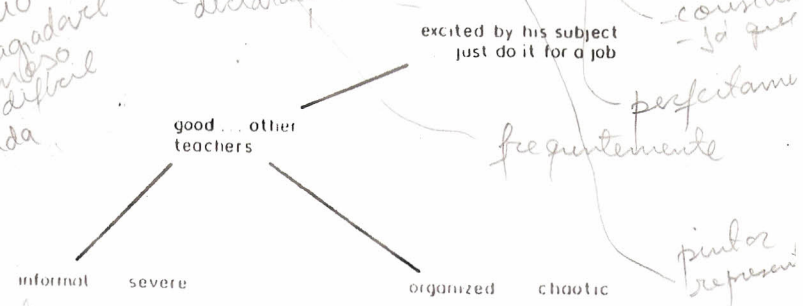
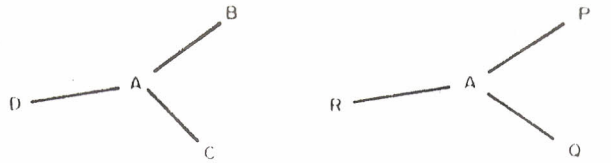


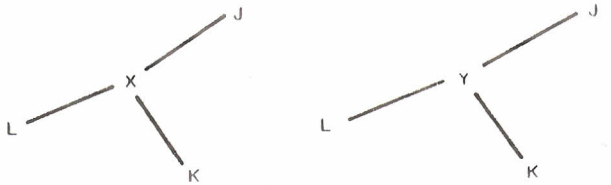
FIG. 4.5.

Maps such as the one in Figure 4.5 can be used both within and outside a normal 'causal' map. They are effective ways of portraying differences in meaning amongst a project group. It is not merely pedantry to explore, and expend energy, identifying the different images persons have of an important element of a problem. For example, if a group of students were acutely dissatisfied with their teaching then we may say they have identified, and own, the same problem. However, before there could ever be a sound basis for concerted effort to change these circumstances there would be a need to explore what each person idiosyncratically means by 'good teaching'. Attribute maps are an effective way of doing this. After negotiation it may be possible for the group to agree about the attributes that are important for construing bad or good teaching. From an aggregated attribute map it may then be helpful to construct a Repertory Grid using different teachers as the elements, and the contents of the attribute map as the constructs in the Grid. Each member of the group can complete the grid so that their teachers can be compared.[5]

It may be helpful to consider the two extreme cases of misunderstanding that can be illustrated using attribute maps (Figure 4.6).



i. same verbal tag (A) used with different meaning



ii. different verbal tag (X and Y) used with the same meaning

FIG. 4.6.

[5] Armstrong and Eden (1979) conducted an exercise along these lines to help a group of estate managers become a more cohesive group. They used a combination of Repertory Grids and Implication Grids to explore differences in meaning (implications grid) and differences in the use of these constructs (rep grid).

Technical Problems in Coding Language

Coding language for maps can often present interesting problems. Is there any significance to the first pole of a construct? Rather than coding an historical explanation as an explanation, would it be more useful to treat it as a general theory about the future and so code it as a possible consequence? How much of what is said should be included on a map? When a person talks he rarely provides explicit psychological opposites – should they be guessed or left as a void pole?

Every consultant who uses mapping to help problem construction seems to develop his own rules about the significance of the first pole of a construct. The following rules are most common.

(i) The first pole represents the clients description of the current situation, and thus the second pole is taken to be a description of a possible future. For example, "high absenteeism instead of reasonable attendance has been causing chaos with work scheduling . . . if only we could set steady work schedules then machine productivity would increase" would be coded as:

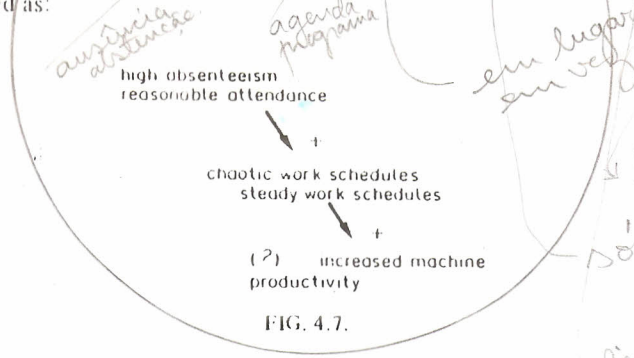


FIG. 4.7.

Generally this method means that the map can be easily read because most arrowheads are +ve signed, and so reading follows down the first poles, or down the second poles.

(ii) A second way of coding makes the first pole represent the descriptive dimension first proffered by the client. The above coding is the same except that "increased machine productivity becomes the first pole and the arrow is thus -ve signed". The advantage of this method is that a glance at the first poles on a map can give an indication of the personality, attitude and general approach of the client to problems. It will often also be an indication of the culture of problem ownership in the organization. Thus, if the first poles are descriptions of the current problematic situation then we may conclude that the issue is construed through a sense of dissatisfaction. If the first poles are predominantly about the 'world as it might be' then we may feel that the issue is construed through a more

optimistic vision. It is often helpful to make a note of such differences amongst project team members working on the same issue.

(iii) Another way of coding makes the first pole represent that description which is believed, by the consultant, to be the positive circumstance – that which is regarded as 'best', desirable, or most preferred. In this case the poles are generally referred to as the 'positive' and 'negative' poles rather than first and second poles. The above coding would now be as shown in Figure 4.8 which is, coincidentally, the reverse of the first method. This method seems to be easier because a quick look at the first poles gives an impression of the 'better future'. However, it can be impossible to work when coding the views of a group of people, or the views of a confused individual.

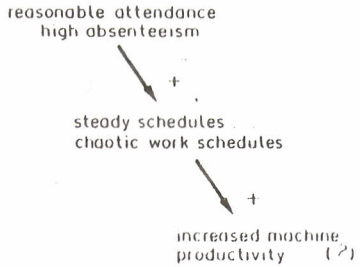


FIG. 4.8.

(iv) There are some who do not believe that it is important to have any rule about the significance of each pole.

The second problem mentioned in Figure 4.8 concerns the relationship between historical explanation and their reinterpretation as prediction. For example, "my policy ideas did not get accepted because I didn't get the advance support of the chairman", can be strictly interpreted as historical explanation, or alternatively can be translated into a future context on the map. The latter approach is generally more helpful, and takes history as the basis for a more general theory with applicability for future planning. A similar problem exists when a person says "we need a new computer because the backlog of processing is too big". Although the statement is in the form of an explanation it could also be treated as the future outcome from a strategy; as in Figure 4.9.

In the second case the direction and sign of the arrow have been reversed. There is no clear-cut rule about which way is best; however, it is sometimes useful to adopt a coding rule which always puts that which is most valued at the head of a chain of arrows. This, of course, implies that a decision can be made about that which is most valued.[6] In the example in Figure 4.9 it is possible to envisage

[6] The conceptual significance of values for an understanding of organizational decision-making is discussed in Chapter 3 of Eden, Jones and Sims (1979).

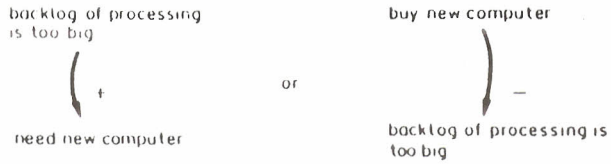


FIG. 4.9.

'buying a new computer' being most valued to the individual (the computer manager?) and reducing backlog to another person; for each of these persons the coding would reflect this difference.

For the consultant it is often important to be aware of these implications even if he chooses not to map in a way which reflects his belief about a client's values. In the Figure 4.9 example it may be unhelpful to the client for a model to represent his personal values in contradistinction to a legitimate organizational goal such as 'reducing backlog'. Nevertheless the consultant would be silly to ignore the personal needs of the computer manager, if he was his client.[7]

How much should be included in a cognitive map? This is a difficult question to answer – it is of the "how long is a piece of string?" variety. It is not usually difficult to make a model large, so large that the client is impressed but loses touch with the central 'features' of his problem. We need to find ways of selecting only those concepts and beliefs that are 'relevant'.

As a person talks about his problem he will make statements which are merely of a 'background' nature and are intended to help the consultant understand terminology. Other than this background data the modeller must attempt to understand the central features of the problem by listening to important values, objectives and goals and then try to ensure that ideas which relate to these values are included on the map. When we discuss later the use of a computer for model building, we shall see how it is possible to consider analytically the relationship between values as they might be identified by the map as a network of 'problems' making an 'issue', and values as we intuitively identified them from our beginning to 'know' our client.

In this way our map is reduced in size by only coding those beliefs which are relevant to areas of interest of the client as if those areas of interest represented a 'problem' arena – something about which the client seemed particularly 'fussed' or anxious, an 'axe he wishes to grind'. There is, however, an acute practical difficulty – how do we do 'on-the-spot' modelling, which requires a rough knowledge of values, when we have not been able to listen long enough to identify values? Our experience suggests that practice seems to make us better at it: that is to say, we have learnt how to use the content of the map as it is being drawn, intonations, non-verbals and other clues so that the mapping accelerates towards a reduction of redundant content. This means that the

[7] The distinction between 'personal' and 'organizational' values is discussed in Eden (1974).

early content of a map often turns out to be unimportant and would not appear on a redrawn version.

When should the content of a map be guessed? The third of the questions listed earlier considers when it is appropriate to insert psychological opposites into a map on the many occasions when the client does not provide them linguistically. We discussed earlier the possibility that the early stages of problem construction often results in most concepts being coded as a single pole. We hope we have demonstrated the significance that establishing the opposite pole of a construct has for understanding the meaning of that construct; and therefore asserted the importance of not implying the opposite pole except when it is absolutely obvious. Some concept types seem more amenable to the implication of opposite poles than others, and some dangers exist when an opposite seems obvious but is not.

Some concepts are expressed as if they can be thought of as quantities, whether or not they are measurable. Thus an 'increase in backlog' seems to be of this type. When this occurs it is common practice to ignore the term 'increase' or 'decrease' and code the concept as 'order backlog' where the first pole of such concepts is always taken to be 'increase' and the second pole as 'decrease'. Disadvantages can occur: such coding can upset the coding rules mentioned earlier, e.g. all first poles are taken to be positively evaluated; to imply 'monotonic' concepts can easily miss an opposite pole such as 'no backlog'. When the pole 'no backlog' is set against the pole 'decrease backlog', which may have been presumed, we see that we can miss an importantly different perception of the problem.

In the same way as increase/decrease can be regarded as obvious opposites adjectives such as more/less, up/down, smaller/bigger, etc., can be regarded as obvious opposite poles. This practice can be very dangerous — more so than increase/decrease assumptions. That which is obvious to the consultant would not necessarily have been obvious to the client, but once the consultant has identified the opposite in this way it is unlikely the client will deny it even though it was not in fact the opposite intended. Indeed it is sometimes particularly helpful to 'force' the client to think about alternatives to the 'obvious', apparently logical, opposite pole. By so doing creative alternative circumstances can be defined, and considered as possible solution strategies.

Sometimes statements which seem to have a 'matter-of-fact' sense about them are difficult to imagine as bi-polar. For example, "the world is doomed because the supply of energy is limited" might presume the concept "supply of energy is limited" as a statement of fact and thus of a single pole form. Even though a person might consider that there is no alternative circumstance to "supply of energy is limited" he will be psychologically conceiving an alternative in order for the construct to have meaning. For example, the opposite pole might be "discovery of more sources of energy", which is being negated by the pole "supply of energy is limited". This would be different in meaning to a person who also takes the concept "supply of energy is limited" as a matter of fact but treats it as the psychological negation of "abundant energy".

NEGOTIATING A PROBLEM

The discussion above leads us to consider the stage at which it becomes helpful for the consultant to negotiate with the client and begin to construct a jointly construed problem they both wish to work on. This section discusses the process of negotiation; and the above comments about the extent to which implied meaning can be inserted within the model should be evaluated in the light of strategies for negotiation.

As the client begins to have trust in your concern and respect for his problem then he will become more interested in your appraisal of the situation. The move from an essentially 'empathetic' to a 'negotiative' paradigm can be done self-consciously and effectively by using a model as the vehicle. As we discussed above there are elements of negotiation in the way psychological opposites are, or are not, implied as a map is drawn. A more direct, and positive, approach to problem negotiation comes from a sequence of possible activities undertaken by the consultant:

(i) seeking elaboration in one arena of discussion rather than another;
(ii) broad analysis of a map which suggests to a client the central areas of concern, the concepts which can have most impact on outcomes, the interrelationship of areas of concern or particular problems, the identification of those relationships which if changed would have a significant impact on the nature of the issue, the identification of feedback loops, etc.; and
(iii) the explicit, and acknowledged, act of the consultant constructing his own model of the problem and then merging it with that of the client.

Each of these activities progressively equalizes the power to define the problem and so facilitates an explicit negotiation of the problem which each of the consultant and client see as representing the 'situation' faced by the client.

Any question the consultant chooses to ask will reflect his own interests and view of the problem, thus it is a form of negotiation because it encourages the client to think about one aspect of his problem rather than another. This part of negotiation is clearer when the consultant sees apparently conflictual statements and logical inconsistencies and asks the client to explain these. Consistency and logic are a matter for personal interpretation and concern, thus the act of questioning a client about his problem by implying 'stupidity' can be unhelpful! Nevertheless it is unavoidable for the consultant to direct his line of questioning to an elaboration of conflictual statements. Additionally the consultant may construct hypotheses concerning potential action which are based on the theories already identified within the model: the consultant may say "you've said so-and-

so, and so-and-so – if we combine the possible implications of opposite poles would it be true that such-and-such would occur?". A typical answer would be: "no, that wouldn't happen like that because . . ."; and so the model is extended with some of the new content resulting from the consultant's ideas.

Clustering concepts according to the explanations that relate to areas of concern within the issue is one way for the consultant to suggest ways in which each problem relates to another. Key concepts are selected for their appropriateness as descriptions of an area of concern; all concepts which have consequences for this key concept form a group unless they can be included in another group which is subordinate. In this way the relationship between groups can be discovered, and so the inter-relationship of problems noted. For example, see Figure 4.10.

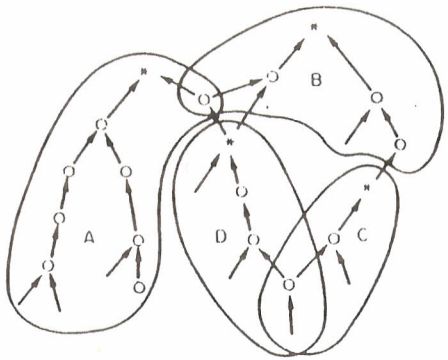


FIG. 4.10.

Figure 4.10 represents a cognitive map, the asterisks are the key concepts, and the shapes which enclose groups of concepts are the interrelating groups. Using the process described above, groups A, B, C and D are established and we discover that they relate to one another as shown in Figure 4.11.

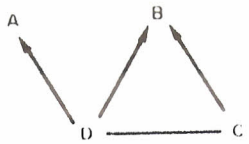


FIG. 4.11.

A and B are superordinate and are not hierarchically linked, D is subordinate to both A and B, whereas C is subordinate to B. If each of these groups of concepts can be identified as areas of concern which make up the issue then we are now able to gain a deeper understanding of the consequences of tackling one

or more problems in isolation from others, and also consider the consequences each problem has for others in the context of the complete issue. Grouping concepts in this way provides an interesting basis for negotiation by the consultant and client working from the same map but identifying different key concepts (and thus problem arenas) to work on.

Because a cognitive map is a structure and network it is possible to establish which theories in the map are most sensitive for the definition of the issue. We can see that some theories appear in more sequences of argument from a tail concept to head concept (a tail concept is one with no explanations, and a head concept is one with no consequences). If any of these 'core' theories were changed, or redefined as false, then we can say that the definition of the issue substantially changes. This form of analysis can provide the client with an indication of those theories he might like to question, and conceivably explore their validity by undertaking informal or formal inquiry to determine their 'truthfulness'.

Finally, the most obvious form of problem negotiation occurs when the consultant considers the client's problem from his own point of view. The consultant constructs, for himself, a map representing his own theories about the nature of the problem. After constructing an independent model he can then carefully merge his own map with that of the client so that the new model is a representation of both their views, including conflictual and contrary views. The client is invited to explore both the consultant's model and the merged model. As the exploration unfolds both parties join a discussion which is structured by the merged map, and thus allows the map to change into a negotiated problem definition which often leads to the development of possible courses of action.

Vicious Circles and Stability – Cognitive Feedback Loops

When a client talks about the way the world works he often refers to 'vicious circles' and regards them as things of importance. Vicious circles can be crucial to developing policy; for they can act to support our intentions or alternatively act in a degenerative manner. Once we define ourselves as caught up in them it is usually extremely difficult to break them or change their direction. When we listen to a group of people describe the situation they see as problematic we often find that some of the theories they use join together to produce a loop. A map of these theories shows that a change at any point leads back to itself. For example, in periodical publishing there are some loops which often recur as persons describe the growth or decline of their market. The following theories are utilized at different times to talk about particular aspects of publishing: "more circulation leads to the publication being more attractive to advertisers . . . the bigger the book then the more readers like it . . . because we have to keep a constant ad ed ratio the more pages of advertising we get the more editorial we produce . . . if the book feels better to the reader, he is more likely to buy it."

If we add to these theories about market behaviour some of the simple arithmetic relationships that exist between the ideas then we have a map which looks like that shown in Figure 4.12.

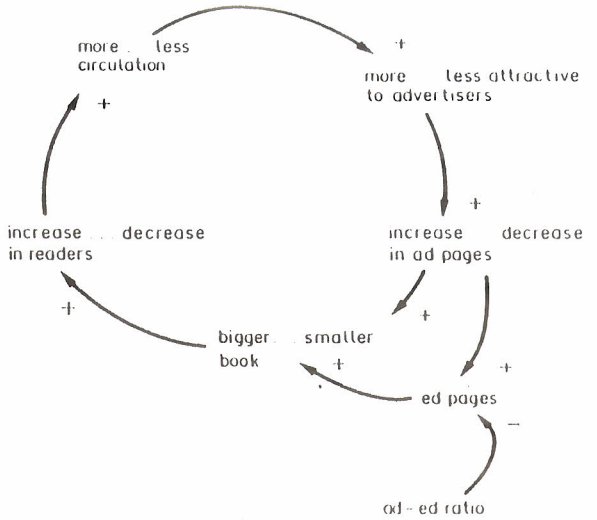


FIG. 4.12.

This represents only one of the possible vicious circles that are often believed to exist for some periodicals. We can see how if we start at any point in the circle and consider possible intervention then the consequences generate growth or decline circumstances; thus if we considered increasing the ad rate in order to intervene on the 'attractiveness to advertisers' then: a decrease in ad pages may lead to a decrease in ed pages (because +ve arrow and the effect of ad ed ratio) which may lead to a smaller book, which may lead to less circulation, which may lead to less attractive to advertisers, which may lead to a decrease in ad pages, and so on round the loop again, ALL OTHER THINGS BEING EQUAL.

The loop identified is a positive feedback loop. Obviously the same loop could produce growth (all other things being equal) by, say, increasing the attractiveness of the book to the reader with free gifts. Note that all that is needed is a once-and-for-all change of one factor in either direction. It is also important to note that this loop can easily be broken by ignoring the constant ad ed rule; and it is such discoveries which can be significant to the client, and which he would not have properly appreciated without the use of a model.

Taking one loop in an isolated manner like this reveals a part of the basic behaviour of a periodical market which the client believes persists. However, seeing a model usually encourages the client to identify other theories which interact with those in the loop. Indeed one of the valuable outcomes of mapping

is the invitation the model makes to the client to say "it's not as simple as that because . . .": and so elucidate more of the problem.

Often we find that loops which appear in maps are not vicious but stabilizing. We see in Figure 4.13 a loop of this sort, many of the ideas on the map being similar to those in the vicious-circle diagram.

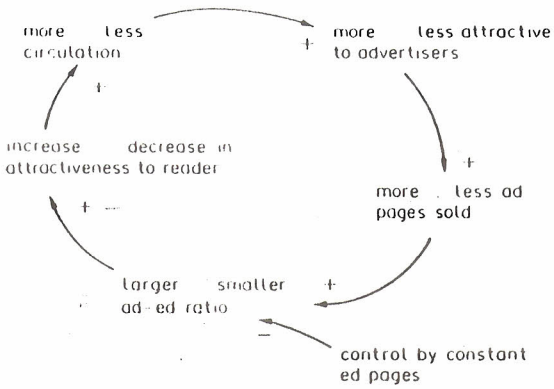


FIG. 4.13.

Following this set of theories we have: less attractiveness to advertiser may lead to less pages of ad sold, which may lead to smaller ad ed ratio (because ed pages remain constant), which may lead to an increase in attractiveness to reader, which may lead to more circulation, which may lead to more attractive to advertiser; thus stabilizing the initial intervention. With these set of theories and all other things being equal, it would be possible for higher ad rates to result finally in about the same number of ad pages!

Here the circle of ideas forms a negative feedback loop. In this loop we can see how, using the control of constant ed pages, the journal team have created an interaction with the market which aims to maintain the *status quo* as long as there are no other interfering changes. A controlling loop illustrates how theories lead to 'stability'; a budgetary control system is intended to have the same impact where budget variance is the signal for homing back 'on course'.

Diagrams similar to those appearing above are seen as 'influence diagrams' in books on System Dynamics[8] for the quantitative simulation modelling of 'real' systems. As they appear in cognitive maps they are taken to be representations of interpretations of a problem by an individual or group they represent the 'reality' of that individual or group. We shall discuss later how an 'owned' rather than objective reality model of a problem can be used as the basis for quantitative

[8] System Dynamics was developed by Forrester (1961) and used to construct the well-known world model Meadows *et al.* (1972). A recent text discussing its use in management is Coyle (1977).

modelling and how the existence of loops within a cognitive map would suggest the use of System Dynamics as a modelling methodology.

Case Study

During the next couple of weeks Jenny started putting together a crude model using some of the data she could easily lay her hands on. Her intention was to produce a small-scale computer simulation model that simply enabled a user to experiment with different market size figures, a variety of cost bases, and a variety of production mixes. She had been working pretty much full time on the project, slaving over a hot terminal, and also getting some rough-and-ready data from John, Peter and Justin (Ian's old deputy in the up-market division and desperately hoping for Ian's old job). She had also been to see Alan on two further occasions.

Although the exercise with the cards had been about trying to help her sort out Alan's statements by enabling him to provide a structured elaboration, she realized when she got back to her office that she could build a 'first shot' cognitive map of the things she had heard. She did this mostly for her own benefit she hoped it would give her a framework for understanding Alan, and thus for managing her relationship with him more effectively. The content of the map was mostly implied through her attempt at understanding his view of her and the project. It was not the sort of map to feed back to Alan, or indeed to let anyone see other than possibly her boss!

On the occasions when she had seen John, Peter, Justin and Alan during these two weeks she thought she might get some better insights into the market if she started mapping the content of the interviews. The activity was informal and the maps were not shown to the other people; she concentrated on making sure they saw her as doing some non-threatening data collection. However, she was used to taking notes using maps, and thought it might have some future benefits in helping her decide what direction she should develop her model after the current crude model had been finished.

Her map of Alan's views expanded, even though he usually repeated himself at each of the meetings. His repetition was not because he forgot what he had said last time, but rather to emphasize his arguments so that he could feel more certain that Jenny had fully heard the significance of what he had said. As she got closer to having a working model to show Alan and, she hoped, Ian, she became a little concerned that Alan would not be paying a great deal of attention to the model but would instead be telling her the same things over again. She wondered whether it would help if she had one more meeting with him before displaying the computer model, and used this meeting to feed back some of the beliefs that came out at the last meeting. Maybe if she fed back a map he would begin to realize more fully that she did listen to what he said.

At the last meeting she had drawn the map illustrated in Figure 4.14. It was

FIG. 4.14. An initial attempt at a model following the first interview with Alan.

untidy in the way they usually are when they are taken down as the person speaks; she thought it was worth tidying and drawing out on to an A3 sheet of paper. Most of the concepts on the map had cropped up on previous occasions. The exception to this was the part of the map that directly referred to the reasons why his 'best man is leaving'. She wondered whether she should take out the comments specifically about Alan, but eventually decided that they might demonstrate her interest in his position relative to Ian. She also thought it likely that she could encourage Alan to use the map to think about other explanations and consequences of his beliefs about Ian – how certain was he about his beliefs? What might he do to change the impact of these beliefs? She could think of a few possibilities for redefining the way Ian might see Alan's section. Overall the idea of feeding back the map seemed likely to move Alan towards being a client rather than an unwilling participant in the project.

At the back of her mind she could see that she was going to have to get John, Peter, Alan and possibly Justin together to debate the numbers her model would produce. Inevitably the debate was going to involve all of the ideas that they each had mentioned, ideas that she couldn't possibly get into her model. If each of them found maps interesting then perhaps she could use a structured mapping approach alongside her model as a means of managing the process of discussing future product development. In particular, if she could get Alan interested in the idea of a structured discussion he might feel happier about involving the marketing managers in the project directly, whereas otherwise he seemed to find discussions about new products a waste of time; "It never seems to end up getting anywhere", he had said. Jenny felt that if she were not careful he would accept the involvement of the marketing managers only in the modest role of number suppliers.

So it was that Jenny met Alan two days after her last meeting with him (she liked to get back to people as quickly as possible, before they had lost the impetus of the previous discussion). "At our last meeting you came up with quite a few ideas about where the future lay. It struck me that it might be helpful if I clarified some of these points. What I have done is to put these ideas together into a sort of model so that we can get some more overall feel as to how the ideas relate to one another. I have tried to get it down into a model without distorting what you said. . . . I have split the model in two parts even though you see them as related – the first part seemed to be a group of ideas that relate specifically to 'innovation' and the second is more related to the need to move quickly on the development front." She showed the first (and possibly less sensitive) part to Alan and explained; "What the model is trying to do is to capture some of the explanations and consequences of each idea for others. The arrows simply mean that I thought you saw an idea influencing another. So, for example, I think you said that by the use of new alloys the current products could be up-dated whereas a move into plastics would lose the benefit of foundry skills." Alan remained silent for several minutes – so long that she worried that he might be wondering 'what the hell is it all about?' "You know that's just

what I do think about it . . . but it's a bit simplistic like that", said Alan. "Where do you think it's simplistic?", invited Jenny. "Well, as your diagram shows, the core of it all is technological innovation. We can get a really good reputation for advanced thinking – 'the people to come to to solve today's problems', rather than just going from crisis to crisis desperately trying to keep up with everyone else. That way we can charge almost anything we like for our products." He paused, rubbed his chin, and went on; "The current developments in material sciences are not just giving new alloys but also making the cost of plastics prohibitive compared to the use of non-oil based materials, and this means we can make hugely better products for the same price as the current ones."

Alan carried on picking up points on the map and expanding his views about them. As Jenny added these to the map he became more and more fascinated with how ideas seem to cluster. At one point he said, "Look, every time we have a meeting on this area we forget how integrally related all the others are to this one." Jenny noted the labels he used for each area and drew a map of the relating areas for Alan to consider. She also pointed out the possible significance of the loop which meant that higher volume would facilitate the use of new foundry techniques which could lead to more possibilities for updating products.

It was some time before she had a chance to introduce the second part of the map. Alan was, by now, losing energy and didn't want to consider a new topic – he was still quite wrapped up in the first part of the map. She decided to postpone any thinking about Ian's attitude to product development.

She left Alan's office without the map – he wanted to keep it to ponder over. This was both annoying and rewarding. She wanted the record but also was pleased that Alan had been encouraged to work on it further. She promised to call by the next day to borrow and take a photocopy – for a moment this worried Alan, he didn't want anyone else to see it, but Jenny reassured him that it was for her own eyes only.

Her next few days were filled with making minor modifications to her model so that she could demonstrate to Alan how her model contributed to considering the issues that were most important in his thinking.