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JOURNEYS THROUGH THE QUALITY GAP:

INFORMATION TECHNOLOGY IN TWO ORGANISATIONS

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PhD Thesis

City University Business School
London

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NOTE: Some of the Appendices have been modified in order to ensure the confidentiality and anonymity of the sponsors.

A READER'S VISUAL GUIDE TO THE PHD JOURNEY

In order to help the reader keep track of my movements during the PhD journey, a visual distinction has been made between the different sources of information and the different levels of discussion.

Different sources of information appear in the following typefaces:

This typeface is used for ideas and comments arising from background research, subsequent reflections on the research, and general introductions and syntheses.

This typeface is used for information generated specifically by research within Sponsor A.

This typeface is used for information generated specifically by research within Sponsor B.

In addition, distinction is made between the four different levels of discussion in the thesis:

FOR THE FIRST LEVEL OF DISCUSSION, HEADINGS LOOK LIKE THIS.

FOR THE SECOND LEVEL, HEADINGS ARE PRESENTED IN THIS FORMAT.

THIS IS HOW THE THIRD LEVEL IS IDENTIFIED.

LEVEL FOUR HEADINGS ARE INDICATED IN THIS WAY.

Bon voyage!

ACKNOWLEDGEMENTS

Many people have helped to shape this thesis. They have done so in spiritual as well as in intellectual and practical ways. I want to thank them all but it is not always possible to identify the influences, especially the more subtle ones. Therefore, what follows is probably an incomplete account.

First and foremost I want to thank my University colleagues and mentors, especially Allan Williams, Sally Woodward, and Richard Reynolds. Their support, encouragement and constructive criticism have been invaluable.

Without sponsorship the IT Skills Project would never have materialised. I am very grateful to the Worshipful Company of Information Technologists and our four commercial sponsors for providing the opportunity and the environment within which to conduct the research. I am indebted to the two sponsors with whom I developed my methodology, their respective Team Representatives, and the staff and management of Projects 'X' and 'Y', who helped to make my experience of organisational research so enjoyable and stimulating.

During the early stages of this research I found myself stumbling, sometimes feeling lost and alone on my journey. I want to mention those who provided me with a sense of purpose and direction, especially the Collaborative Inquiry group at Bath University and all who attended the Conference at Hawkwood in 1990. I also offer my thanks and admiration to Arnold Pacey for his inspiration and kind words. It is said that no man is an island. Arnold was an oasis.

It will be apparent to readers of this thesis that the research journey had its roots in my Cambridge undergraduate days. I owe a debt of gratitude to all those who taught me and shared my learning experiences there and who extended their support to me during my time at City.

Thanks to all those who read and commented on the endless pages of draft versions of this thesis; to the library staff who dealt with my (sometimes 'bizarre') requests for reference material so speedily and efficiently; and to the friends who weathered the three years with me.

But, as is customary, the last vote of thanks goes to the person who helped me to produce the printed product. He is a Desk Top Publisher and his name is Julian Wheaton. Thank you, Julian, for your professional advice, reliability and creative ideas. Without you, I may not have made the deadline!

DECLARATION OF COPYRIGHT

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ABSTRACT

The bulk of this thesis concerns the search for and application of a subjectivist research philosophy which I initially called Contextual-Symbolism. It is secondarily about the software development work of analysts and programmers in two organisations.

The research philosophy sprang from previous learning experiences; Cambridge University in particular. My original aim was to apply a subjectivist methodology within two organisations, at project level, referred to as 'Sponsor A' ('Project X') and 'Sponsor B' ('Project Y') for the sake of anonymity. In each case, a different interpretative tool was used to make sense of my experience. In Sponsor A it was the use of the colours red and blue. In Sponsor B it was a theatrical metaphor. Hence, the symbolism. The contextualism resided in the fact that it was the context of the study that suggested the route for sense-making, rather than a pre-determined theoretical framework. However, I later realised that I had fallen prey to the scientific paradigm. In attempting to make my approach appear more 'acceptable' to the companies involved, I had compromised my own research beliefs and illustrated how the theory and practice of research can be in conflict.

The focus on analysts and programmers formed part of a much larger IT Skills Project which was sponsored by the Worshipful Company of Information Technologists and four commercial concerns in the UK. The objective of this wider undertaking, as stated in the official Information Sheet, was:

> *"Identifying future IT skill needs with a view to enhancing the competitiveness of City-oriented organisations. The research will help to ensure that organisations are geared to make the most effective use of human resources and IT in implementing their business plans."*

However, although the research had originally set out to focus on IT skills, issues surrounding the implementation of Total Quality Management proved to be integral to the problems that were being experienced by both Projects X and Y. This was especially evident with respect to the management of human resources. Ironically, it was whilst reflecting on the weaknesses I perceived in their TQM programmes that I succeeded in identifying my own! Thus, the final stages of my research journey brought not only ideas for a new philosophy of TQM but also a deeper sense of self-awareness and some important messages for other researchers.

PART

ONE

FRONTISEPIECE

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain of success, than to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new. This coolness arises partly from fear of the opponents, who have the laws on their side, and partly from the incredulity of men, who do not readily believe in new things until they have had long experience of them."

Quote from Nicolo Machiavelli's 16th Century text "The Prince".

"Matter, that thing the most solid and the well-known, which you are holding in your hands and which makes up your body, is now known to be mostly empty space. Empty space and points of light. What does this say about the reality of the world?"

(Winterson, 1989. Quote used with kind permission of Bloomsbury.)

"The only reality I can possibly know is the world as I perceive and experience it at this moment. The only reality you can possibly know is the world as you perceive and experience it at this moment. And the only certainty is that those perceived realities are different."

(Rogers, 1978.)

REALITY

I believe there is no single truth
Only multiple realities
Constructed and re-constructed
On a moment-by-moment basis
By each one of us.

I believe there is no separation
Between subject and object;
We are all subjects -
We affect what we see
And we are all affected.

I believe the world is our mirror -
In our search for knowledge
We find ourselves.

In creating this thesis I found myself.

Welcome to my reality.

INTRODUCTION

BACKGROUND TO THE RESEARCH

In 1988 City University Business School and the Company of Information Technologists joined forces to set up an IT Skills Project with the aim of identifying future IT skills needs in the City of London. They succeeded in obtaining sponsorship from four large commercial organisations in the UK. The author was recruited to conduct this research and was subsequently joined by two other University researchers.

Together with management representatives from the sponsoring organisations, we formed a Team. Although the research itself was conducted by the University members, the Team collaborated on the direction which the research should take and on its focus. This work was performed under the guidance of a Steering Committee which consisted of senior members from both the University and the organisations.

Two of the University researchers registered for PhDs as part of the overall Project. I was one of them. Thus, my role became a dual one of IT Skills Project Team member and PhD candidate. The work I performed in each role differed in emphasis. For the Project my concerns were mainly pragmatic: 'what can the research provide for the sponsors in the way of deliverables?'. For the PhD they were more academic: 'how can I make an original contribution to knowledge in this area?'. My hope is this thesis will demonstrate that I fulfilled both these roles adequately.

I conducted fieldwork within two of the four sponsoring organisations, focussing on the work of analysts and programmers. The detailed reports which I produced contained many issues of concern to IT staff but which were also relevant for the companies in the widest sense of human resource management, including issues of Total Quality Management. Both reports were well received and details concerning feedback have been included in the thesis. Anonymity has been preserved at the request of the companies.

The academic focus of the thesis concerns the development of a subjectivist research philosophy. Hence, the bulk relates to theory and methodology. However, empirical findings are used to demonstrate the usefulness of my approach as an interpretative tool as well as the pitfalls associated with the adoption of a 'non-scientific' approach.

BACKGROUND TO THE THESIS

This thesis tells the story of a journey, or, more precisely, four journeys. Their purpose became clearer as they progressed: to develop a research philosophy which counter-balanced the prevalence of scientific methods in the field of organisational, IT, and TQM research.

The first of these journeys was one of theoretical discovery which I have called a Journey Through Post-Processual Research. During the course of this adventure, my philosophical and methodological belief system underwent significant change, primarily in shifting from an objectivist to a subjectivist perspective. It became important for me to identify a method of gaining knowledge which fitted in with my own value system.

The second journey involved the exploration of terrain which had been hitherto unfamiliar: information technology. I have, therefore, called this a Journey Through Information Technology. This represented a sharp learning curve. At the end of this trip I had not only become familiar with the technology (its theory, practice and jargon) but also started to share this knowledge (in the role of lecturer) with others who were embarking on their own journeys. I formulated strong ideas concerning the nature of information technology and how it could be researched.

The third journey afforded me the opportunity to apply what I had learnt in making the other two. It was essentially a cultural experience. I have called this a Journey Through Two Organisations. I was privileged to share the working space of many people and to interact with them in their thoughts and reflections on organisational life.

These three journeys were by no means discrete. They were sometimes intermingled,

and probably always reciprocally influential. The process of travelling through this PhD was, therefore, complex. In order to express it clearly, I had to find a way of plaiting the different threads. Before I could do this, though, I had to establish a firm grasp of them. Identifying which experience related to which journey proved to be a significant challenge, especially since much of experience is sub-conscious. Sometimes it seemed all three journeys were involved. Sometimes it was not possible to make a conscious decision at all.

The fourth journey came only after the other three had been completed. Triggered by Total Quality Management issues arising from the organisational fieldwork, the research culminated not only in a new perspective on TQM but also in a journey of self-discovery (The Total of TQM) which helped to throw the whole research exercise into sharp relief.

I realise that each reader will make their own way through this thesis. Nevertheless, some suggested route maps and signposts have been provided to aid navigation. I hope you have an interesting journey.

THOUGHTS OF WRITING UP

The following thoughts were recorded in the immediate run-up to writing the thesis itself. There are several reasons why I have chosen to include them here. I believe they will give the reader a sense of my philosophical perspective and of the things that concerned me in setting my research down on paper. In addition, their inclusion helps me to fulfill one of the demands of my methodology, which is to be as explicit as possible about the personal views which stand behind the documented work. It will also explain why I will be using the metaphor of journey to convey major themes in the research.

1ST OCTOBER, 1990

"It's like writing the first sentence of a book - or what I imagine that would be like....

Difficult. Clogged up. It's like removing a plug to let the water flow free through the dam wall. "Getting my finger out" seems an appropriate phrase!

Why the block? Something to do with research as a personal process. Also, not knowing where to start, or whether it will sound 'right' when I do say something. Conscious that, whilst what I say may be true for me, it may be judged to be 'false' or somehow unacceptable by someone else - the reader - especially the 'judges' (examiners).

Writing <u>up</u> is really about writing <u>down</u> (not <u>putting</u> down). An all-time commitment. Words on a page... unchangeable.

A beginning: I had a commitment to start today because it is the first day of my official final year. Also, because I have just had a very powerful experience - the Collaborative Inquiry Conference (Hawkwood, Gloucestershire, 27-30th September, 1990, organised by Bath University). Lots to say about that - or, rather, to feel. It's all about feeling and experience, as well as process. Process seems to be important to Collaborative

Inquiry - I need to check this out as I have always thought of myself as a post-processualist."

2ND OCTOBER, 1990: A WHACK ON THE SIDE OF THE HEAD

"It struck me last night that what I really want to get written first is the 'Conclusions' chapter, except that this is not the title I prefer. I prefer 'Reflections' and this in turn reflects the idea that we see reflections of ourselves (mirrored) in our work. It also gives a sense of looking back - looking back in time as well as looking back at one's reflection in the mirror (of research).

.....

I heard a story at the Collaborative Inquiry Conference about an old Chinese man who was visited by an American tourist. They sat together for a tea ceremony. The old man poured his own cup to the brim and then filled the American's. He kept on pouring and pouring so that it flooded the table and the floor, until the American (having considered various explanations including his host's old age), could stand it no more and asked him why he did not stop. The old man replied:

> *"When you came to me your cup was so full that there was nothing else I could do."*

The moral of the story was that you have to empty your own cup before you can learn from others.

This reminded me of something which was said to me in one of the group sessions at the Conference. Upon discovering that I was exploring the Collaborative Inquiry approach for the first time during my PhD journey, one woman said:

> *"You don't ask for 'A Whack on the Side of the Head' in your final year!".*

She also pointed out that it was very difficult to 'unknow' something once you had experienced it. I compared this to the Chinese moral. The two sentiments seemed to contradict eachother.

We each bring our own set of values, beliefs, knowledge, etc. to bear on every situation we encounter. How, then, can we also 'empty our cups'? Is this equivalent to the positivist belief that one can be objective? Can we really do something inbetween - put our knowledge and our values to one side temporarily? For me, it was more a case of being flexible enough to accommodate the new alongside the old.

As far as the proverb was concerned, the old (man) was equivalent to the new (knowledge) for the American. I began to ask myself whether the so-called 'New Paradigm' was really new? Much of its basis (holism, person-centredness) was to be found in ancient beliefs and traditions, such as are found in the Far East. Was it a question of discarding the old for the new, or of accommodation?

By not unlearning all we know we can gain deeper insight into other perspectives on the world. Otherwise, all our learning and experience would be incomplete: the brave person cannot be brave until they have experienced what it is to be frightened. But is 'accommodating' the same as 'knowing'? Can we know about something and yet still reject it completely from our actions? Probably. We don't necessarily unknow it, we simply hold it in ourselves as something we do not want to embrace. If we did not know it, we could not make that decision."

(? DATE): POST-POSITIVIST OBJECTIONS

"Axiology is a fundamental part of making sense of the world. We are what we know, think, believe and feel. We all have our own set of beliefs and values, whether or not we are willing to admit to, or even realise, them. We can only make sense of things in relation to what we already think we know, understand, or have experienced. If we accept all this, then we have to ask ourselves whether it is advisable, or even possible, to separate out our cognitive and experiential 'baggage' from that about which we are trying to make sense."

POSITIVISM

ONTOLOGY

OBJECTIVE

EPISTEMOLOGY

THE SEPARATION OF "VALUES" FROM "FACT"

AXIOLOGY

SUBJECTIVE

HOLISM

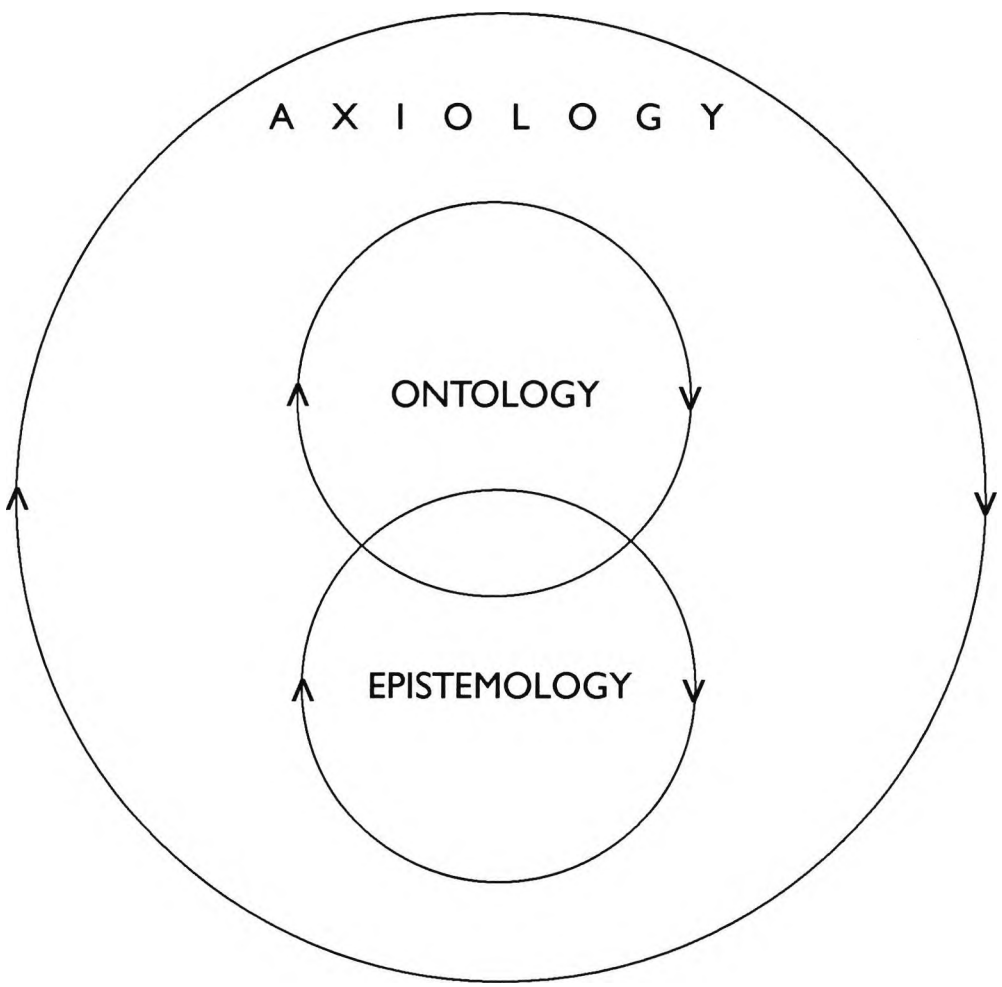


FIGURE 1: POSITIVISM AND HOLISM

17TH OCTOBER, 1990: DIALOGUE ON PLAITING THE THESIS

"Question: *What am I trying to plait?*

Answer: *A major part of my life over the last two years.*

Question: *Why is it a problem?*

Answer: *The threads are of different textures: I am conscious of having to meet the expectations of examiners. Traditional values, etc, impinge on me. The split personality of the research is very evident now.*

Question: *How is it split?*

Answer: *Because the threads are of different textures. Each thread is 'real' for me but they are not 'traditionally' woven together in a thesis. Usually, there is a tendency for a piece of research to resemble either one or the other texture more, and to adopt that as its central focus. For me, however, I feel as if I have been living at least two lives. One is firmly rooted in the pragmatic world of IT: TLA'S (three-leter acronyms), technical developments, bits and bytes. The other is more 'free' and unconstrained. Somehow it flows. The first 'me' does not - it is heavy, like metal; like machines.*

When I was at the Conference I took part in a psychodrama workshop. It was designed to identify the "researching part of ourselves" and to discover what it was like. This was intended to help us understand our deeper attitudes towards our research work.

I found my researcher and I did not like it. It was heavy like a metal bar, and it could not move but, as one conference delegate said, at least it was stable. The next stage in the psychodrama was to

exchange our experiences with someone else and see what effect this had on the researching part of ourselves. I exchanged experiences with a researcher who was a raging fire! The fire melted me so that I was warm and began to flow but, within a certain bounded area. It was a pleasant feeling.

In trying to make sense of this experience, I now believe I did not want to be rigid, but was afraid to let go, as if by so doing I would lose my grip on something. On reflection, I feel this explains quite well my present difficulties in 'plaiting' the thesis. I want to let the stuff flow - I don't want to produce a boring, rigid thesis. But if I let go, will it still be acceptable? Or will I be accused of losing control?

The metal bar became fluid and, in so doing, succeeded in finding its own limitations of movement. Like water finding its level. Perhaps, if I let go, my thesis will do likewise? ***I continue in the knowledge that what I do is an act of faith and that, thereby, the thesis becomes an offering. The offering is made in the hope of acceptance but, with the fear that it will be merely a sacrifice."***

18TH OCTOBER, 1990: FELLOW TRAVELLERS

"There are two groups of people in my work: IT researchers and post-positivists. Is this the cause of the different textures?

Yes, that's it! I have been making at least two journeys: a journey through the world of IT and a journey through the world of post-positivism..... and now I can almost plait.....

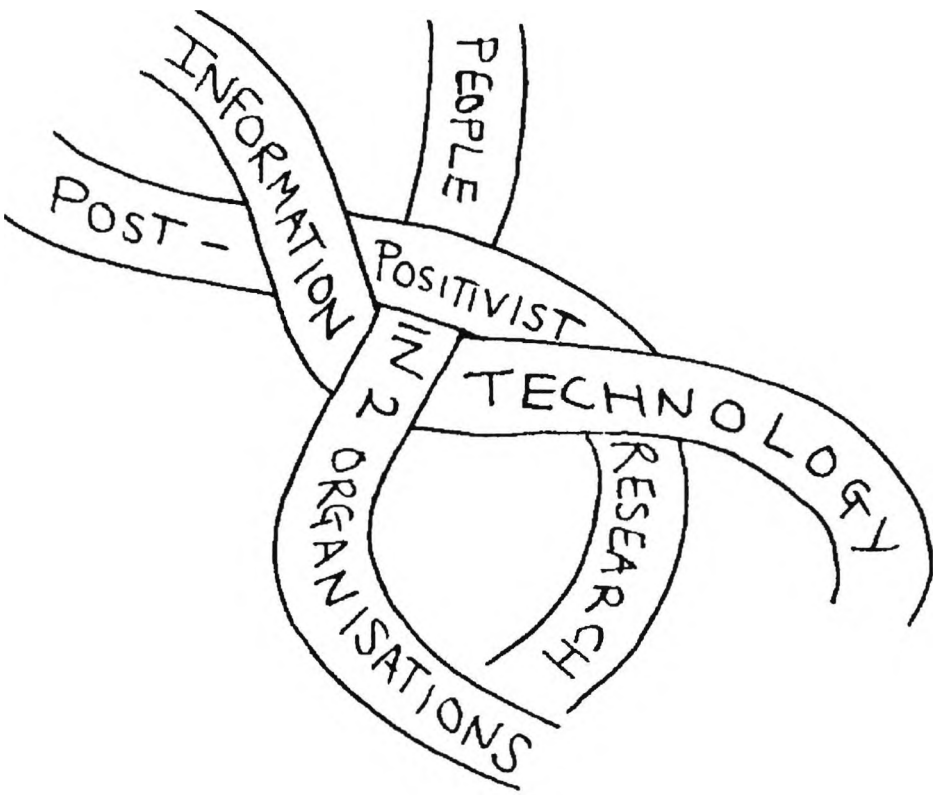


FIGURE 2: PLAITING THE THESIS

The successful plaiting process leads to the thesis at the end. I no longer feel so negative and fearful. There will be a positive end product.

Now I can see what was bothering me most: how to represent in one holistic device what I have learnt about IT and all its related recruitment and training issues, as well as what I have learnt about the process of doing research.

I am going to use the metaphor of Journey in order to convey my experiences."

PART

TWO

THEORY AND METHODOLOGY

ROUTE MAPS AND SIGNPOSTS:

A JOURNEY THROUGH POST-PROCESSUAL RESEARCH: STAGES ONE, TWO AND THREE

This journey began a long time before the PhD itself. Figure 3 illustrates how I perceived my movements. I travelled from an objectivist, positivistic position in 1984 to a subjectivist, anti-positivist stance in 1990/91. In identifying with anti-positivism I recognised that positivism had neglected the role of the individual and meaningful experience. I rejected materialism and determinism, believing instead in a spiritual dimension to life which was irreducible to generalisable laws.

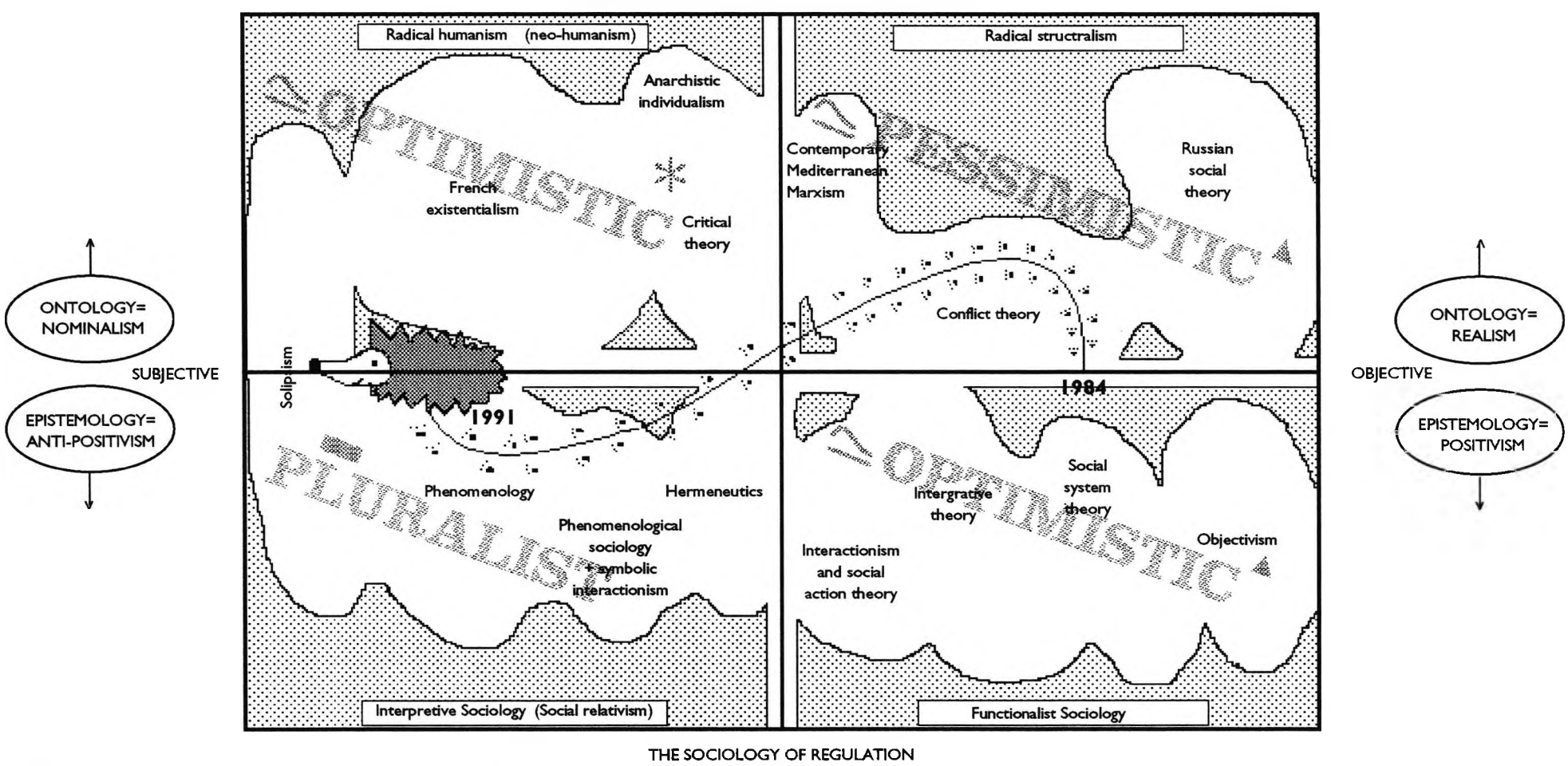
I accorded prime importance to the values which influenced the accumulation of knowledge. In particular, I noted the role of politics and prejudice. This was to be especially relevant for my research into information technology, where, for example, stereotypes of age, gender, and personality affected the human resource management strategies of organisations.

I selected two conceptual frameworks from amongst those I had encountered previously as being appropriate for a study of IT. These were contextualism and symbolism.

Contextualism emphasised the importance of context for understanding a situation. It postulated a fundamental link between the focus for the research and the context within which the research took place. Changing the context meant changing the potential meaning. The area being researched was treated like a text made up of symbols. The symbols took their meaning from the context in which they occurred. Thus, to separate the two (as happened when formulating generalisable laws) was meaningless.

Symbolism had been applied in both positivist and non-positivist approaches. The non-positivist method aimed to extract meaning from a situation by examining potential cross-references and associations amongst the data. This was referred to as 'networking' and

was the main tool which I adopted in my work. The plausability of such a construction was based on criteria such as goodness of fit and strength of association. The polysemous nature of reality (the potential for more than one interpretation) suggested, however, that any construction was open to challenge by re-interpretation. Symbolism's emphasis was, therefore, upon encouraging a process of critical re-evaluation rather than upon the accumulation of 'facts'.



KEY:

BASED ON SECOND LITERATURE REVIEW

BASED ON CONFLICT AS NEGOTIABLE (SEE HIRSCHHEIM, AND KLEIN, 1989)

BASED ON ER, 1989

FIGURE BASED MAINLY ON: BURRELL AND MORGAN, (1989) AND WOOD-HARPER, (1985)

FIGURE 15: A JOURNEY THROUGH POST-PROCESSUAL RESEARCH

INTRODUCTION

This chapter discusses the theoretical underpinning of this thesis and how it gave shape to the methodology which I have used in my research. Before beginning, I would like to relate a short anecdote which joins together the start and the ending of my journeys.

All UK prospective university candidates apply for degree places through a system called UCCA. In 1984 I submitted my application form to them and listed my preferred choices of university and course (Appendix 1).

Some of my friends found it doubtful that the number of subjects I had selected would receive serious attention (archaeology, anthropology, philosophy, psychology, computing, artificial intelligence, and sociology). Nevertheless, I felt it justifiably reflected my desire to learn about people and what made them 'tick'. When it transpired that there were no problems with the entries, I concluded that I must have been, more or less, on the right track!

Recently, I had even greater cause to be happy. While I was writing up this thesis, it suddenly occurred to me that I had managed to range across all those subjects.

One evening I found myself reading a book by Carl Rogers (Rogers, 1990). The dust cover described it as "Seven remarkable conversations between the great American psychiatrist Carl Rogers and some other great minds in philosophy and psychology." Rogers was well known for pioneering a new approach to psychotherapy, known successively as 'non-directive', 'client-centred', and 'person-centred'. Also, a few days later, I read an article on more recent related issues (Healy, 1990). The idea of patient as co-researcher fitted well with my beliefs about the nature of 'reality' and research in general.

I, therefore, approached the ending of my journey with an added sense of completeness; I had come full circle.

A JOURNEY THROUGH POST-PROCESSUAL RESEARCH

THE OPEN UNIVERSITY: STAGE ONE

My theoretical journey began with the Open University in 1984 when I followed a half-credit third level degree course entitled "Science and Belief : from Darwin to Einstein". It was described as follows:

> *"This course is concerned with the philosophical, religious and ideological beliefs as they affected the theories and practice of science from about 1860 to about 1945..... The course involves the critical reading of primary and secondary sources in order to discern basic metaphysical beliefs, and it should enable you to identify and assess the historical significance of the metaphysical beliefs underlying particular scientific developments. It should also enable you to evaluate connections between metaphysical beliefs in science, and the social and economic conditions under which they were expressed."*
>
> *(Open University, 1984)*

Science and Belief taught me several things which acted as signposts in my later travels through the PhD.

I discovered that, despite claims to be value-free, the history of scientific research was the product of value systems as expressed through the personal beliefs and politics of individuals, governments and societies. At the individual level, the influence of personal beliefs was particularly strong. The case which I remember best, and which is one of the best known, was Einstein's rejection of quantum theory.

An important element of this theory was concerned with the Heisenberg Uncertainty Principle. Put simply, the principle said that it was not possible to measure a particle's momentum AND position simultaneously. Only one OR the other could be discovered, thereby introducing a certain amount of uncertainty. Einstein's beliefs concerning the

role of God in the natural world meant that he could not accept this idea. In a letter to Born in 1944 he said:

> *"You believe in the God who plays dice..... Even the great initial success of the quantum theory does not make me believe in the fundamental dice-game."*
>
> *(Coley and Stannard, 1981)*

This quote demonstrated well the effect of a personal belief in the face of evidence apparently to the contrary.

As I moved through the OU course and read of the work of scientists, I discovered not only their beliefs and assumptions, but also my own. I found that, depending on my set of values, their work was more or less acceptable.

It became important for me to identify a method of gaining knowledge which fitted in with my own value system. Science and Belief showed me that this process could be evaluated at the three philosophical levels of ontology, epistemology, and axiology.

Ontology concerns the question of what exists. Epistemology is about problems of knowledge in general. Axiology addresses issues relating to what has value and is worthwhile.

In going about their daily lives, everyone, whether or not they are aware of it, holds a position with respect to these three concepts.

The scope of ontological and epistemological positions covered was complex and difficult to synthesise. However, I drew up Figures 4 and 5 to illustrate some of the main characteristics. (These diagrams are taken from an archaeology essay which I wrote in 1987 and are based on information contained in: Open Universtiy, 1982.)

Two other topics covered by the OU course were to prove relevant to the next two stages of my journey. Both these topics used biological analogy; an indication of the influence of preceding scientific theories of natural selection, i.e. Darwinism and evolutionary theory. These topics were: functional anthropology and scientific management.

IDEALISM

⇓

Human experience reveals reality and via traits of man as a spiritual being.

⇓

Can be monist; only one entity, i.e. spirit.

⇓

Can be reductionist i.e. explanation in terms of mind only.

⇓

Can be deterministic.

DUALISM

⇓

Matter and spirit interacting.

⇓

Dualistic idealism asserts spirit is predominent over matter.

MATERIALISM

⇓

Matter only and all can be explained in terms of the arrangement of matter particles; physical only.

⇓

Often called monist; only one entity, i.e. matter.

⇓

Often reductionist, i.e. reduced to fixed laws governing behaviour of matter.

⇓

Deterministic - all actions determined by causal laws governing matter; no place for elements of creativity or probability.

NATURALISM

⇓

(Scientific) Whatever exists is natural and can be explained by methods uniform for all events; compatible with materialism and idealism but not theism; especially applicable to human sciences of biomedical/ biological models.

IDEALISM

SUBJECTIVE

⇓

Ideas: only exists if perceived.

OBJECTIVE

⇓

Both ideal and real but reality is ideal (or mental) rather than only what is actual or known via the senses.

⇓

DUALISTIC IDEALISM

(See above) is a form of objective idealism.

⇓

Absolute idealism.

⇓

The perfect rational self.

⇓

Personal idealism.

⇓

The community of self.

MATERIALISM

MECHANICAL

⇓

Accommodates a level of organisation for mental qualities but they are secondary to physical qualities.

⇓

Changes occur via merely the directionless or cyclical working of the same laws.

DIALECTICAL

⇓

Changes take place via contradictions in matter rather than fixed laws of matter in motion.

⇓

Gives rise to different levels of material organisation each with a different set of laws e.g. physics or biology or social organisation.

⇓

(Marxists are often dialectical materialists).

Materialism also linked with realism: things exist externally to us and independent of sense experience (c.f. sensationalism in epistemology).

FIGURE 4: SOME ONTOLOGICAL STANDPOINTS

EMPIRICISM ⇐ CLOSE LINKS ⇒ **SENSATIONALISM**
(INDUCTIVE)

⇓

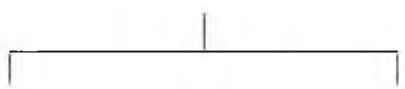
Knowledge via the senses.

⇓

POSITIVISM

⇓

Science is the ideal form of knowledge; there is no reality beyond sense experience; uses general laws or well-authenticated descriptive statements.



SYSTEMATIC

⇓

Reduces all behaviour to an integrated pattern of rules.

CRITICAL

⇓

Analyses foundations of scientific knowledge; examines sources and meanings of all concepts used in an uncritical and "metaphysical" way.

Positivists do not admit that values (axiology) actually influence knowledge.

⇓

Deterministic.

⇓

All knowledge is derived from the senses (c.f. realism in ontology).

RATIONALISM
(DEDUCTIVE)

⇓

Reason is the chief source and test of knowledge (opposed to empiricism and conflicts with positivism).

FIGURE 5: SOME EPISTEMOLOGICAL STANDPOINTS

FUNCTIONAL ANTHROPOLOGY

Radcliffe-Brown's essay "On the concept of function in social science" (1935) was a good illustration of the assumptions behind functional anthropology (Radcliffe-Brown, 1980).

Biological analogies were applied to the social world of human beings in an attempt to understand how societies were formed and operated (Young, 1981, pp86-88). A society was seen as a functioning organism, with all its parts working in unity. This organism had a structure. The structure was the system of relations (social relations) by which they were joined together to form the whole. The (social) life of the organism was the functioning of the (social) structure.

Anything which took place in the constituent units was viewed in terms of its function in the life of the whole. The whole -the social structure - was prime. Indeed, individual units could come and go without affecting its continuity. Hence, society was reduced to the two concepts of structure and function.

I found this reductionist perspective to be disturbing in a number of ways, including the:

- extent to which human beings lost their individuality and identity
- focus on a totality rather than on understanding the individual people, and the implicit assumption that the sum of the whole was more important than the parts
- implied constraints on freedom and variety of individual expression
- failure to deal with roles of conflict and change

At the turn of the century, biological analogy was introduced into the workplace, too.

SCIENTIFIC MANAGEMENT

The 'father' of the application of functionalist science to the labour process was Frederick W. Taylor; hence, the term 'Taylorism'. Some of its main characteristics are given below (Young, 1981, pp94-97).

A company which employed workers was equated with the biological organism (c.f. our use of the term 'organisation'). Jobs were analysed and fragmented in order to create structures and functions which contributed to the smooth running of the whole. It was thought that the more order and structure could be brought to bear on the arrangement of work and human labour, the more it would result in high productivity and overall efficiency (a word borrowed from physics; see Symbolic Archaeology below for comments on values and the adoption of terminology). Areas of work were broken down into specialised tasks, and tasks were broken down into ordered steps. The major recommendation which Taylorism brought was the separation out from tasks of the planning element, thus producing a new specialism.

Taylorism embraced the same two basic concepts as functional anthropology: structure and function. It was, therefore, not surprising to find that there were similarities between them in terms of what I perceived to be their undesirable elements. For example:

- jobs became specialised, thereby reducing the amount of variety involved (especially removal of the planning element

- the work process became inflexible, and creativity erradicated

- there was a tendency for work to be simplified to the point of being boring, repetitive and unskilled; often as 'mechanical' as the equipment used to perform it

- the focus was on the work process rather than on the worker - if work roles were clear-cut and simplified it would enable workers to be slotted in and out of the company without much disruption; individuals were increasingly disposable

- the interests and needs of individuals were not of a high priority; Taylor based his payment system on units of productivity because he saw job satisfaction as purely monetary and extrinsic rather than intrinsic

- employees' rejection of management's values was not allowed for in this approach

- the parts (employees) had to adjust to the organism (the company); any 'maladjustment' or 'malfunction' on the part of the employee was attributed to their inadequacy rather than that of the company; the job design motto was to fit the person to the job and not the job to the person

Note: see also writings by Kraft on the work of programmers (Kraft, 1979).

These impressions were carried through to the next two stages of my theoretical journey and, as will be seen, influenced my ideas.

UNIVERSITY OF CAMBRIDGE: STAGE TWO

In 1985 I began studying for my first degree (Archaeology/Anthropology) at the University of Cambridge. Here I was introduced to both scientific and 'non-scientific' methods of inquiry. Both areas were of great interest and, at one point, I felt as if I were holding an untenable position in attempting to bridge both camps but, by 1987 (my second year) I had found my niche.

'SCIENTIFIC' INQUIRY

Scientific methods were applied within archaeology in order to learn about past societies. They were applied to both the physical (e.g. bones, stone tools, ceramics, environmental features), and to the non-physical (e.g. theoretical model-building).

The amount of information which could be extracted from physical evidence was enor-

mous, and helped to suggest human skeletal forms, dietary patterns, settlement distributions, artistic skills and, some argued, mental capacities (for the latter see Gowlett, 1984).

Few people would argue that work in these areas has formed the bedrock of archaeological 'knowledge' as it is generally presented today. However, it was when moving from the analysis of physical remains, to making inferences about the social processes which produced them, and especially in relation to theory-building, that I found my beliefs to be most at variance with the scientific school of thought. I identified much more strongly with the non-scientific approach.

I have used the terms 'scientific' and 'non-scientific' as labels in order to convey the basic idea that one approach was governed by scientific principles and the other was not. In fact, the scientific approach was referred to by some as 'New Archaeology'. Early in the 1960's, New Archaeology's acknowledged leader, Lewis Binford, gave it international exposure and dubbed it 'processual' archaeology (Brooke, 1986); the 'process' element emphasised the physical processes involved in the creation of an archaeological record (e.g. weathering processes). Binford drew together the threads of the new polemic in his book "New Perspectives in Archaeology" (Binford, 1968).

New Archaeology represented a move towards the adoption of logical positivism and was a reaction to the strict empiricism of earlier 'traditional' archaeology. Logical positivism (also called logical empiricism and neo-positivism) originated with a group of people who became known as 'The Vienna Circle' in the 1920's, and included Russell and Godel (Hirschheim, 1985). The functionalist school (e.g. the anthropologist Radcliffe-Brown) was also part of this movement.

Logical positivism was to become the dominant epistemology of contemporary science. In view of archaeology's desire to acquire scientific status, its adoption of this perspective was not surprising. Characteristics of the movement included:

- a move away from phenomenalism, whereby experience was the only source of knowledge, towards physicalism, where the physical world had a role in producing data
- a move away from laws to theoretical networks of knowledge statements linked by deductive logic and grounded in direct observation; the hypothetico-deductive form of reasoning was employed (the archaeological work of Binford is a good example of this).

According to Bintliff, post-Second World War prehistorians could not accept Social Darwinism or Historical Materialism, both of which favoured analysis of local processes of change. This led to an "erroneous pseudo-history of the migration of peoples and diffusion of innovations from historic centres" (Bintliff, 1986).

New Archaeology began to question existing theories, like invasion theory and diffusionism, not least because the introduction of scientific dating techniques revealed that some of their major assumptions had been wrong. A virtual revolution took place in European chronologies (for a good account see Renfrew, 1973).

The New Archaeology movement recognised that 'psychological objectivity' was not possible, and looked to deductive forms of reasoning as an evaluative measure of archaeological interpretations. It aimed at a systematic analysis of the data, adopting the analogy of a biological system in order to study human culture, seeing the latter as a means of adaptation through time. An evolutionary framework was applied.

It also sought to introduce universal and generalisable laws as the basis for investigation, in the same way that they were perceived to form a basis for the natural sciences. Binford and Sabloff (1982) stated:

"We need a science of the archaeological record."

Flannery talked about the Dream and the Nightmare, the choice between a science or an imprecise pseudoscience of archaeology (Flannery, 1973).

As part of an attempt to achieve the 'Dream', New Archaeology borrowed models,

practical techniques, and jargon developed within other disciplines. I found it particularly interesting (in the light of my O.U. study) that one of these was the philosophy of science. Some people criticised New Archaeologists, saying that they were posing as philosophers of science. Flannery (1982) echoed the feelings of traditional field archaeologists when he wrote:

> *"Now we're going to have philosophers who don't know anything about archaeology, advising archaeologists who don't know anything about philosophy."*

The question of whether New Archaeology would ever achieve its scientific dream invariably revealed the different schools of thought that had developed within it. Some believed the solution lay in a theoretical model which could be regarded as a comprehensible general theory, with linkages between its variables being determined by statistical laws. Some thought this was 'pie in the sky', others that it was too rigid a framework. Nevertheless, a quantitative approach was universally accepted and statistical testing promoted.

Scientific aspirations were reflected in the language used. 'Models' and 'hypotheses' were formulated from the data and 'tested' for their robusticity. The aim was to erradicate the 'bias' of the researcher's values (axiological considerations) from the investigative process as much as possible. Yet, just as I had come to learn with the Open University of the role of value systems in directing the path of scientific development, so also I acknowledged their role in the production of archaeological knowledge. The processual New Archaeology did not allow for this perspective.

Renfrew's cognitive approach in "Towards an Archaeology of Mind" (Renfrew, 1982) illustrated well the reasoning processes involved. He described the stages which led up to the production of archaeological material as: mind - thoughts - matter - artefacts. That is where the process ended, and it was by back-tracking from the artefact to the cognitive condition which produced it, which gave us our insight into past societies.

An analogy which was often applied to New Archaeology was the process of investigating a crime. The detective applied deductive logic to the physical evidence, and to the statements of witnesses, where available, in order to discover the true identity of the

perpetrator. At no point was it explicitly considered that the detective might actually have an active role (c.f. Agatha Christie's plots!). As Binford (1987) put it:

> *"The external world exists in its own right, and that includes the properties of the archaeological record."*

The 'scientific' archaeology was based on the following assumptions:

- that deductive logic offered the most ACCURATE route to understanding the data
- that there was a single and identifiable TRUTH underlying all archaeological records (even if we could not be sure we had accessed it)
- that, by extrapolating from experiences of previously 'solved crimes', predictions could be formulated which governed the human production of material culture
- that these could then be generalised to apply to other archaeological cases
- that generalisable explanations should be sought in preference to discrete events or individuals, and should focus on trends, societies and systems

The last point introduces a type of interpretative theory applied within archaeology called systems theory. Together with the application of evolutionary concepts (referred to earlier) it illustrated characteristics which I found to be inappropriate for a study of human culture. I was to be reacquainted with both of these approaches during my Stage Three research into IT. They are, therefore, considered in brief below.

EVOLUTIONARY CONCEPTS

With the rise of New Archaeology in the early 1960's, evolutionary theory regained its importance in archaeological interpretation (Dunnell, 1980).

As indicated earlier, New Archaeology adopted the analogy from the biological sciences and applied it via culture, seeing culture as an adaptive trait, rather than as a set of ideas. The focus was on long time scales and on adaptation to a changing environment. Evolution occurred not in individuals but in populations, and rules concerning the survival of the fittest applied, in a similar way to Darwin's theory of natural selection (see Figure 6).

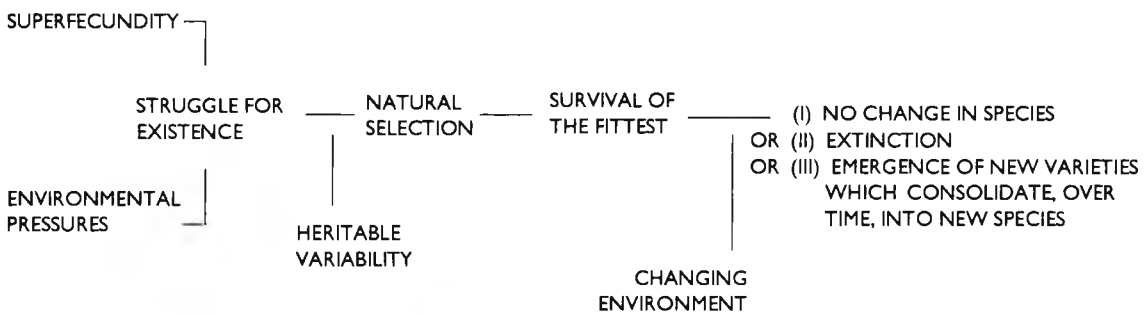


FIGURE 6: DARWIN'S THEORY OF NATURAL SELECTION

In crude terms Darwin was a materialist, believing that "the mind is function of body" (Bartholomew, 1981). He interpreted benevolence as a maladaptive trait which accumulated in human groups only where it elicited reciprocal responses from others, and avoided conflict which might otherwise impede evolution.

Although ideas based on an evolutionary perspective were applied in different ways by different researchers, basic similarities remained and were incompatible with my beliefs.

In a similar way to other functional, biological approaches, I felt that this view reduced the evidence to the extent that its symbolic potential was missed. I believed that thoughts and ideas had a creative capacity which was not accounted for by this approach. Also, I did not accept that all human behaviour was selfishly goal-directed (the selfish gene).

Evolutionary theorists tended to share Darwin's basic materialistic view of the world. This monist perspective excluded not only the ideational realm, but also the spiritual. Richard Dawkins had declared God 'a dead end' (Dawkins, 1983). Some of New Archaeology's protagonists (notably Binford) held a similarly dismissive view; after all, religion was not scientific. In contrast, I wanted to maintain a more pluralistic and open-minded stance. The role of the spiritual was to reassert itself in Stage Three.

Evolutionary concepts were incorporated into many different forms of interpretation. One of the best known was systems theory.

SYSTEMS THEORY

The origination of General Systems Theory (GST) is usually credited to von Bertalanffy. The idea of viewing the world in terms of systems was based on biological analogy (c.f. Stage One: Functional Anthropology and Scientific Management). A number of variations on GST were applied to archaeological interpretation. What follows is an overview of some features which they held in common, as well as references to a few well-known exponents.

Systems theory in archaeology was only one of several approaches to draw on evolutionary concepts. Some terms which it adopted were: morphogenesis (evolutionary development in an organism or part thereof via positive feedback), orthogenesis (series of stages which all cultures pass through in the same order), and epigenesis (gradual differentiation and elaboration, each stage having its seeds in the preceding one). The latter is a trait also common to marxism.

GST attempted to pull out similarities between different systems in the world, producing a series of concepts against which comparisons and measurements could be made. Archaeology applied GST by viewing society (and culture) as a system. It attempted to make the study of past societies and cultures scientifically explicit. Society and culture were things in which people took part rather than shared; they were entities independent of the individuals themselves. Thus, the focus for study was not the people, but the de-personalised entity. I found this to be one of systems theory's most disturbing aspects.

In order for a system to be studied, it had to be broken down into multivariate parts called subsystems (or variables) and the interactions between them analysed. The subsystems could come and go but the system (the 'organism') always remained. Computer modelling and statistical correlations were often employed to study the interactions.

A major problem here was how to select the 'important' and 'relevant' variables, and how to validate the choice. Systems theory did not address how to compensate for all the infinite possibilities and missing variables of which the researcher may be unaware. Nor did it avoid the difficulty of establishing the nature of relations between variables. A modelling exercise only reflected the information fed into it. Any selection and organisation of variables was bound to reflect the perspective of the modeller. How could the 'effectiveness' for which it strived be assessed in this respect? Systems theory did not seem able to incorporate any of these points.

Systems theory tended to view homeostasis (negative feedback) as the social 'norm' and, therefore, it was change which required explanation. Culture was assumed to be conservative, that is, resilient to change. Change was seen in terms of internal processes (c.f. marxism) and came about only when the conservative effects of culture had been surmounted to produce positive feedback.

Similarity between cultures was seen in terms of the interactions between systems, and 'culture centres' and 'subcentres' were referred to. It is interesting to note that these were concepts which systems theory shared with the previous diffusionist theories. Diffusionism had been criticised for its inability to deal with independent internal innovation. Now systems theory was criticised in a similar respect.

Just as groups separated in time could have 'reinvented the wheel' so, too, groups separated in space. Flannery underlined this point when he said that, therefore, computing statistical correlations may be of no relevance at all, since it need not reflect causality (Flannery, 1973).

Some maintained that systems theory was an heuristic exercise. Renfrew, for example, referred to "Six Characters in Search of an Author" (Renfrew, 1984). However, he did

not discuss the main thrust of the play as I saw it (at a performance in a London theatre), which was that each person who read, saw, or directed the play, interpreted it in their own terms (this point being an example in itself!). The characters bemoaned their creator's unawareness of the implications of their creation. Thus, even a creator could not be sure that what they produced would be interpreted in a particular way.

This suggested that there was more than one meaning to be had. The philosophical basis of processual archaeology (accuracy, truth, etc.) and its application through systems theory was unable to deal with this possibility and, thus, I found it to be wanting. Indeed, the existence of multiple meaning (polysemy) was to be a recurrent theme in my work.

Systems theory was also reductionist. It dealt in aggregates (to form subsystems) whereby the individual and the individual event became minimised. Renfrew argued that the individual could be "built" into the systems model! This was refutable on several grounds, though, not least because an individual may not be aware or responsible for either their actions or the researcher's interpretation of them.

In addition to being reductionist, it was also a materialist approach (often vulgar materialism), tending to centre on economic concerns, and to track social development in terms of 'progress' from one economic category to another. I found this framework to be too narrow and incapable of exploring non-materialist aspects of data. It was difficult to quantify living systems, and systems theory had particular problems in relation to symbolic sub-systems. The importance of symbolic and ideational aspects of culture were not, therefore, adequately addressed.

Systems theory was often presented as an alternative to functionalism. Nevertheless, it had a number of functionalist characteristics, and was often compared to functionalist anthropology. For example, all aspects of human culture were believed to be ultimately inter-related. This meant that innovation in one sphere would impact on innovation in another sphere and, if the effect were powerful enough, would overcome cultural conservatism, resulting in change.

In the words of Shanks and Tilley (1987):

> *"Any functional explanation of change presupposes some needs, wants or goals. In other words, it is teleological in form."*

According to systems theory, greed was the prime driving force in cultural growth. In teleological fashion, the model assumed what it set out to investigate. It became deterministic.

Finally, I felt that systems theory addressed the 'how' but not the 'why' of archaeology. It concentrated on factors of change (variables) but not the underlying motivations.

It is clear from the above discussion that I had many doubts about the appropriateness of systemic inquiry methods for the purposes of understanding human life and social processes.

'NON-SCIENTIFIC' INQUIRY

There was a reaction to the scientific movement within the discipline and, appropriately enough, this became known as post-processualism.

Post-processualism re-claimed links with empirical works and older archaeological writings, like those of Childe and Piggott (Childe, 1986, and Piggott, 1959).

Broadly speaking, it could be defined as a humanistic approach. Post-processualists argued that the archaeological record was the result of human thought and action, both of the society that produced it, and of the people involved in interpreting it. In neither case could these human thoughts and actions be reduced to deterministic, physical laws. In neither case could the personal belief systems be discounted or erradicated. In fact, in some cases the role of the subjective was elevated to a position which was seen to enhance the interpretative process rather than to cloud it.

In contrast to the scientific school, post-processualism was based on the following set of assumptions:

- that archaeological data was not value-free
- that the archaeologist took an active role in the sense-making process
- that the archaeological record was primarily a social not a physical product, subject to the biases of those involved in its discovery, interpretation, and presentation. (Note that this also included the bias of those who would later re-interprete it, through secondary sources such as published material, museums, etc.)
- that, since bias could not be completely erradicated from the sense-making process, a more honest approach would be to acknowledge its presence and embrace it as a positive component of the analytical tool kit
- that by involving the bias of the present in interpreting the past, archaeology was able to take on a new form of social relevance; this included the political sphere, although its primacy depended on the particular interpretative process being used (for instance, see Marxism)

This last point underlines the fact that post-processualism was not a term used to refer to one single research approach. In fact, it was an umbrella term for a variety of 'isms' applied within archaeology, including (in more or less the order in which I learnt about them):

Marxism
Structuralism
Post-Structuralism
Contextualism

Symbolism

Feminism

Post-processualism fitted into my value system more comfortably than processualism. However, because it was a younger approach than New Archaeology its practical application, within some of the 'isms', was still being refined. When I left Cambridge, therefore, I took with me an incomplete research tool.

Before examining how I tackled this within the context of the IT Skills Project, it is important to consider in more detail the Cambridge roots of my PhD journey. They have given rise to what has been called my 'eclectic' methodology (Webster, 1990). Each of the approaches in the list above has had some influence on my work, so their main characteristics (as they struck me at the time of my degree), and the extent to which I have adopted and adapted them, will now be considered.

MARXISM

Like systems theory, there were different types of marxism applied within archaeology. The points below highlight features common to most of them, and which I considered to be important at the time.

It could be argued that marxism was the closest to a processual position of the six approaches listed above. Indeed, links with systems theory have already been indicated. Benton identified himself with what he said was the marxist objective of a "natural science of history" (Benton, 1977). It is also interesting to note that Childe was a marxist (Childe, 1979, and Gathercole, 1971).

Marxist archaeology upheld that laws resided in the economic developmental processes of human society. Whereas an ecological determinist (from the positivist school) would have seen the environment as the deciding factor in human social development, a marxist would have replaced this with actual economic concerns. This was a materialist belief.

Marxism tended to give primacy to the material worth of objects over and above, for example, their potential to be vehicles for the embodiment/transmission of ideas. It did allow an active role for the manipulation of material objects by humans but only in relation to their material and economic functions. Hence, the extent to which material culture could take on symbolic roles and meanings was limited. I perceived this to be an area worthy of greater attention than marxism afforded.

Economics were also always seen as dictating social consciousness. Consciousness was made up of ideology, beliefs, intentions, etc. Yet even this was seen as a false consciousness. Ideology was portrayed simply as a mask for dominance and power. The creative capacity of ideology was only accounted for in so far as false consciousness had a role in the development of society. The individual possession and fulfilment of conscious intent was denied. This is another example of how marxism explained everything in functional terms.

The appropriation and manipulation of knowledge is one common way in which dominant groups gain control over others. A positive feature of marxism was that it introduced the notion of critical theory. Critical theory recognised the way in which knowledge could be appropriated for political ends, and gave this process an active role in the context of human social development.

In terms of organisations, appropriation might be achieved by the hierarchy, for example, through its use of corporate culture. To give an example from the PhD, this was evident from the "perceptual gap between culture and the workplace context" which is covered in the Findings (Brooke, 1990a).

Marxism expressed its economic concerns through the universal desire of human society to expand. This process gave rise to the differentiation of society into sub-groups with differing group interests. The inevitable conflict and contradiction which arose between these groups was an important element in the economic developmental process. Humankind was motivated, constrained, and guided by universal economic expansionist imperatives.

This law of expansionism and conflict had one beneficial effect: it provided a focus for minority issues (and alienation) as well as those of the dominant ruling groups. Providing such an outlet became a priority in my own work and is reflected in the PhD through its individual focus: analysts, programmers, and others at the 'grass roots' staff level. Within the field of IT and organisations, the tendency has been to pitch studies at the higher levels and to concentrate on those who make up the organisational and decision-making hierarchy. My work attempted to provide an alternative focus.

Almost by way of counterbalance to the expansionist imperative, marxism had an ecological awareness. It put the onus upon humans to preserve the environment. This has particular social relevance in the currently 'green' climate of the early 1990's. To a certain extent, care for the 'natural' environment is implicit in my research, too, through my concerns about the dangers inherent in the use of technology for technology's sake.

Ironically, marxism put heavy emphasis on technology and its role in social development. Sometimes, this was expressed as vulgar materialism, where the technology affected or dictated the thoughts of people.

These two points heightened my awareness of a tendency to give primacy to technology over and above the concerns of individual people. As a humanist, I found this particularly disturbing. This concern is portrayed in the thesis, usually in relation to a phenomenon which I discuss called technological determinism.

Another drawback of marxist theory was that it adopted a rigid and reductionist framework for the analysis of society. The model was divided into two: infrastructure (the base) and superstructure. The infrastructure always dictated what happened in the superstructure, and not vice versa. Furthermore, this two-dimensional model could not adequately deal with developments in a third, external, dimension. (This was the reverse problem, for example, of diffusionism; see earlier.)

There was also an assumption in marxism that economic development followed an inevitable route which was explicitly portrayed as progressive in nature through the following pattern: tribalism - slavery - feudalism - capitalism - socialism. This implied the

ultimate stage (socialism) was held in higher esteem than the other stages, and likewise down the chain.

However, marxism did decry unilinearity in the strict sense of the term. Although the stages and processes of economic development were declared as laws in the scientific sense, there was an acceptance that these stages could occur simultaneously and that they were not irreversible. Flexibility and non-determinism were to be important features in my research and are evident, for example, in my adoption of elements from contextualism. Indeed, marxism underlined the importance of context to understanding, and recognised the individuality of, historical events.

Another indication of the inflexibility of marxism as applied in archaeology was the use of epigenesis (see especially Friedman and Rowlands, 1978).

This was a theory of social formation which held that the seeds of the future were in the present and that, therefore, each new form of society had its roots in the preceding system. The system was self-perpetuating and left little room for a critique of itself. This is a historical materialist viewpoint. The model was interesting and accommodated many anthropological examples but, often stretched credibility and fitted the evidence to suit.

In the instance of colonial oppression of a tribal society, the fate of the latter would have been explained in terms of its previous social condition, despite the possibility that it might have been more appropriate to explore the condition of the oppressor. This was an example where external causation may have applied and yet could not be accounted for within the marxist framework. The model could have been very useful when dealing with self-contained and pristine societies but, it was debatable whether any of these had ever existed!

Another major weakness which I perceived of marxism was that it was unable to incorporate or explain feminism and issues relating to the subordination of women in general. By emphasising the contribution made by the domestic sector and the productive power of the family unit, it augmented the importance of the domestic mode of

production. Unfortunately, problems arose when looking at how female labour power in the home (and domestic labour power in general, in the case of capitalist societies) was translated into the infrastructural concepts of value and wage labour. Adopting a feminist perspective became an important consideration in my research and is discussed further below.

Marxist archaeology was a systemic approach, in that it broke down society into parts and studied the interactions between them. This is an example of dialectical materialism (see Figure 4). However, the marxist system was vulnerable to:

- being 'closed' (inability to deal with external factors)
- assuming all variables were accounted for by the system
- having only two-dimensions
- focussing on the nature of processes (c.f. processualism) rather than actually explaining their source

Finally, it could be argued that marxism was doing exactly what it purported to erradicate - that is, replacing one dominant paradigm with another. The marxist claim for communism as the inevitable outcome of human social progress was a claim for truth. Marx claimed that this was not dogma. Yet it is difficult to distinguish between educating the masses in order to free them of their 'false consciousness' and simply replacing it with a different form of the same.

There was considerable room for doubt, therefore, as to the extent to which marxism could validify its own (political) appropriation of knowledge in competition with alternative stances.

To summarise, many of the points outlined above illustrate themes of determinism, linearity, and inflexibility. In general, this marxist view of human nature and society contrasted with my personal beliefs. I, therefore, rejected marxism as an analytical tool.

Nevertheless, as I have indicated, there were a number of helpful characteristics, too. These were absorbed into my personal baggage and brought to bear on my research.

STRUCTURALISM

Structuralist archaeology analysed society in terms of oppositions, contrasts, and hierarchical structures, with the aim of detecting organising principles. Thus, like marxism, it was a functionalist approach. Like marxism, it dealt with structures of meaning and how these were related to social change. Indeed, the two approaches were sometimes combined to form structural marxism, where the structure of the economy was the language 'code' (e.g. Faris, 1983). Structuralism could also be combined with other approaches.

All human beings engage in the process of making sense of the world around them. To do this, the structuralists argued, we first order things into categories. These categories took the form of sets of oppositions; for example, male versus female, hot versus cold, good versus bad, etc. Leroi-Gourhain was well known for applying this method to his analyses of prehistoric art (e.g. Leroi-Gourhan, 1968). One of the major problems with this was that sometimes the categories became so all-inclusive as to fail to say very much at all (Fritz, 1978).

Like other functionalist approaches, structuralism used ethnographic analogies in order to provide cultural models in past contexts. However, it recognised that dangerous assumptions might result, and so it discredited its use on a formal level, employing it only as it related to the processual and structural inter-relations of material culture (Small, 1987).

Structuralism also employed the analogy of language, conferring rules of grammar upon the structure of society. It was an essentialist viewpoint in that it saw an underlying cultural code that "just does exist" (Hodder, 1987). The application of language rules was based on the assumption that so long as you knew the 'correct cultural code', meaning could be extracted from the evidence.

Tool-making would have been regarded as an aspect of culture. Whereas functionalist interpretations saw culture as "Man's extrasomatic means of adaptation" (Binford, 1972, pp20-32 and pp195-206), structuralism saw it as a means of coping with the world in ideational terms. In structuralism, a tool would have been viewed as a sentence structure, and its analysis consisted of applying grammatical rules. (For comparison, see the functionalist analysis of Grace, 1989.)

I found the analogy of language to be helpful to the extent that it stressed the symbolic, rather than just the material, dimension of archaeological material. Like the spoken or written word, I believed there were more subtle depths which could be explored.

Another term associated with structuralism was semiotics. Semiotics involved the interpretation of signs. Saussure wrote about this and was often quoted as the 'father of contemporary structuralism' (see, for example, translation from 1917 writings, Bally, 1983).

Anything could be a sign, and it was the series of relationships that go to form the process of communication which resulted in the phenomena called signs. Wherever there were signs, there was meaning.

A sign was held to consist of two main components: the signified and the signifier. The diagram below illustrates this situation:

SIGN	SIGNIFIER	SIGNIFIED
The thing itself	Relates to the senses and acts as vehicle to the signified	Relates to the intelligence and represents the meaning of the signifier
Let us suppose the thing which we want to symbolise is a tree	Let us suppose the signifier used is the written word:	The word "TREE" might be de-coded as:
	"TREE"	

But, then again, it might not, and this gave rise to a number of questions. It might not be known if the 'correct' code had been selected. Also, the focus for study seemed to be more on structure and system in language (the 'langue') than on what was actually being expressed (the 'parole'). Structuralism assumed that the langue determined the parole and, therefore, the language code effectively determined the actor, rather than vice versa.

There were some echoes here of weaknesses identified in marxism and processualism.

Derrida put it very well when he said that structuralism was a form of "philosophical totalitarianism" (Derrida, 1978). He claimed that it attempted to account for the totality of a phenomenon by reducing it to a formula that governed it totally. This had strong similarities to the scientific school. Indeed, Saussure spoke of a 'science of signs'.

In applying rigid governing rules, structuralism became inflexible and incapable of dealing with context-dependency, that is, the possibility that meanings changed depending on the context in which the signs occurred. In addition, a whole dimension of meaning was potentially missed: that of meaning through action. A commonly quoted example of this was a baby's nappy pin. Its meaning could vary according to the context in which

it was used. For instance, its incorporation into the garb of the Punk sub-culture (Hodder, 1982).

Both these points relating to context introduced a concept which was not fully addressed in purely structuralist analyses. This concept was polysemy, or the existence of multiple meaning.

In his writings on de-construction, Derrida employed polysemy to accentuate the richness of language (Derrida, 1978). Discovering Derrida was an important marker in my theoretical journey. It helped to convince me that the acknowledgement and acceptance of polysemy would be crucial to any analytical technique which I used.

Structuralists were not the only group to adopt a textual model. Many other post-processualists did (although not always explicitly). I found the structuralist version to be useful and took from it an increased appreciation of the symbolic dimension to life (e.g. in my reading of Ponzio, 1990), but found it wanting in terms of contextual and polysemic considerations. I, therefore, looked for help in these respects to other forms of post-processual study.

POST-STRUCTURALISM

Post-structuralism in archaeology was sometimes compared to post-modernism. It drew on the work of a number of people including: Derrida, Foucault and Bourdieu. An extension of structuralism, it continued the idea of oppositions and used semiotic analyses, but with a change of emphasis. It abandoned the notion of a rigid code, and replaced it with an abstract grammar which was entirely dependent upon context. Unlike structuralism, it focussed on parole rather than langue, giving primacy to the sense-making process over and above its actual end product (Hebdige, 1979). One important reason for this reversal of focus related to the existence of polysemy.

This textual model emphasised the existence of different writers, different readers, and different interpretations. It talked of a polysemy in terms of a "surplus of meanings"

(Shanks and Tilley, 1987). For this reason, post-structuralism abandoned the notion of signifieds.

However, the number of possible interpretations was not infinite. Chomsky used the analogy of a switch box, where the number of possible switch positions delimited the number of possible interpretations (Chomsky, 1988). In order to read the text, then, the reader needed to know the general rules which applied and the particular context. This was not entirely rule-governable, though, because of the role of subjective insight.

In contrast to marxism and structuralism, the concept of structure in post-structuralism was not without meaning for the society being studied, nor was it something which controlled them. Individuals were assigned an active role. The text (or language) of an event was seen as a concrete thing designed to have social effect. The context in which a message was conveyed had to be appropriate in order for the message to be effective. Thus, the whole arena became subject to the intentions of the person who produced the sign. Action became an important part of the interpretative process and the meaning of a sign could be dictated by that action (not vice versa).

In its attempt to access the emic (internal) perspective of the agent, through its focus on meaning in action, post-structuralism made an important theoretical contribution. It also stressed the problems in divorcing, as structuralism had done, an abstract linguistic code from events. Context was paramount.

There were several unresolved issues in post-structuralism (also common to post-modernism), however. Two of the most crucial questions which it raised for me were:

- was archaeology limited to saying that the data could only be fully understood by the particular society that produced it?

- to what extent was there a reality or a real world anyway?

CONTEXTUALISM AND SYMBOLISM

There was a considerable lack of clarity in the application of these terms to archaeology. They tended to be blurred with eachother and with the other post-processual terms. It is best to regard them as themes which occurred at various levels of the interpretative process as it was applied in post-processual archaeology. Some of their major features are outlined below.

CONTEXTUALISM emphasised the importance of context for understanding material culture patterning, thereby implying both a degree of uniqueness and the interconnectedness operative between object and context. It embodied notions introduced by structuralism and post-structuralism: archaeology was read like a text and the symbols that made up the text took their meaning from the context in which they occurred.

A text could have a different message content when placed in a different context. This emphasised the dangers of formulating 'laws' and, especially, of making cross-cultural generalisations. This had important implications, since many archaeological interpretations were based on extrapolations from modern ethnographic case studies.

Contextual archaeology identified three levels of interpretation: the observable and physical environment, the structure or text of the archaeology, and its content in terms of the particular situation which conferred historical meaning. It considered that ecological and environmental archaeology (of the processual school) had addressed the first of these, and that marxist and structuralist archaeology had addressed the second. The third, though, had been largely ignored. Symbolic archaeology attempted to redress this imbalance. Strictly speaking, therefore, symbolic archaeology formed part of the contextualist whole.

The idea of SYMBOLISM in archaeology was not entirely new. Symbolic aspects to data had been long incorporated in processual techniques, but the way in which it was applied by symbolic archaeology was very different.

Hodder made a clear distinction between symbolic and other methods when he defined two ways of studying meaning (Hodder, 1987):

a) structured systems of functional inter-relationships - the systemic approach

b) structured content of ideas and symbols - the symbolic approach

It could be argued that only post-structuralism touched on the second of these, since even structuralism seemed more concerned with the functional relationships involved in linguistics than with the realm of ideas and ideology.

Judith Okely's 1975 study of British Gypsies (Hodder, 1982) suggested a different attitude towards dirt and refuse than that which was considered society's 'norm'. It was later to provide a good example of how symbolism extended beyond the purely functional sphere.

Okely found that Gypsies symbolically externalised their culture by appearing to be unwashed and by having a close public relationship with refuse. The tendency amongst outsiders (the etic perspective) was to see them as being dirty people with no concept of hygiene. Meanwhile, inside their homes Gypsies maintained a very hygienic and well-ordered code of life. An emic perspective might, therefore, have been to interprete their behaviour as a means of keeping distance between themselves and society, and of being distinctive.

A purely functional and etic view would have missed the richness and inherent contrasts of the data. It would also have put more emphasis on the interests of the general public than on the Gypsies themselves, portraying them as social 'misfits', deviations from the 'norm', etc. This case study highlighted the important contribution which symbolism could make in enriching archaeological interpretations.

The methodology of symbolism involved making abstractions to identify meaning content behind objects and was involved with more specific, rather than general, explanation. These abstractions were made from a totality of cross-references and assessments of

associations and contrasts in other spheres. This process was sometimes referred to as 'networking the data' (see Findings chapter for how I networked my data).

Associations revealed the structure of the grammar, and the structure of the grammar enabled the reader to determine the language rules. Meaning only existed in the relationships between all elements and it was those relationships in context which defined the meaning (Chomsky's work refers).

Networking the data involved setting up categories (c.f. structuralism) and was a subjective activity. Therefore, the plausibility of the picture presented was based on subjective criteria such as goodness of fit and frequency of associations; in other words, whether or not it constituted 'a good argument'. Nevertheless, archaeological text was seen as no different to any other in that it was subject to re-interpretation. Symbolism, therefore, encouraged continuous critical re-evaluation of interpretations.

It also promoted an awareness of the historical roots of terminology and the values that might be associated with it and, thereby, conveyed through use. This was a crucial point in that it extended the notion which all post-processual approaches claimed to acknowledge: the role of axiology in interpretation. It was a move towards an approach which saw archaeological knowledge in terms of the reader rather than in terms of the read.

Symbolism required general theory and a close relationship with the data (hence, emphasising both deductive and inductive procedures) especially the link between structure, meaning and social practice. Only a limited use of analogy was recommended, largely because of the recognised dangers inherent in making cross-cultural generalisations.

Unfortunately, putting symbolism into practice raised a number of problems.

The first was that the nature of symbolism was seen as fairly static through time (synchronic). A more diachronic approach was needed which would recognise modes of symbolic expression formerly unknown. An example of such a case was the so-called

'artistic explosion' of the Upper Palaeolithic. It was feasible that symbolic pre-cursors had existed but difficult to know how this might be researched.

The second was the requirement that all available data should be thoroughly networked. This assumed that every possible permutation could be accessed and applied.

The third problem related to the idea that symbolism could be 'mis-read' in the sense that the archaeologist might interprete the data differently to the original agent. This linked back to the idea of polysemy and the question of how to choose between meanings. The usual answer to this was similar to Chomsky's: that context defined the range of meaning. But, what if the context was missing or incomplete?

Shanks and Tilley addressed this in their book "Re-Constructing Archaeology" (Shanks and Tilley, 1987). They argued that text may become unreadable in the sense of knowing which interpretation applied. They accepted this as an unavoidable possibility and made several recommendations such that:

- personal/political, etc., biases should be made explicit so that the potential for mis-representation was more easily recognisable (especially relevant when considering re-interpretation by others in later years)

- exhibitions and displays should reveal how meanings were imbued by the way in which they were presented

- lateral thinking should be encouraged in the observer - for example, by providing data juxtapositioned out of context, and by using non-conformist language to describe it (e.g. irony, humour) - thus, offering potential for new meaning

- the notion that there was only one acceptable interpretation should be avoided (e.g. by emphasising whose interpretation it was and how it reflected their personal beliefs)

- people should be encouraged to interact with the data if possible, thereby demonstrating that it was polysemous through use

Finally, like post-structuralism, symbolism attempted to access an 'emic' perspective, through looking at the active process of symbol production. However, some analyses transferred assumptions from other areas of archaeology, thereby masking the more original contribution that symbolism offered.

In his paper "Stylistic Behaviour and Information Exchange", Wobst assigned a secondary status to 'domestic-sphere' symbolism in contrast to symbols found in the 'public sphere' (Wobst, 1977).

Wobst reified this view by transferring the values of a patriarchal society to the archaeological context. A male-oriented view of the past was, thus, archaeologically re-affirmed through symbolism. In so doing, not only were women relegated to a secondary role in terms of "power play" but this was also legitimised by virtue of the apparent lack of female-symbolism interaction and participation.

Also, by concentrating on externalising symbols in the public sphere, Wobst failed to consider the importance of, and contrast with, internal and domestic-sphere organisation of family units (c.f. Gypsies above). These points began to echoe criticisms levelled at other approaches, especially functional anthropology, ethnographic studies, and marxism. I discovered there was potential for an uncritical application of symbolism just as much as there was with alternative methods.

In my own PhD research, I have adopted a number of points from contextual and symbolic archaeology. In my search for symbolic patterning, I made use of analogy and also employed the 'networking' technique in order to make sense of the data I had collected.

In addition, I took up several of the recommendations made by Shanks and Tilley (1987), the most apparent of these being to state my biases explicitly and as far as possible. Indeed, this whole chapter is a reflection of that aim. I have also made critical

"The only constant feature of male-female relations is that women can reproduce and be certain of their relatedness to their progeny, and men can do neither."

(Ferry, 1984.)

re-evaluations of my research methodology in the Journey Through Two Organisations and the final chapter. It is hoped that these exercises will provide the reader with an insight into my own sense-making processes, as well as to accentuate the fact that my interpretations are not the only ones possible.

FEMINISM

My discussion of Wobst's use of symbolism (Wobst, 1977) highlighted some weaknesses in its application. One of these concerned the treatment of women.

As a discipline, archaeology had been accused of ignoring women. That criticism was applied to both its potential as a career option, as well as to its interpretation and presentation of the past. It was behind in relation to other subject areas like anthropology and history.

This situation was just beginning to be addressed when I was in my final year at Cambridge. The professional institutions were starting to include women-related issues on their agendas, conferences were offering special sessions, and 'feminist' research projects and literature were receiving more attention.

Within the university itself, an informal Feminist Archaeology Group was set up. Amongst its first tasks were: to consider the need for a feminist archaeology, to clarify the meaning of this label, to identify the Group's own aims and objectives, and to consider how they could be put into practice. A brief outline of these points follows, and will illustrate aspects of feminism which were to be incorporated in my PhD research.

NEED FOR A FEMINIST ARCHAEOLOGY:

The question of whether or not there was a need for feminism in archaeology produced a resounding 'yes'. Problems existed at three levels: sexist interpretations of the past, the projection of the present onto the past, and how women saw themselves within the discipline. The latter point called into question existing career and power structures, and related primarily to pragmatic issues. The other two called into question the entire theoretical and methodological basis of archaeology itself.

Archaeological interpretations were biased in several ways, including information on a sexual division of labour, status symbols and prestige, and clothes. A 'man does, woman is' belief permeated throughout. The classic sexual stereotype was that men were toolmakers and hunters, and women were cooks and child-rearers. Often, this view was based on extrapolation from 'modern' ethnographic studies; which, it could be argued, were themselves gender-biased, partly because men had almost always been the researchers.

Such assumptions were progressively amplified, through assertion to statement, not only re-inforcing biases of the status quo, but also legitimating their reproduction on the basis that they were historically-given 'norms'. This raised an issue widely recognised amongst feminist archaeologists - the presentation of patriarchal values as biological fact and the naturalisation of inequality.

Social roles were portrayed as reflections of reproductive physiology instead of the product of social relations. In this way, men and women became opposed. Women's roles were devalued, especially in relation to technology production (see Stage Three). In many cases, this resulted in their conspicuous absence from the archaeological 'record'.

Models based on such sexual assymetry assumed what they should have been explaining. The picture became very one-sided. The need for a holistic understanding was perhaps the best argument in favour of a feminist approach. Rosaldo argued that we would never understand the lives of men without reference to the women, and vice versa (Rosaldo, 1980).

Despite the fact that sexual assymetry in archaeology was often supported by reference to ethnography, there was clear evidence to the contrary. One of the most interesting reports discussed a feature common to several Native American tribes (Blackwood, 1984).

"Berdache" was a role which could be fulfilled by either a man or a woman. It was a cross-gender role. In some tribes, a woman would perform the duties of a man, and vice versa. In other cases, there was no male-female role distinction at all. For this reason, some people preferred the term 'third gender'.

This case study clearly demonstrated not only that sexual assymetry in Western terms was a dangerous assumption, but also that 'gender' and 'sex' were non-interchangeable concepts. In addition, it revealed the inadequacy of the range of 'norms' and concepts promoted by the existing system of inquiry; a system boulstered by modern patriarchal values.

Feminist archaeology had identified the urgency of effecting change in the discipline.

MEANING OF THE TERM 'FEMINISM':

Attempting to define feminism was a difficult but interesting task. It was agreed that its public image included negative characteristics like aggression and a desire to dominate. In fact, these impressions had become so strong, even for the women, that consideration was given to adopting a different title all together, such as 'gender archaeology'.

After much debate, it was felt that abandoning the word 'feminism' might serve to reify its negative connotations. It was decided that the only way to rectify the situation was to stay with it, 'live' it, and demonstrate its positive aspects. These were highlighted in discussions concerning aims and objectives.

AIMS AND OBJECTIVES:

The need for an holistic understanding of human society was the key to a feminist study. This presupposed co-operation, not domination, and the Group demonstrated this by actively encouraging and welcoming men as members.

Feminism was not something which could be achieved if undertaken by only a few. If this happened, then it would become just another model-building technique. It was not seen as an alternative to other approaches but as a necessity. The aim was not to re-

write prehistory nor was it to attempt to replace a male mythology with a female one. It called for a total re-think of approaches to archaeology and was pervasive, requiring a change in attitude at all levels: individual, social, educational, and idealogical.

Archaeologists (and historians) had the potentially powerful means to influence society's view of its past and, thereby, change its current views and attitudes. This was a considerable task. Feminism stressed the need to work together and to take joint responsibility.

METHODOLOGY:

In some ways, it seemed easier to state what feminist archaeology was not, than what it was. This lack of clarity extended to the methodological sphere. There was no explicit, existing methodology, although there had been a number of attempts at 'feminist' interpretation (e.g. Braithwaite, 1982).

This absence raised doubts in those who did not share our beliefs, especially the processualist school, and they challenged us to do something about it. Their reaction was both illuminating and disheartening. It emphasised the destructive power that was born of divisiveness rather than co-operation. Feminism was not about one group of people taking responsibility on their own. We believed the challenge would have been more constructive if expressed as "what are we all going to do about it?".

One of the reasons why feminism provoked such negative responses was that it appeared to challenge the whole integrity of archaeology. In the words of Conkey and Spector, developing a feminist methodology implied that:

> *"... we must question the rationale and role of archaeology. and this has implications for more than the archaeology of gender."*
>
> *(Conkey and Spector, 1984)*

Did this mean the whole discipline had 'gone up the wrong road'? The Group thought not.

Looking back through time, it was clear that the data-baby had not been thrown out with the interpretative bathwater at every archaeological 'revolution' (see, for instance, the use of diffusionism and systems theory). It was possible to take a fresh look at archaeology and yet still make use of existing knowledge.

In any case, the fact that feminist archaeology revealed the need to seriously re-consider previous approaches served only to accentuate its importance, and was by no means an excuse for its rejection!

In conclusion, being a member of the Feminist Archaeology Group helped me to appreciate the extent to which researchers could be biased by values extant in the status quo and to realise how easy it would be for me to fall into the same trap. I felt it was vital to retain such an awareness when conducting my own research. As will be seen from Stage Three, this awareness was to be particularly necessary when inquiring into Information Technology. Archaeology had shown me how women's roles in the production, use and distribution of technology tended always to be devalued or ignored. Modern perceptions of the role of women in IT proved to be no less a cause for concern.

POST-PROCESSUAL ENDINGS

By the time I had completed my studies at Cambridge, I had moved towards what some might consider a fairly 'extreme' end of the post-processual spectrum.

Post-structuralism had raised for me the question of whether 'reality' existed. I had come to believe that reality was whatever the individual believed it to be! In archaeological terms, I felt that, by fully accepting the role of the subjective, archaeologists were admitting their work revealed potentially more about the present than it did about the past. Therefore, I saw the work of archaeology as telling a story, and the story as telling us more about the storytellers than it did about the characters we employed in its telling.

I hope this brief examination of post-processual approaches to research has provided the reader with an appreciation of my biases at the point of embarking upon the third stage of my journey - the commencement of the PhD itself. It is this which will be related next.

ROUTE MAPS AND SIGNPOSTS:

A JOURNEY THROUGH INFORMATION TECHNOLOGY

In this section, the Journey Through Post-Processual Research continues but, a second journey is introduced: the Journey Through Information Technology. Figure 3 shows that I oscillated between an optimistic and a pessimistic view of IT, eventually settling for a pluralism which viewed IT as neither innately good nor bad, but dependent upon human choice for its effect. By adopting the latter, I placed responsibility for the consequences of IT's application squarely in the arena of the individual, thereby introducing the notion of ethics.

I rejected the technological determinism which was so apparent in the literature and suggested that the starting point for any project should be the human need. Convinced of the socially-mediated nature of information, and the essentially cultural nature of organisation research, I re-inforced my argument in favour of an inquiry methodology which placed the human subject (as opposed to object) at its centre.

I continued my journey in the conviction that a combination of contextualism and symbolism would provide the opportunity to address what I saw as an imbalance in previous research work.

TWO JOURNEYS INTERTWINED

THE PHD: STAGE THREE

This section records what amounted to two parallel and intertwined journeys.

For the most part, A Journey Through IT was a new one for me. A Journey Through Post-Processual Research, however, was to be a re-discovery and continuation of that begun in Stages One and Two. During these two journeys, I developed a research strategy for the study of IT.

Stage Three, then, illustrates how I mapped out my own theoretical territory within IT, as well as how it shaped the methodological route which I was to follow during my fieldwork.

This part of the chapter does not include a comprehensive literature review for two reasons. Firstly, the literature was too comprehensive! Secondly, some of the work conducted in IT is found in later chapters. Works which have influenced my thinking, but which are not mentioned explicitly in the text, can be found in the References section at the back of the thesis. This applies to the rest of the thesis, too.

It is important to note that in the early stages of my research I had not identified, or agreed with the sponsors, the specific focus for my fieldwork. The details of how this decision was eventually made, along with others concerning how the research strategy was to be applied, are part of another journey: A Journey Through Two Organisations, and this is discussed in the next main chapter.

HIND SIGHT

I have said that I left Cambridge with an incomplete research tool (methodology). I now believe it was the desire to formulate my own application of post-processual research which accounts for the focus of my thesis. This motivation seems far clearer in retrospect than it did at the beginning of the PhD. At that time, I thought my main interest

in the IT Skills Project resided in a long-held interest in computing. The theoretical and methodological considerations seemed to come afterwards. With hind sight, however, I believe they all played a valuable part.

When I joined the project, I felt that I would be embarking on a completely new theory journey. I had moved from archaeology into information technology - two seemingly very different topics - and I did not consciously consider transferring the baggage I had brought with me from Cambridge to my new location. I later realised that this was not the case, and it was because of this that I was able to build my research methodology on theoretical foundations with which I was already very familiar.

What is interesting for me, is that because this realisation was not immediate, I was not entirely true to my prior beliefs. The implications of this had a marked affect on me during my second year, when I re-read the first two Working Papers which I had produced for the project (Brooke, 1988a and 1988b).

Although both these papers reflected my humanistic concern by focussing on people, they also incorporated some points which I later believed to be unacceptable. Re-reading these papers, therefore, indicated how far I had travelled since embarking on the PhD and helped me to sharpen up my research strategy. Both of them are discussed in this section.

LITERATURE REVIEWS

I joined the IT Skills Project at City University Business School on 1st October, 1988.

During my first year on the Project, I wrote two papers arising from literature surveys which I had conducted. The second of these was never completed. The main points from each are discussed below but the completed report (Brooke, 1988b) is attached as an Appendix for those who wish to see more detail (Appendix 2).

The process of reviewing the literature continued throughout the PhD research and the ideas I gained from this are recorded where relevant in the rest of the thesis. However,

these two early searches were particularly important because they formed the starting point for my research strategy, and served to illustrate my learning processes as a close-knit relationship between a journey through IT and a journey through post-processual research.

FIRST SURVEY REPORT

As a result of the first survey, I identified four stages of organisational change, each with their own implications for the IT skills climate. These four stages were:

1) Change is initiated by certain triggers.

2) Organisations become aware of the implications of change; and consider how this will affect corporate stragegy. New circumstances may call for a new response, and an analysis of internal organisational culture and policies will be necessary before this can be ascertained.

3) Having identified the key issues for action, any changes that are to be made have to be managed effectively. Aims may be clear but appropriate methods need to be carefully selected in order to achieve success. The happiness and co-operation of employees will decide this to a large extent.

4) Once change has been implemented within an organisation, regular reviews of its effects should be carried out. This reviewing procedure will provide the opportunity for an organisation to determine whether or not its newly adopted strategy is both internally accepted and externally competitive.

I then produced a diagram which illustrated the major themes encountered in the literature, and grouped them according to the 4-stage process of change outline above. This is reproduced in Figure 7.

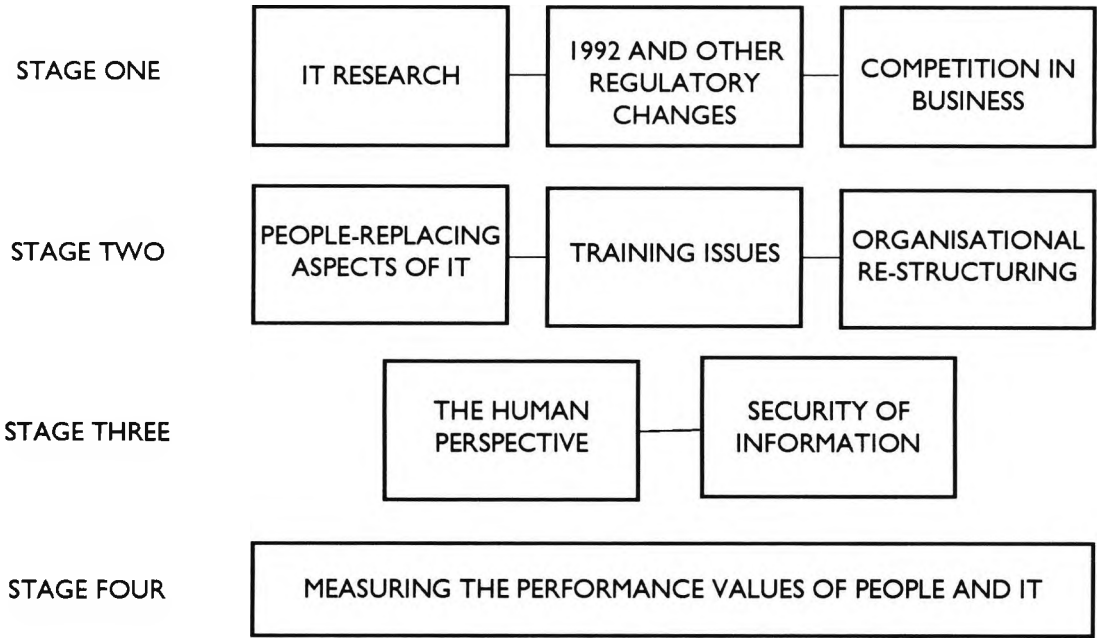


FIGURE 7: MAIN ISSUES ARISING FROM FIRST BIBLIOGRAPHIC SEARCH

One of the questions which I was to ask myself later was why the human perspective was not introduced before Stage 3: was this a reflection of the literature or of my thinking? I decided that it was partly both, my approach having since changed somewhat.

The structure and approach of this report was fairly 'traditional' and incorporated some comments which I was later to regard as technologically determinist. For example: "IT is a prime vehicle for competitive advantage", and "IT needs to be considered as an integral part of any corporate stragegy" (Appendix 2, page 9 of the report). Both these statements had a taken-for-granted approach to the role of IT in business. The paper assumed IT's potential for competitive business 'success'.

This message was particularly evident in Stage 2 in the discussion of People-Replacing Aspects of IT:

> *"IT is not only in competition with other users in the marketplace but is also in competition with the humans that use IT."*
>
> *(page 13 of the report).*

Later on, Professor Merton of Harvard Business School was quoted as having said that

there might be a ceiling beyond which the computer could not go and at which point the whole concept of competition (in the financial markets) would become meaningless (page 14 of the report). A year later I was to conclude this was a good example of where business suffered as a result of focussing on the technology rather than on the people (IT staff, users, customers, etc.).

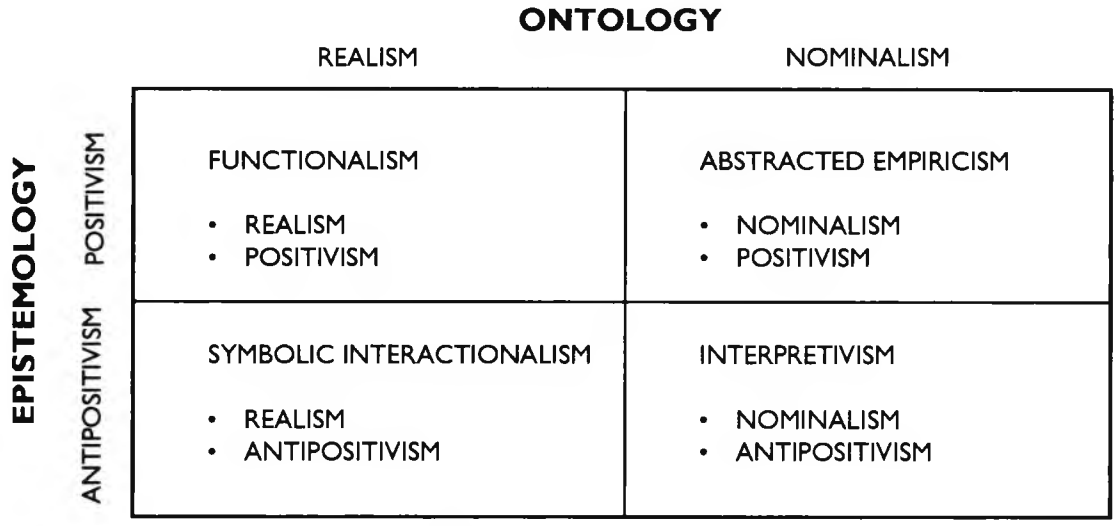
With hind sight I regard the fact that I did not discuss the potential for IT as an aide, rather than as a direct competitor to human labour, as a weakness.

It would appear that, in addition to adopting a technologically determinist stance, the paper sometimes tended towards a pessimistic view of the effects of IT in the workplace. Subsequently, I was to adopt what I thought was a non-deterministic position on this. Er called this a 'relativist' or 'pluralist' view, and contrasted it to the optimist and pessimist views:

> *"The optimist view asserts that information technology increases the productivity of all concerned; creates as many new jobs as it destroys; increases organisational effectiveness and efficiency; enhances communication; improves the quality of working life; and makes possible more leisure, medical facilities, etc. The pessimist view believes that the contrary is true - namely, most management jobs are too unstructured to be automated; a large scale deployment of information technology will lead to unemployment, deskilled jobs, less satisfaction, deteriorated working life, centralisation of power, and lessening of personal privacy and freedom. Among these two extremes lies the middle ground - the pluralist or relativist view that the positive or negative impact of information technology is dependent on the way the technology is put to use. This view is more concerned with the development of criteria for social and organisational acceptance and applications of information technology in appropriate circumstances. Most people generally adopt one of these views, either consciously or unconsciously, depending on their background and prior training."*
>
> *(Er, 1989)*

My own experience at that time suggested that writers from the 'traditional' functionalist management school of thought usually adopted an optimistic view of IT (see, for example NEDO, 1987). In contrast, pessimistic views were often associated with marxist philosophy (for example Kraft, 1979).

Er, too, discussed the theoretical bases of the three views and produced four categories of research framework according to ontological and epistemological beliefs. This is reproduced in Figure 8. Interestingly, however, I found that I did not fit into his model.



TAKEN FROM ER, 1989

FIGURE 8: THE ONTOLOGICAL AND EPISTEMOLOGICAL FRAMEWORK

According to his schema, by adopting a pluralist view, I should have been developing a research strategy of either 'abstracted empiricism' or 'symbolic interactionism'.

Whilst I accepted the nominalist perspective of abstracted empiricism, I was not a positivist (as is clear from Stages One and Two). I, therefore, tended towards the anti-positivism of symbolic interactionism. I was aware that there were a number of similarities between my position and that of symbolic interactionism (e.g. Deegan and Hill, 1987). However, I rejected its realist beliefs (a universe comprised of things which exist independent of sense experience), and its links with materialism (also central to my rejection of marxism).

According to Prasad (1990), symbolic interactionism had three main premises:

- human beings act towards things on the basis of the meaning that they hold for them

- the meaning of these things grows from social interaction with other people

- these meanings are formulated and modified within an interpretative process which comes into play each time something is encountered

Thus, it was founded on an epistemology which accorded a prime place to the construction of meaning in terms of understanding the world. To that extent, I was in accord. However, symbolic interactionism implied that more than one person was required in order to construct meaning (the 'interaction' part). I found this limiting, especially in the light of my understanding of linguistic-type analyses, and the potential for interaction between one individual and a 'sign' (Blumer, 1969).

In fact, what I was attempting to do was develop what Er called an 'interpretivist' approach.

An interpretivist believes there is no social reality to measure, and adopts nominalism and antipositivism to form a research strategy. Nominalism holds that reality is simply a subjective construction of the human mind. Antipositivism rejects the appropriateness of a causal model for understanding social or human actions, except for physiological responses.

Although I might question the last point in some respects, I found this to be much more in accord with my own feelings.

Re-reading my report, then, suggested that I had shifted from a technologically deterministic position which tended to express itself in a pessimistic way, to one where I was much more aware of IT's potential to do 'good' or 'bad' depending on how it was applied. Despite this, a number of points made in the report, together with the main conclusions, were to remain central to my PhD work, and some of these are discussed below.

In 'Organisational Re-Structuring' I observed that British management adopted a conservative culture, and did not provide the supportive, participative environment which the London Human Resource Development Group (LHRDG) survey had revealed may be called for by companies providing customised products in a Single European Market (page 23 of the report, and Rajan and Fryatt, 1988).

Organisational culture was to be an important theme in the PhD fieldwork and the Findings bore out the idea that major cultural changes would take place in order to prepare for the future.

The fact that I dedicated a section to 'The Human Perspective' reinforces that I had retained my humanistic values. The first paragraph from this is worth repeating since it contains an argument which I developed more fully later on - that IT is a social product:

> *"Organisational re-structuring involving IT needs careful consideration, especially since IT is not a quick-fix solution but, a resource like any other. Furthermore, it is a social product and its ability to create 'winners and losers' is often unappreciated (Willcocks and Marks, 1988). In business, the development of IT will inevitably incorporate two levels: issues concerning the business strategy and issues relating to the employee-user. This conflict of group interests (broadly speaking the employers versus the employee) constitutes the political element of information technology. IT should, therefore, be viewed in its political and social organisational context, and management will have to develop political and cultural support for its objective, by identifying and responding to these various interest groups."*
>
> *(page 27 of the report)*

This section also drew out the fears of all parties involved in the implementation of IT, especially in relation to CONTROL. The control factor reappeared in my first set of research proposals, too, (see 'Research Strategy for IT' below).

Under Stage 4, I discussed 'Measuring the Performance Values of People and IT'. This section, again, presented a humanistic perspective.

Taking a lead from a paper by Benjamin and Benson, it stressed the value of people

to an organisation as its only unique resource. It referred to the unappreciated and unaccounted for contribution of individuals to the balance sheet (Benjamin and Benson, 1986).

Although I now believe precise financial measurement of this contribution to be unrealistic (and, in some ways, undesirable), the main thrust of this argument was to inform my PhD fieldwork and is generally reflected in the Findings.

Turning now to the concluding 'Summary', it is evident to me that, despite some shift in approach since it was written, the overall tone of the points made therein was carried through to the practical stages of the research. These were:

> *"1. The need for methods of calculating potential skill gaps, allowing for the re-training of existing staff, the transferrability of their skills and an assessment of an individual's potential, perhaps using trainability techniques.*
>
> *2. The potential for exploitation of 'non-traditional' employment markets such as: the over-35's, women returners.*
>
> *3. An urgent need for a new attitude to training as indicated by point 2. The current skills shortage provides a most timely opportunity for British employers to review their recruitment strategies.*
>
> *4. A requirement for managers to continually reassess their aims and methods in order to remain competitive within a European single market."*
>
> *(page 35 of the report)*

The first point promoted the merits of trainability in identifying the skill requirements of IT staff. This was referring to a technique discussed in the literature by Sylvia Downs (Downs, 1985 and 1977).

This technique appealed to me because it tested a candidate's ability to do a job within a practical situation rather than by mental tests or educational qualifications. It seemed to be matching the individual against the actual role which they would be performing rather than against abstract notions of intelligence.

This was an indication of the 'non-traditional' stance which my research was to take in relation to procedures for IT recruitment and was re-inforced by the second and third conclusions.

The second conclusion appears somewhat over-stated when taken out of context. For example, seeming to suggest that over-35's are 'over the hill'! Yet this was not as far-fetched as it sounded. In fact, I myself had previously received that label at the grand age of 27. Indeed, the attitude of employers towards recruiting certain age groups as IT trainees was less than positive in many cases. As indicated in the conclusions, I believed this called for a change, not just in employment and training policy (the theory) but also behaviour (the practice).

In many respects I was echoing a message which was to gain in popularity with the media. They had begun to feature articles on the subject of the demographic downturn and the need for employers to make use of 'non-traditional' IT recruitment pools. These included the over 35's, women returners, ethnic groups, and those with no formal educational qualifications. Later, women were to become a particular focus (e.g. Ledaca, 1989, Sweet, 1989, Newton, 1989, and Anonymous, 1989).

These issues were being addressed by a number of projects around the country; again, with a primary focus on women, such as the Women Into IT (WIT) campaign, initiated by Philip Virgo and sponsored by many organisations).

All these concerns had an influence on my later fieldwork, especially in relation to my feminist beliefs, and my attitude concerning the reported 'skills crisis'. They duly featured in the reports which I produced for the two companies concerned, and the details appear in the Findings chapter.

SECOND SURVEY REPORT

This report was written in September, 1989 and its objectives were:

> *"a) To present an overview of the main issues encountered in the literature;*
>
> *b) To draw out the ideologies of the published material;*
>
> *c) To identify any perceived gaps or 'deficiencies' in the works;*
>
> *d) To make recommendations on how the Project (and, more specifically, the CIT Scholar's PhD) could make an original contribution to the area of IT skills research."*
>
> *(Brooke, 1989)*

In an attempt to make the task of reviewing the material more manageable, I constructed four categories of literature: government-led research; commercial research; grass roots and individual research; academic research.

GOVERNMENT-LED RESEARCH

This category referred to work carried out directly by the Government and its associated institutions, or else by others under the direction/sponsorship of the Government.

Publications in this category tended to present IT as an inevitable path of development; in other words, it was technologically determinist. Generally, this was seen as a positive situation, IT being progressive and beneficial for society. As was evident from the other categories, though, this was not necessarily the view of all technological determinists.

The authors of "IT Futures" identified three types of technological determinism in the forecasting literature: progress in IT as a fixed course of action (no account taken of investment patterns); social impact of IT as a fixed course of action; technology as the major cause of social change. Despite their claims not to subscribe to this view themselves, they still demonstrated determinist and materialist tendencies when discussing the nature of social change (Bessant et al, 1985):

> *"Many authors point to IT as pre-eminently a malleable technology..... This malleability is likely to be reflected in the social implications of the diffusion of IT. If ITs are to be adopted in many spheres of activity - whether because they can reduce unnecessary toil, increase efficiency, or improve quality - then the key question becomes how they will be used as opposed to whether they will be used. Furthermore, if the applications of ITs prove to be as flexible as most forecasts predict, then it becomes increasingly important when making the choices which will influence the future to understand the distribution of costs and benefits associated with the use of these new technologies."*
>
> *(op. cit. p5)*

It was interesting to note that diffusion of technology was assumed but not analysed, and likewise with the 'if's of the paragraph. I found this situation worrying. If published material, and the media in general, presented 'reality' in a certain way, there was a danger that our future would become a self-fulfilling IT prophecy.

Friedman and Cornford made some useful observations in this regard (Friedman and Cornford, 1989).

They stated that not only did the diffusion path of IT depend upon idiosyncratic personal networks but also that the computer and academic literature over-emphasised the pace of change. This occured by virtue of the language which writers used. Changes were often portrayed as wide-scale when they were not, and as irreversible, sometimes being extrapolated (unilinearly) along a direction of change, in an unjustifiable way.

I wondered whether the players had ever considered the responsibility which they carried.

Clearly, then, such mis-representations were not confined to Government-led research alone. Yet it was unsurprising to find that technological determinism featured so highly in government-related research. After all, the main motive behind it was to promote and effect a faster IT take-up rate within the UK in order to achieve a competitive advantage in business; or so it was argued.

That objective was broadened in the light of 1992 and the Single Market. Many of the issues concerning IT and economic competition in the UK were placed within the framework of a united Europe. Whichever framework was applied, however, the focus remained on how to create an IT infrastructure for the UK. In contrast to France, for example, the government never offered state intervention as a solution! I suspected this was due to the fact that the Conservatives preferred to encourage private ownership and funding.

The infrastructural issues were complemented in the literature within this group by 'softer' ones with a more individualised emphasis.

NEDO's report "Switching on Skills" dealt with recruitment policy (IMS, 1988), and their "IT Futures" series did try to give a higher profile to the human element (Bessant et al, 1985, NEDO ITEDC, 1986 and 1987).

The major benefit of such publications was their practical orientation. They aimed to give real-life examples and advice on how to implement their recommendations.

In contrast, the free literature distributed by the DTI was more concerned with instilling ideals into IT decision-makers and, although they included some case study material, their contents were too generalised to be of any real help, and recommendations largely consisted of referrals to training and consultancy specialists for more advice.

COMMERCIAL RESEARCH

This incorporated two sub-groups: service companies (including consultancies and suppliers), and organisations (including internal research and self-help).

Many of the first sub-group were benefiting from the prevailing climate of IT increased visibility. Their advice, expertise and products were increasingly sought after. Consultancy firms, in particular, were producing reports for the business market.

In reviewing the literature, I had to bear in mind the special political and economic

motives characteristic of the group. Most of them adopted a glossy marketing approach - short on words, long on visual appeal (e.g. Coopers & Lybrand, 1986, Arthur Andersen & Co., 1986, KPMG, 1988, Ernst & Whinney, 1989, KPMG, 1989, Price Waterhouse, 1989).

They were not necessarily places to challenge the old order or to tackle sensitive issues. Phrases like 'deskilling' and 'unemployment' were rare and the overall tone was optimistic.

An over-emphasis by members of this category on the technical nature of IT (thereby perpetuating the myth of complexity for users) may have been due to vested interest in protecting their position as keepers of specialist knowledge. It was perhaps to be expected that they would adopt a technologically determinist view, too. I would have preferred to see writings which actually educated the readers into making their own decisions, rather than reproducing reliance on the 'experts' but, I supposed this would have been putting themselves out of business!

A good example of their approach is given by the definition of IT set out in the Price Waterhouse publications mentioned above:

> *"Information Technology*
>
> *is data processing*
> *is automation*
> *is communication*
> *is recording*
> *is knowledge*
> *is artificial intelligence*
>
> *Yesterday it was about managing experts*
> *Today it is the very stuff of management*
> *Tomorrow there may be little else that needs to be managed"*

This rather slick definition stressed the importance of management and yet human resources were not mentioned at all; except perhaps very implicitly if subsumed under 'knowledge'.

Within this sub-group IT solutions were invariably presented in terms of profit margins. Unfortunately, since management nearly always regarded staff as a cost and not an investment, the implications of the technology for employees took a low profile in the decision-making processes. This was particularly unfortunate since consultancy-type firms had a unique opportunity to work closely with an organisation and at invidual employee level. They also gained a deeper insight into the culture. These were two points which I considered would be important in my own PhD fieldwork.

The way in which consultancy was conducted meant that the literature often only reflected a limited knowledge base (i.e. the experiences of those companies who had paid for their services), and its depth and quality were, arguably, related to the price tag. In terms of my own research philosophy, this constituted very valuable information. However, these publications tended to give the impression that they represented the whole field of IT and management. This was a claim which I knew I would not be able to make with my own work.

The second sub-group - organisations - resulted from the bringing together of interested and concerned individuals as representatives of companies or sectors of business.

The research portrayed similarities with governmental research in that it focussed on 'higher' level structural issues rather than the underlying human issues. A good example of this was "Create or Abdicate?" by Rajan and Fryatt (Rajan and Fryatt, 1988). This was a well-researched and written work but too quantitative and lacked deeper analyses. There were lots of tables but little in the way of strategy for putting the 'create' part of the equation into action. Figures were given for sector level employment but the people/ company/IT interfaces were not sufficiently addressed.

It was often clear that the material in the organisations category had been fuelled by a reactive response to IT rather than by proactive planning. The resultant impression was that the UK was playing a game of 'catch-up' with the rest of the economic world. Not only was IT assumed as an inevitable, desirable commercial path (technological determinism) but, that the nation's economic position and quality of life would be thus secured.

The economic role of IT was an important and recurrent theme in all the literature categories and pointed up that the dominant IT paradigm was based on materialist and quantitative values.

GRASS ROOTS AND INDIVIDUAL RESEARCH

The grass roots group referred to those people who had come together because of a shared interest (e.g. women's groups) or individual freelance writers. They were sometimes from commercial backgrounds, sometimes academic. In relative terms, they constituted a smaller proportion of the total literature as compared with the other categories. Some addressed specific issues depending on their 'membership'.

By definition, the approach was bottom-up. They adopted more of a humanistic perspective and addressed matters which had been overlooked or under-played by other categories (Hales, 1988, Pacey, 1983). These included equality of access to IT jobs and skills (structural inequalities), and the needs of individuals in the work environment (man-machine interfaces and holistic ergonomics).

They also tended to recognise the wider implications of these decision areas for, say, recruitment opportunity and the future of work itself. This broad approach resulted in research which did not only present the disadvantages and advantages of IT but also considered alternative choices and strategies.

Members of the individual research sub-group had often moved on from other institutions and set up on their own in order to provide advice and research services (e.g. Philip Virgo ex-Manpower Services Commission and NCC, and Stewart Judd ex-Information Technology Skills Agency, who joined to form IT Strategy Services). Their mobility and access to information was sometimes restricted in comparison to other groups, highlighting for some the attractiveness of corporate-funded research within academic institutions (see below).

These individuals were sometimes informally referred to as gurus and, in common with other groups, tended only to address IT issues in terms of 'when and how?' rather than

'who and why?'. For some people (such as those mentioned above) this may have been a reflection of their previous backgrounds.

ACADEMIC RESEARCH

I divided this group into two: business-academic research and 'pure' academic research.

The business-academic sub-group consisted of academics who had also acquired a widely-known business background, or vice versa, thereby combining business and academic skills. Again, their informal status rating was sometimes referred to as 'guru', their expertise being generally recognised by researchers in both management and IT fields.

The literature tended to focus on implications for people as well as for organisational structures, however, it seldom applied social analyses. IT was rarely presented as an option, the main thrust being the process of IT adoption or how to make the best use of IT already in place.

Some of the gurus in this group had acquired public charisma (e.g. Professor Charles Handy), attracting large audiences wherever they went. To some extent, I felt this detracted from the content of their message and concentrated attention on the image that surrounded it. Another 'interference' factor was their political need to temper research presentations in order to retain credibility in the 'traditional' business world. This meant that new, more radical perspectives were rarely offered.

The second sub-group included corporate-funded research where it had been carried out by an academic institution (the IT Skills Project itself would fit into this category).

Most of the published material adopted an optimistic approach to IT, seeing it as a provider of many creative employment opportunities. However, the few existing works which did emphasise its negative aspects also tended to be academic pieces, often occuring in the social sciences and rooted in a marxist philosophy.

This was not unexpected, since the negative implications were closely related to people issues, and these tended to reside at the lower levels of analysis; not always visible from the higher levels of traditional, strategic management science. Academic training, particularly in the social sciences, encouraged investigation into such underlying issues. Also, whilst the business perspective was primarily driven by profit motive, the academic perspective tended to address other concerns, such as what was meant by the term 'IT' itself (see below).

Although optimistic and pessimistic scenarios were to be found within the academic literature, both camps favoured a technologically determinist stance, failing to highlight that IT did not of itself dictate consequences but that it was people who were empowered to make decisions. This was one of the major gaps in the existing body of literature.

Interestingly, though, some of the literature expressed the same desire noted of the government-related group: that of denying technological determinism. This engendered a feeling in me of 'me thinks they doth protest too much'.

An example was McLoughlin and Clark's book on technological change (McLoughlin and Clark, 1988). They argued that their concept of an engineering system avoided a deterministic nature for IT and opened 'the black box' (see 'Nature of IT' below). Nevertheless, they acribed to it an independent influence and produced a definition which was not only tautological but also completely mechanistic.

Technologies were defined in terms of three primary elements: the first two were termed architecture, and the third technology. None of these, however, made reference to the human component. The 'hardness' of their model is illustrated in their diagram, reproduced as Figure 9.

PRIMARY ELEMENTS	
ARCHITECTURE	TECHNOLOGY
SYSTEM PRINCIPLES OVERALL SYSTEM CONFIGURATION	HARDWARE SOFTWARE
SECONDARY ELEMENTS	
DIMENSIONING DETAILED DESIGN FOR A PARTICULAR ORGANISATIONAL SETTING	
APPEARANCE AUDIBLE AND VISUAL CHARACTERISTICS, ERGONOMICS, AESTHETICS	

TAKEN FROM MCCLOUGHLIN AND CLARK, 1988

FIGURE 9: THE CONCEPT OF ENGINEERING SYSTEM

Overall this group lacked serious treatment of those responsible for implementing IT. Some more recent works (e.g. Lyon, 1988, Zuboff, 1988) had combined social analysis with practical case studies at individual and corporate levels. Even so, there had been little explanation of how the high level theory was tied to the low level pragmatics. Here was a gap for researchers to advice organisations on how to assess the positive and negative effects of IT in relation to the particular contexts with which they were dealing.

I drew several conclusions as a result of the second literature review relating to: a) the need for an alternative research methodology; b) a deeper consideration of the nature of IT itself; c) a greater awareness of the social implications of IT; and d) an appreciation of the changes which might be called for in how we perceive and structure our society. These points are expanded below.

a) The perceived need for an alternative research methodology was based on the predominance of technologically determinist literature. The underlying theory which unified all these writers was that technology push outweighed demand pull in business markets, even ascribing some autonomy for the technology whereby it was independent of human intention (Freeman, 1987).

My call was for a framework which did not assume IT as an inevitable path of development, or as an inevitable dominant factor of social change. I argued that a new approach would have to be flexible enough to view the high level structural issues as well as to analyse detailed information at the individual level. I believed the low level view was essential in order to make valid recommendations, specific to each company's needs. In addition to seeing individuals as having an important role in the research framework in general, I also believed the IT 'industry' was people-driven in a bottom-up way (see 'Nature of IT' below). All this pointed to a humanistic, contextually dependent approach to the study.

b) Technological determinists tended to present IT as either inherently good or bad. This meant that the role of choice had been eliminated. This was consistent with the views expressed in a) above but, in making such *a priori* assumptions, the whole process of ascribing values of good or bad was placed beyond critical analysis. I argued that, by considering the nature of IT in more depth, these issues could be subjected to further scrutiny.

c) I noted that several 'triggers' (see first literature review), such as demographic down-turn, financial de-regulation, and preparations for 1992, had resulted in an increased awareness of the social implications of IT. Yet the potential effects had not been sufficiently explored. For example, where would new technology recruits come from, and how would they be recognised? These were potentially sensitive issues for management, perhaps involving deep-seated cultural beliefs. I realised that a research methodology which could cope with this and map the inter-relationships would be very useful.

d) Most of the research had been fairly short-sighted; a symptom of short-termism, perhaps. In discussing the long-term future of British business, Barbara Stephens of NEDO had expressed concern over an apparent complacency in the UK electronics industry (Stephens, 1989). I found this particularly disturbing, believing that the so-called skills 'crisis' was just the tip of an iceberg in terms of the possible requirements for change to the status quo. I saw it as an opportunity to re-examine traditional preconceptions, and to gain a better understanding of how we

had reached our present position. I also thought it would be important for management to treat this as a learning process and act upon their new knowledge while there was still an opportunity to do so.

Especially in respect of the latter point, I envisaged that the Project could make a valuable contribution by providing companies with practical action plans backed up with academic research. This reflected the fact that the Project had adopted an action research strategy and would increase the chances of recommendations being implemented quickly. I also hoped that a new research approach would assist in this.

Interestingly, I considered there might be a role for quantitative techniques as well as qualitative. I think I was referring to the whole Project here, though, and not just my own research. Indeed, other members of the Project did develop quantitative methods of study later on (e.g. Reynolds, 1991a).

The conclusions from the second literature review, in particular, were to form an important basis for developing my research strategy for IT, and are evident in the later stages of my thinking as reported below.

A RESEARCH STRATEGY FOR THE STUDY OF IT

PRELIMINARY RESEARCH

The process of developing a research strategy for IT was a long, and sometimes subconscious one. It started before I had even joined the project, with a report which I presented at my interview (Brooke, 1988a). This report is attached as Appendix 3.

Reviewing this paper a year later, I realised that my views had changed. However, I did not realise then that my work would develop at two levels: the pragmatic (for the commercial sponsors), and the methodological (for the PhD). At the time of writing this first report, only the pragmatic considerations were explored. As is reported in the next chapter (A Journey Through Two Organisations), the nature of the project called for

compromise in a number of areas. The suggestions I put forward should be considered within this context.

The two key phrases 'systematic contribution' and 'classifying IT skill needs' appeared in the original briefing material which I received for the Project (see Appendix 4). My treatment of these two stated objectives indicated how much my opinion was to alter.

The treatment of the first phrase was (Appendix 3, page 1):

> *"A systematic contribution is effective when standardised such that it can be applied more broadly. Therefore, the recommendations of this report will need to be in a form that can be implemented on a repeated basis. In view of the fact that the time-scale is oriented toward the next 5-10 years. the methodology will also need to be one that can accommodate long-term as well as short-term change and encompass breadth of information as well as depth."*

and, later on (page 16):

> *"In order to provide a systematic contribution to research into future IT skill needs, a standard procedure should be drawn up to obtain feedback from the City ....."*

In fact, the Project did adopt a methodology which was applied broadly - the Delphi and Business Surveys. These were carried out by other members of the Project, however. Suggesting that either recommendations or information gathering could be applied on a repeated basis was somewhat naive, since it would depend on the changing circumstances; hence the contextual emphasis of my later work. With respect to feedback, the Project adopted an action research strategy and this is examined later.

I believe my eventual methodology was able to take account of the long-term view although in a number of ways this became irrelevant to my work. The reason for this was that, according to my philosophy, time was a social construct, reproduced on a daily basis, in the same way that we created reality. Thus, the essential question for me became how to best cope with that sort of social re-production process, rather than how

to encompass a particular chunk of 'time'. I concluded that, so long as the research methodology rose to the former challenge, the latter would cease to be an issue.

One of my colleagues was refining a Delphi forecasting technique (Reynolds, 1991a). Although his perspective was very different from mine, we both agreed that whatever came out of his survey, it would not be a truth statement about the future. Rather, it would be an indication of what options might be available and what scenarios might be created by the players. A forecasting method could never reliably tell us what would happen in the future, since having this knowledge might in itself influence future courses of action. This point resonated with both of us. For me, the central focus of research was the thoughts and ideas of the people rather than future 'events' in themselves.

The second objective of classification was dealt with as follows (page 3):

> *"Classification at the microscopic level could be taken to mean the labelling of individuals. At this level, classification would not only be potentially unacceptable to those participating in a study but, also unhelpful in illuminating the broad sweep of IT trends in the City. At a macroscopic level, however, the major areas of IT skill needs could be identified, increasing awareness of current and future training needs and encouraging a favourable public response towards meeting them."*

This extract showed that I was opposed to lumping people together in order to make generalisations. Nevertheless, its emphasis on a macroscopic study is at variance with what I was to develop later. Once again, though, other members of the Project adopted a much higher level view.

One of the most ironic discoveries of this re-visitation, was that I had adopted a slightly technologically determinist position, saying that "individuals cannot be forced into acceptance of IT, only educated into it" (page 7)!

I referred to 'anti-technological forces at work in society' (same page) and drew attention to the benefits that IT could bring (page 8), and the advantages of studying financial organisations in that their benefits might be more easily quantified (page 10). I also said

that IT's negative side had been emphasised at the expense of the positive (page 12). In contrast to my first bibliographic survey, I was taking an optimistic view in conjunction with technological determinism.

Looking back, it would seem that I passed through optimism, to pessimism, to a pluralist mixture of the two!

Another point raised in this preliminary study was to prove illuminating with respect to my final choice of methodology (page 15). In examining how to build a research framework, I commented that people outside of an organisation had the advantage of adding an objective dimension to a study. Whilst this belief was shared by the sponsors and endured to the end of my research (see Feedback section of the final chapter) it was to become a personal hurdle for me.

In adopting a subjectivist paradigm at the outset of my study, I had abandoned notions of objectivity. I had also decided that an emic (internal) perspective would provide a stronger empathy with organisational staff than an etic (external) one. This guided my behaviour within the two organisations. I became a participant rather than an observer and, whilst my purpose was explicit, meant that I was treated almost like a member of the project. It was my belief that this differed fundamentally from the type of work which commercial consultants had carried out (see Commercial Research above).

As if to compound the irony, my succeeding statement in the report was that, of all those who conducted organisational research, academics were one of "the most objective in terms of assessing the future"(page 15)!

The Recommendations from this report can be seen in the Appendix. Broadly speaking, they were concerned with the collection and dissemination of information, with a quantitative bias. They convey the feeling of a marketing strategy with the aim of creating a high profile for the Project.

In the event, the sponsors were to take up this theme and the Project Team were encouraged to produce reports which would receive a potentially very wide audience.

My PhD work continued at a subtler level of awareness. Since the sponsors were not actually particularly interested in the academic side of the Project, I pursued this in an almost internalised manner.

RE-POSITIONING MYSELF

Despite the fact that I was already committed to a humanistic approach when I joined the IT Skills Project, the discovery that the dominant IT paradigm was technologically determinist (see Literature Reviews above) caused me to re-assess my situation in the PhD context.

I discovered that there were at least three good arguments in favour of adopting an alternative perspective. One reflected a groundswell of opinion concerning the neglect of the individual when implementing IT systems, the second was rooted in the nature of IT itself, and the third in the nature of organisational studies. These three arguments are expanded below.

1. NEGLECT OF THE INDIVIDUAL DURING IT IMPLEMENTATION

Few researchers had applied an individualistic or humanistic methodology to their studies of IT. Those that had, perhaps unsurprisingly, were found in the social sciences. Useful publications at that time included works by David Lyon and Shoshana Zuboff (Lyon, 1988, Zuboff, 1988).

However, there was a groundswell of opinion amongst business managers and industry watchers concerning the neglect of the individual during the implementation of IT systems. I took advantage of this in my first set of research proposals, by using it as a springboard to justify the development of an alternative research approach. The following is extracted from those proposals (written between April and June, 1989) and outlines the basic argument:

> *"It is currently admitted in business circles that the INDIVIDUAL has been badly neglected at almost every level of business operation, from strategic planning through to training. The 'skills*

crisis' is largely responsible for this attitude change. Having reached a 'crisis' point, companies are slowly modifying their policies. Note, for example, the introduction of 'Human Resources Manager' to the organisational hierarchy. (This research project could also be seen as a product of an altering climate.)

What has yet to be stated explicitly is that there exists a concomitant need for change within organisational research itself. Studies which claim to aim at the individual level do so by adopting organic, biological and systemic methodologies. In essence, the human is studied as a self-contained organic SYSTEM. It could be argued that systemic frameworks are especially suitable for studying the arena of information technology systems. It is my contention, however, than an alternative approach is necessary in order to extract the richness of information (e.g. symbolic) which is available from case studies, such as we will be able to conduct.

There are a few writers on management and business issues who have tried to adopt a more individualistic approach in their research whilst obviously dealing with the same sort of tools and materials as more 'conventional' writers. It may be possible to build upon these approaches when conducting my PhD analysis. In addition, I have quite a clear idea of the features which a research methodology should embrace and to which I accord prime importance. They are:

- *contextual information*
- *symbolic meaning*
- *stylistic attributes*
- *the intrinsic bias of information (see critical theory in Marxism, previous chapter)*
- *the non-existence of a single, correct answer (symbols are, by nature, polysemous)*

These points are not out of place in organisational research. On the contrary, they are ESSENTIAL to it. Research literature, both in academic and practitioner circles, tends to suggest implicitly that there is some objective truth to be had, and some ultimate force which is at work to produce our future, about which we are destined only to make hazy guesses.

This is a gross misrepresentation, presented and reproduced by those who hold positions of 'power', either as owners of knowledge or as owners of wealth and political influence in our society.

The future is inextricably bound up with both the present and the

past and, like them, is a SOCIAL PRODUCT. Why is this so? - because time is a human construct. It is dependent upon social reproduction. Technology is also a social product, so is the Government, so is the European Single Market, and so, too, are IT skills. All these issues, therefore, need to be addressed at a social level (individuals in a context).

The research is essentially about CONTROL. The sponsors want to control their future with respect to IT. The country wants to control its future with respect to being competitive in business. Individuals may want to control their future with respect to job enrichment and security. This issue of control could be seen as intrinsic to all applied research. which this project has always declared itself to be.

Control involves the playing out of politics and power relations at many levels. Much organisational research has focussed on this fact. Individuals can obstruct the intended course of a company's project or they can carry it through to its planned end. There are no pre-determined linear relationships here, only individual social beings interacting on a moment-by-moment basis. Certainly, there are 'rules and norms' by which we make sense of the world around us and interact with it, and there are also ways in which our methods of perception will vary and be affected by our individual experiences of socialisation; although neither of these are unchangeable. Indeed, the fact that individuals possess different perceptions of the SAME thing, contributes to the dynamic nature of organisational relations.

No-one believes that our research will provide an IRREVOCABLE TRUTH about the nature of IT skills over the next five to ten years. That fact underlines what we recognise as the power of human nature itself. We are not a predictable species, and neither is the world which we construct around us. However, adopting a research methodology that accounts (as far as is possible) for the role of individuals, we ought to be able to produce a piece of research that more closely indicates the potential for trends and the sorts of choices that might be available."

This now reads rather strongly. In effect, I was mapping out my PhD territory and staking a claim to it. I think it reflects a certain amount of anger at the scarcity of 'alternative' research, leading to isolation, and, undoubtedly, fear. The fear was a product of embarking on a journey which would cover what I thought were uncharted waters. Nevertheless, the essence of the declaration still holds true for me.

2. THE NATURE OF INFORMATION TECHNOLOGY

One of the earliest tasks undertaken on the Project was to define the term 'information technology' with the objective of agreeing amongst the Project Team a definition for the purposes of the IT Skills Project. It proved to be a difficult task, since there were so many different definitions in circulation. A report which was produced for the Project came up with over 25 published versions (Woodward, 1989).

This document was discussed and the Research Team produced the following definition of IT which appeared in the final version of that report:

> *"The term 'information technology' comprises two words: 'information' and 'technology'. For our working definition:*
>
> * *Information encompasses data (defined as content) and information (defined as data capable of having commercial value) in various forms.*
>
> * *Technology encompases developments brought about by the convergence of electronics, computing and telecommunications enabling information to be represented.*
>
> * *Implicit within information technology is the people component."*

During the literature survey conducted for the report on definitions, it was apparent that many books on IT did not contain a full explanation of the term anywhere within their covers. I believed the main reason was that it was easier to define what was meant by technology than by information. Those that had tended to fall into one or more of three categories: physical, functional, and social.

Physical definitions focussed on the convergence of telecommunications and computing (and sometimes electronics); for example, Rajan, 1987). However, in contrast to our statement, these usually concentrated on the technological aspects and not those of information, and often neglected the active role of people.

Functional definitions tended to focus on what the technology was capable of doing

(usually types of information and data capture methods), and often talked about 'systems' (Neate, 1988).

However, a functional approach would have been especially inadequate for the Project. Technology could have taken many different shapes and forms during the 5-10 year time horizon which was being explored. A functional definition would, therefore, have been a serious contraint.

In rejecting a functional perspective, I found a useful analogy in the driver of a car. The driver could not be defined simply in terms of that one skill, it being likely that they would possess a number of others, too, (not to mention their tacit skills and knowledge). This might equally apply to IT. Hence, to define IT in terms of specific capabilities, such as the 'acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information' would not only have been limiting but meaningless (Longley and Shain, 1985).

Social definitions were those that highlighted the people component. There were not many of these and it was this gap which we were trying to bridge with the third statement in the Project's definition. Although the Research Team definition was the result of group process compromise, it reassuringly indicated that the rest of the Team shared a people-oriented focus.

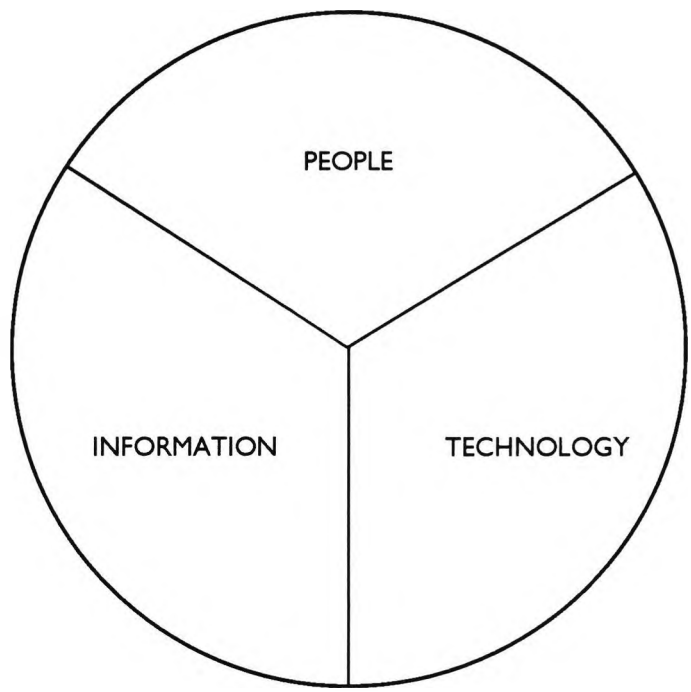
I was happy to work within this framework at the general level of joint and group exercises but, for the purposes of my PhD, I wished to produce something more specific and personal. I also felt the concept of information itself needed to be analysed further. Information technology was an enabler and a vehicle for carrying a message (c.f. semiology) which could be converted into information, yet how this took place within the context of IT was not mentioned.

In October 1989 I gave a presentation at a research seminar which went a long way towards addressing these concerns (Brooke, 1989b). At that time, my methodology was still under development, but the presentation highlighted two points which shaped my future direction:

a) Information was the product of social mediation, the result of an active process, a socially-constructed product. The introduction of technology into the production process did not negate my idea that information only existed if there was someone to mediate with it.

b) Humans, therefore, constituted an integral and critical part of information systems. They were actively implicated in the concept of information and passively implicated in the concept of technology.

A concise and symbolic representation of this argument is reproduced in Figure 10 and is based on a diagram taken from Gunton (1988).



ADAPTED FROM GUNTON, 1988

FIGURE 10: THE COMPONENTS OF INFORMATION TECHNOLOGY

[I later found it interesting to compare this Figure with Figure 2 on the process of plaiting the journeys within the thesis itself. I saw the Journey through Two Organisations as a focus on other people, the Journey through Post-Positivist Research as largely exploring the concept of information, and the Journey Through IT as learning about technology.]

The diagram was intended to stress not only that people were integral to the concept

of IT, but also that an examination of the relationship between the three components (PEOPLE, INFORMATION, TECHNOLOGY) indicated they were uniquely so.

This was done by exploring whether the concept of IT could exist without the presence of any one of the other three components. In order to demonstrate this, the model in Figure 10 was cut out of paper and the segments manipulated as described below.

First of all the TECHNOLOGY component was removed from the diagram. I argued that this scenario depicted a pre-technology era, where people produced information without the aid of technology.
Replacing TECHNOLOGY and removing instead INFORMATION I presented a scenario where people were associated directly with technology use but where the product of that usage was not information *per se*.

Finally, I replaced INFORMATION and removed PEOPLE. This had an interesting affect on the rest of the picture. The TECHNOLOGY component remained intact but, I argued, the INFORMATION component changed to that of DATA, highlighting that information could not exist without people.

As a product of social mediation, I believed information was fundamentally dependent upon the role of people. The people-information relationship was implicated in two main ways: at the design stage of IT (primarily a development life cycle), and at the subsequent user interfaces (data/information etc.) This was illustrated diagrammatically in Figure 11 and suggested IT was about transformations.

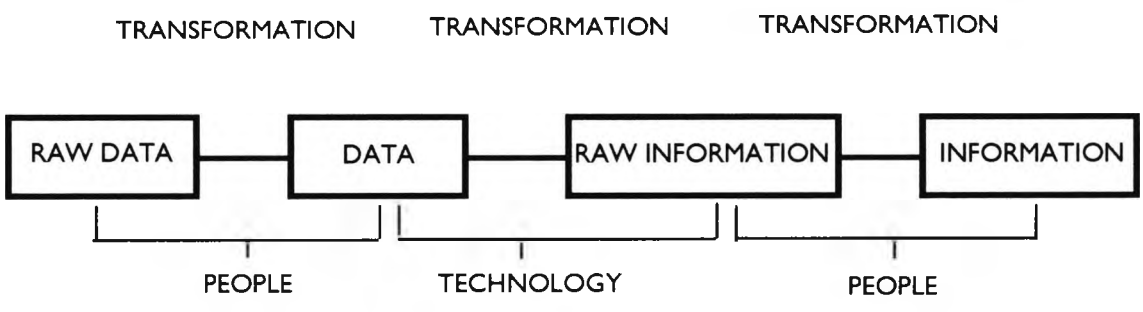


FIGURE 11: TRANSFORMATIONS

I realised, however, that some of the processes involved in this diagram might change over time, and between contexts, according to social and technological developments. I, therefore, offered it not as a static picture, but as a representation of the situation as I saw it at that time. I also used the term 'transformation' to imply a change of some kind. Examples of such changes are given further below.

In order to argue my case, I used an analogy from Systems Science, with which most of my audience were familiar: the Black Box model. Implicit within this model was the isomorphism between a Black Box and a computer (see Figure 12).

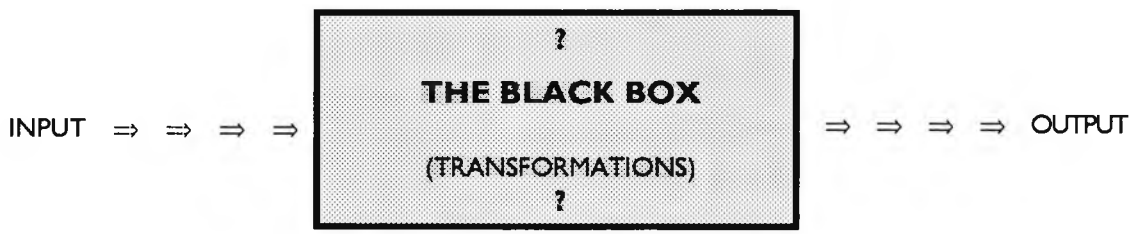


FIGURE 12: THE BLACK BOX

Crudely put, systems scientists argued that so long as we could observe what went in one end of the Box and came out the other, then we could produce models to represent what went on in the middle. I superimposed Figure 11 onto Figure 12 and noted that, once again, a transformation had taken place. The "?" in the Black Box had disappeared; in fact, it was no longer a Black Box at all (Figure 13). Why was this?

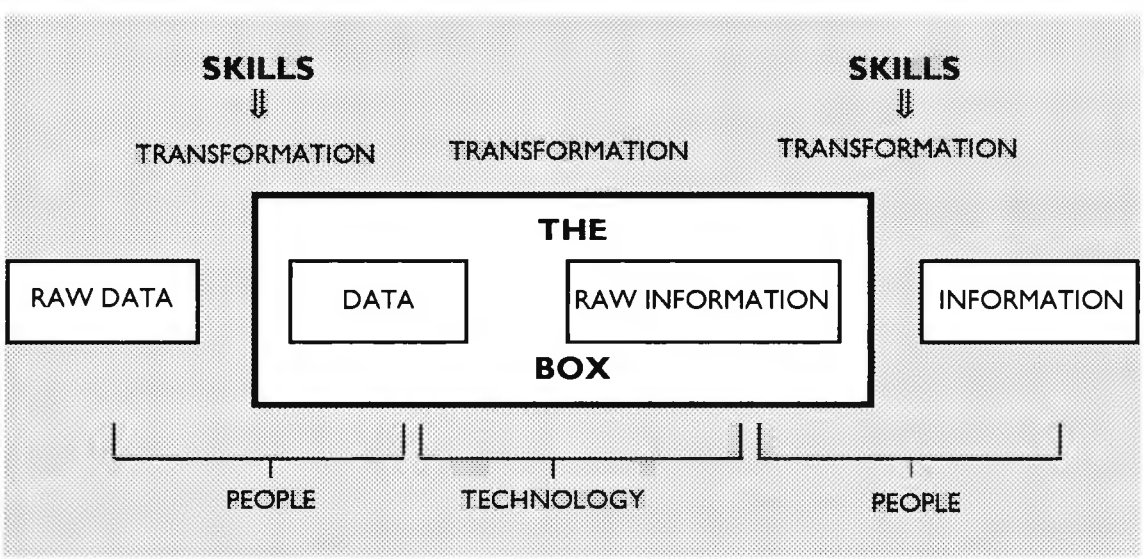
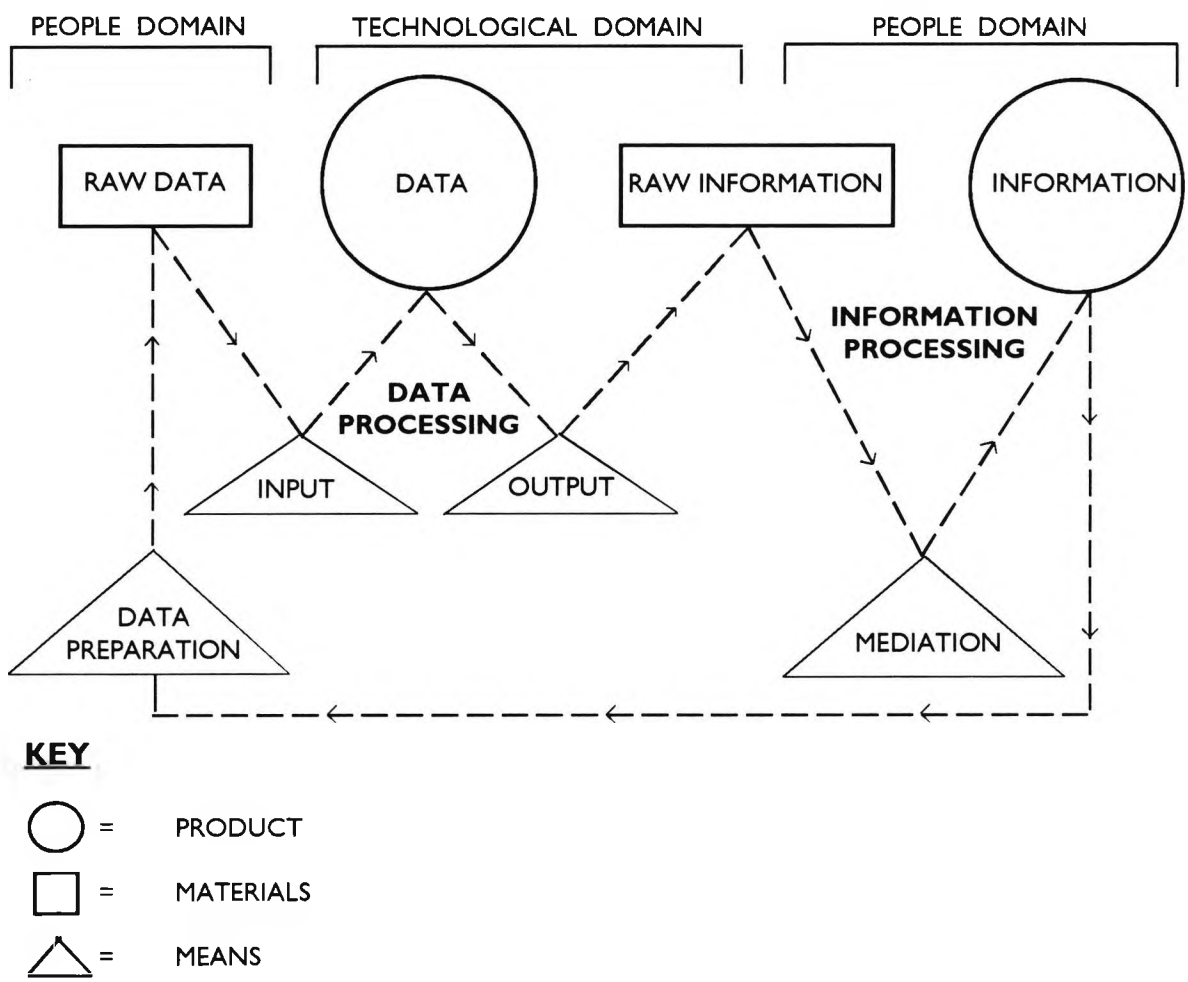


FIGURE 13: TRANSFORMING THE BLACK BOX

Within the area of IT, detailed knowledge had been recorded of the technology domain (largely Computer Science), and this knowledge was typically framed in scientific, positivistic terms. However, a corresponding databank had not been collected on the relationships outside of this. Yet Figure 13 suggested that this was precisely where IT skills would reside: on either side of the Box. Hence, the 'Black-ness' of the Box was pushed out to the people domain.

Rather than adopt a systems science approach and use the recorded knowledge of the technology domain to produce models about the people domain, I argued for a people-oriented perspective. I noted several major issues for consideration: the nature of the inter-relationship between people, information, and technology, the nature of the trans-formation processes (as represented in the Figures 11 and 13), and the location of skills within them. Figure 14 depicts the culmination of my presentation.



*CONSIDER WHAT ARE THE IMPLICATIONS OF THIS DIAGRAM FOR OUR UNDERSTANDING OF THE TERM **INFORMATION ENGINEERING**?*

FIGURE 14: THE NATURE OF THE TRANSFORMATIONS

The transformational processes identified in my diagrams included raw data, data, raw information, and information, although this was not intended to be a unilineal model.

I defined these processes by way of examples which I repeat below:

Example of Raw Data (material) into Data (product): Unstructured company accounts being entered through a keyboard (the means) by a person (therefore, a primary data source i.e. knowledge derived from our understanding of the world around us), and then being structured by the technology, to form a database, via a software application.

Data (product) into Raw Information (material): A printout or VDU display (means) of a company's financial performance over the last 5 years.

Raw Information (material) into Information (product): A person considering the financial performance of a company and deciding not to invest in it.

Figure 14 portrayed a cyclical process. This was reproduced during use of the technology. For example, a user may want to access some figures from a database. The relevant record is called up on screen (raw information). However, following examination (social mediation producing information) an error is discovered. The record is then updated (data entry) and stored back in the database (data).

A question which I was aware people might be asking themselves was 'could the technology generate its own materials and/or products, e.g. via on-line real-time processing?'.

At that time, the concept of technology generating its own raw data had not materialised. The technology was still fundamentally reliant upon human input for the origination of the materials with which they worked. Data and Raw Information constituted the technological domain on my diagram, so there was no dispute regarding the role of technology here.

With respect to Information, this directly referred back to the definition of information itself. According to my definition, unless something had been socially mediated, it was not information. Consequently, I did not regard anything that excluded the mediation of humans as information technology.

This perspective contrasted strongly with, for example, Stonier's definition which proposed that information was a physical entity which existed independently of humans and their ability to observe it (STONIER, T. (1990) "Information and the Internal Structure of the Universe", Springer-Verlag, London).

Some people believed that expert systems were designed to translate data into information on our behalf. In contrast, I argued that expert systems produced raw information only and that their commercial viability depended upon someone acting upon it (this was a more explicit version of the second point in the Project's agreed definition). Raw information was transformed into information once it had been socially mediated but this need not have been a physical act; i.e. it could have been a mental process.

I also argued that it was possible to delay mediation. I supported this view with the case of the 1988 Stock Market crash. The computers took a lot of the blame for triggering a downward spiral on share prices (although, of course, it was humans that had programmed them in the first place). However, it was not until the first person discovered what had been happening that any INFORMATION came into existence.

I set out four points to drive this point home and to reinforce the importance of people:

a) The word 'INFORM-ation':

   How do we become informed? By making sense of data through interacting or engaging with it (see quote at the start of this section).

b) Social mediation implies that some form of communication has taken place between the mediator and the mediated:

This is a key point since it is generally accepted that IT came into being with the convergence of telecommunications and computing technologies.

c) When we talk of information systems we are referring to systems that process data for PEOPLE to make use of i.e. to transform into information for productive use.

d) Without people, there would be no need for IT, no invention of IT and no drive to develop IT (so far as our understanding of the world exists).

I later read a succinct argument in relation to the development of IT which supported this last point in particular:

> *"* People - not systems - deliver services*
>
> * People - users - specify systems*
>
> * People deliver (or don't deliver) the benefits of systems investment*
>
> *With people so crucial, only a 'human centred' approach will do."*
>
> *(Hales and Simpson, 1990)*

The primary outcome of my argument took the user perspective even further. Technology could only process data, whereas people could process information. Strictly speaking, therefore, as applied to technology, the term information processing became a misnoma. People were the information processors.

I was also to discover that some of my theory concerning the nature of information was not entirely new to the IT area:

> *"It is said that we are now approaching, or are actually in, an information society. This is held to be so because we are said to have around us 'information systems'. Most of such systems I encounter could be better described as data systems. It is true that data suitably organised and acted upon may become information. Information absorbed, understood and applied by people may become knowledge. Knowledge frequently applied in a domain may become wisdom, and wisdom the basis for positive action."*
>
> *(Cooley, 1987)*

Another discussion which had similarities with my perspective was presented by Barrett (1989).

Barrett echoed the point I made in b) above and reminded me of my post-processual archaeological links. He referred to the handling of material by IT as the handling of text and this text as serving a communicative function between ourselves and others, or only with the self (op. cit. pxiii). In this latter respect, we both differed from the definition of information usually accorded to humanistic perspectives, whereby more than one person has to exist in order for there to be communication (Nurminen, 1988, p135).

Barrett argued that some form of language was being used to construct meaning in the IT context, and this meaning was communicated to others or to the self. He, therefore, regarded the text as a social construct. For Barrett, as for me, the use of IT implied the presence of, and a focus on people.

Not long after the seminar presentation (January, 1990) I decided to write something which could be circulated to academics in various countries who might be willing to comment on my research framework. One of the papers which I included in the mailing was a note on the definition of information technology. It added another two reasons for my human focus.

Firstly, I believed IT was people-driven. In addition to their role in the transformation processes outlined above, I found the nature of the IT 'industry' itself to be anchored in people. There was no SIC classification for IT as an industry, in fact. 'Information industry' might have been a more appropriate title in many cases. IT was fragmented under different sectors of industry, especially service sectors. The only unity observable within IT was located with the people themselves, with the role or the service; with those who were regarded as either constructive users or IT professionals.

Secondly, I argued that the concept of IT was not value free. In thinking about IT we brought to it our own assumptions about its potential to be beneficial or harmful. Such values were ascribed during implementation and use, by and within organisations, homes, and society in general. I believed this situation had given rise to two of the

schools of pessimism and optimism. These schools were characterised by opposing extreme views of the impact of IT in the workplace: 'upskilling' versus 'deskilling'. It seemed to be taken for granted that this was something which IT itself dictated rather than something about which management were empowered to decide.

I believed this scenario to be an abdication of responsibility for how IT was used, applied and controlled. I did not regard change as something which was done to people but, as something in which they played an active part. Processes of change could be negotiated at the organisational, mission statement level, long before they reached the 'workfloor', thereby introducing a more participative element.

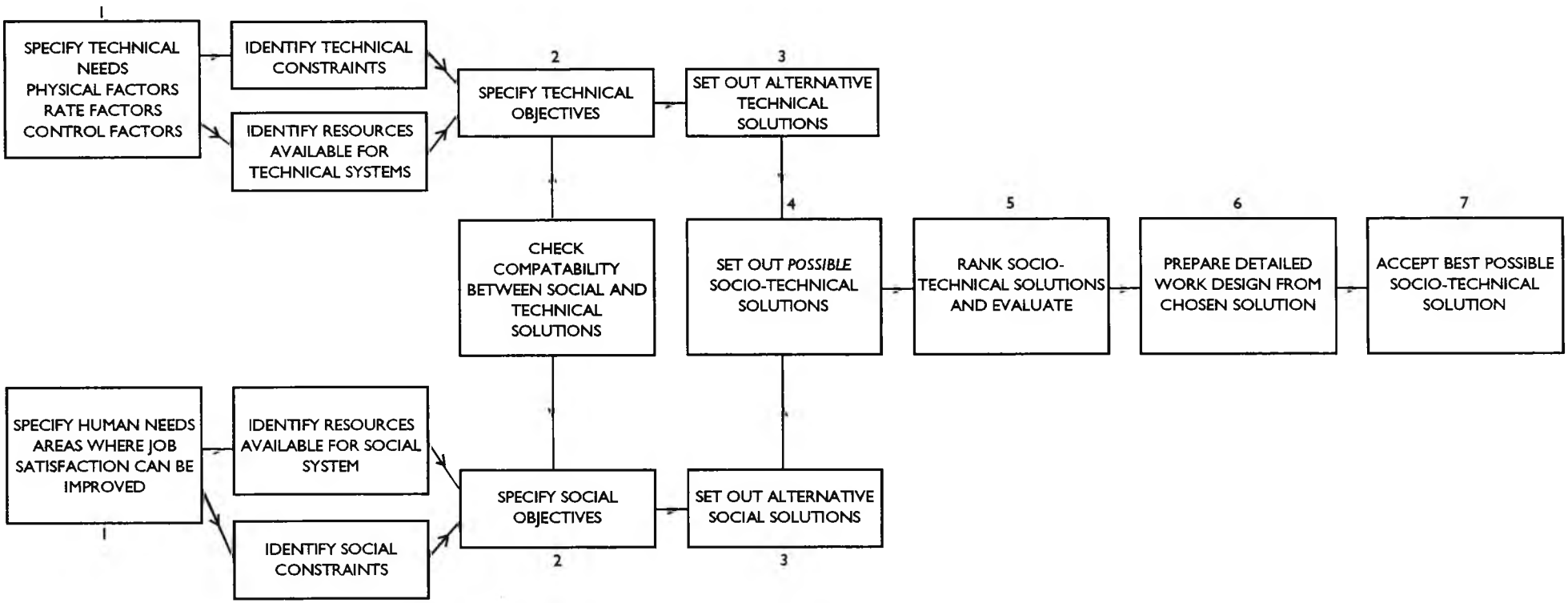
The DTI (1990) stated that:

> *"Participative methods take social and organisational requirements into account at an early stage in the development cycle. Users participate in analysing organisational requirements and in planning appropriate social and technical structures to support both individual and organisational needs.*
>
> *One of the best known of the participative methodologies is the 'effective technical and human implementation of computer systems' (better known as ETHICS) developed by Mumford. This analysis explores organisational issues, for example goals, values and sources of job satisfaction, as well as traditional information flows and key tasks."*

The ETHICS methodology is reproduced in Figure 15.

It is important to note that, although this represented a 'systemic' analysis, 'values' were included in the exercise. Hence, there was a move away from objective criteria to incorporate human, emotional and intellectual viewpoints. The existence of the publication from which I have quoted above, was itself an indication of a more recent growth in visibility of HCI/MMI research (human-computer interaction and man-machine interface).

One of the reasons for this may well have been related to the profit motive (the realisation that badly designed IT was not user-friendly, would not fulfil its purpose and,



TAKEN FROM: MUMFORD, 1979

FIGURE 15: THE ETHICS METHOD

therefore, had been and would continue to be a bad investment all round) rather than to altruism. Nevertheless, it provided the opportunity to promote user-centred design techniques. A key objective of user-centred design is to put the user's needs above technical considerations and to discover, and adequately provide for, the social, technical and organisational user support which will be required (c.f. the pluralist/relativist view). This is particularly important since one of the most significant features of IT as its potential to magnify and reinforce the best and the worse features of a business.

This latter point, in particular, highlighted one of the major implications of adopting a user-centred/participative perspective to IT development: it shifted the focus of responsibility away from the technology itself to the arena of employer ethos and all the ethical issues that might be involved. I came to appreciate, therefore, that IT could pose a significant threat to an organisation's status quo. The fact that British management was stereotypically conservative, short-termist, and risk averse mitigated against the participative approach being adopted for fear of the deep structural and attitudinal revisions it might bring (the Findings and the final chapter incorporate discussion of these issues).

In all respects, then, I found social and people issues to be integral to a study of IT, and concluded action was required in two broad areas:

1) A re-focussing of research to take account of the human element.

   There was a trend in IT and business towards 'end user' concerns (end user being an inadequate term, since the user was obviously involved on both sides of the transformation processes as illustrated in Figure 14); the phrase 'user friendly' gained in significance, for example. Initially these concerns may have been triggered by poor investment returns from IT and a so-called 'skills crisis'. However, I believed (optimistically) that they were also part of a much more general consciousness-raising in relation to the key role of people in IT.

2) A new approach to research methodology - or, at least, uncommon, in terms of organisational research on IT.

Adopting a user-centred perspective in the practical areas of IT development and implementation was not enough. There would have to be a concomitant change in the research methodology to focus on the role of individuals. It would also take account of the role of ethics, as well as considering how the dominant management (organisational) ethos influenced the perceptions and development of IT, and IT workers.

3) THE NATURE OF ORGANISATIONAL STUDIES

During the earlier part of the Project, three stages of investigation had taken place which, in chronological order, reviewed: models in the literature for studying IT; existing definitions of IT; and models for analysing skills and roles within organisations.

It was decided by the Team that the output from the first of these investigations was inappropriate to our work. The second study has been referred to already. The third is considered briefly here, because it relates to my own PhD methodology.

In November 1989 I produced a report for the Team which summarised the approaches identified in the literature for studying skills and roles within organisations (Brooke, 1989c).

It was thought that this exercise would be a fairly homogenous one. In fact, it transpired that roles were usually dealt with at a higher, more generalised, level in the literature than skills. Therefore, the two areas were examined separately.

The most common approach to both was functional. The Team decided that there were a number of pitfalls to this, including the tendency for functional models to reflect current situations, and that this might present a problem in the light of the dynamic, changing environments which we were studying. The conclusion was that no one particular type of model would satisfy the on-going needs of the Project so that a more flexible approach would be required.

Perhaps the most significant outcome of the report was that the Team expressed concern regarding the profile of people within IT studies. When models (of either skills or roles) were found to be inappropriate, it was largely due either to a neglect/under-emphasis of the individual, or a failure to provide a sufficiently flexible framework within which to study the expected changes in occupational and organisational structures. Concern for the individual extended also to end users.

The conclusion was that, whatever strategy was adopted by the whole Project, it would "inevitably be a trade off between the need for flexibility and the desire for absolute precision" (page 28). This comment clearly did not fit with my later work, in the sense that 'absolute precision' was not a viable concept within a subjectivist philosophy. This is another example of how my perspective changed.

Although my colleagues retained the option of applying model-building to their later work (following completion of Delphi, Business Survey, and Scenario-building exercises), I did not feel model-building was appropriate to my PhD strategy. The closest I came was using metaphors as a means of constructing meaning from my data (plus, some diagrams to illustrate points I made in my reports to the sponsors - see Findings chapter). Therefore, although I remained aware of the work which had been conducted on organisational skills and roles, I did not consciously transfer any of it into my own. Nevertheless, the review of models had been useful, if only to re-inforce the need for a more humanistic angle.

The IT Skills Project was set up to investigate the IT skill needs of organisations over the ensuing 5-10 years. For my part, I believed this would mean working closely with individuals in the organisations, talking to them about their work, asking for their visions of the future, and trying to place these within the context of their own workplace experiences. Thus, by the very nature of the task, the human element would assume prime importance.

An aspect of the work which had direct links with my previous archaeological studies was that of CULTURE.

At Cambridge, I had focussed on the interpretation of (usually) 'dead' material cultures. Now I was to experience working with 'living' cultures. It, therefore, seemed even more important to ensure that my methodology would give attention to the non-material, non-quantifiable, and individualistic aspects of those cultures.

There was a large amount of literature on the subject of organisational culture. My research boundaries did not permit the time to familiarise myself with this in any depth, except where it informed my methodology (for instance, the role of symbolism). However, shortly after my research seminar presentation, I discovered a brave and useful attempt at a definition of organisational culture content (Brown, 1990). It listed the following:

- Rites, rituals and ceremonies
- Leaders and heroes
- Legends, myths and stories
- Symbols and symbolic activity
- Language
- Physical setting
- Artifacts
- Beliefs and values (including ideas, attitudes and aspirations)

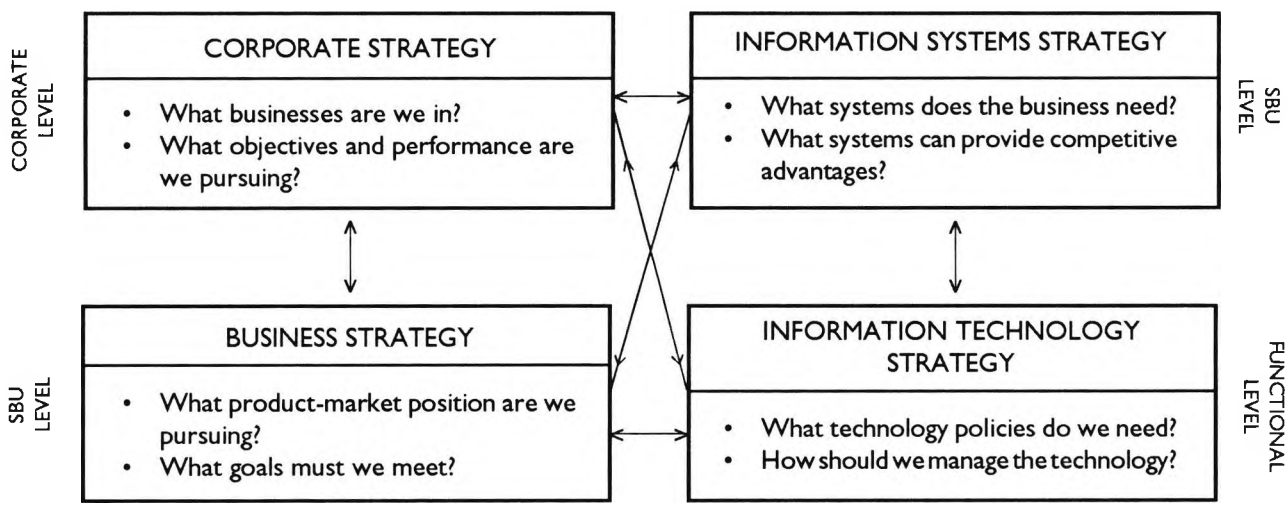
[My emphases]

This list of contents resonated with my previous work in archaeology and re-affirmed my belief that the PhD research should build upon that foundation.

As mentioned earlier, my survey of the literature to date revealed that existing research had often sprung from a positivist philosophy. Much of it had adopted a systems approach, was technologically determinist, and was based on the 'traditional' scientific management paradigm. An example was a book edited by Michael Earl called "Information Management: the Strategic Dimension" (Earl, 1988).

Figure 16 shows the strategic model for IT which appeared on the front cover of this book. It captures the tone of the book well; objectified knowledge, generalised systems model-building, and a focus on technology-driven 'progress' at the expense of a focus on the role of individuals. Indeed, an almost assumed referent point for many texts of this type was that a strategic overview was required of the business which, by definition, excluded a focus on the 'lower level' of individuals. (This point also recalled objections to the review of skills and roles models.)

Without re-hashing all the previous objections I have made to the neglect of individuals, it is interesting to note that, nowhere on this diagram was training mentioned. I believed training to be a crucial factor in all of the areas it showed. The fact that the UK had an internationally poor reputation for training its workforce, was a direct reflection of the low value which it put on its people. I felt that this was responsible for many of the problems experienced by businesses introducing IT into the workplace; and the PhD Findings appeared to bear this out.



TAKEN FROM EARL, 1988

FIGURE 16: INFORMATION MANAGEMENT: THE STRATEGIC DIMENSION

I also noted with interest a comment by Prasad (1990) which reflected my belief that IT was neither inherently good nor bad, and which made reference to training:

> *"[The research paper is].... rejecting both positive and dehumanising theories as being too simplistic, and suggesting instead that modes of accommodation are integral to the framing and development of experience. In the process, it also suggests that a hermeneutical understanding of work computerisation can offer new directions for the practice of organisation research.*
>
> *First of all, if 'defining' technology is so crucial to people's eventual experience of it, we need to pay more attention to the processes whereby computer technology is defined in organisations. This would suggest that we no longer see training programmes as situations where a mere transfer of technical expertise takes place, but as significant domains of meaning creation."*

It was with renewed conviction that I declared my motive for adopting an 'alternative' approach, which gave more visibility to people and their needs (including training), and to the concept of information as a social product, as well as avoiding the pre-assumed values of technological determinism.

ROUTE MAPS AND SIGNPOSTS:

SIMILARITY AND DIFFERENCE

In this fourth and final stage of my theory journey, I crystallised how my usage of contextualism and symbolism (and, as part of that, metaphor) compared with previous works. I found a number of similarities, largely in relation to the importance accorded to the role of people and subjectivity in constructing meaning. However, most of the research had been framed in more positivistic terms than I was prepared to embrace, primarily in their attempts to make generalisable statements.

Finally, I reviewed the concept of Action Research, which had been adopted by the IT Skills Project. I identified in several ways with the published accounts but, again, found it was presented as an 'alternative' way of conducting scientific (positivist) research. Since my belief was that reality was polysemous (had many possible meanings) and that it was created and re-created by each individual on a moment-by-moment basis, I did not feel that my work could be sub-sumed beneath the value-laden label of 'science'.

SIMILARITY AND DIFFERENCE

JOURNEY THROUGH POST-PROCESSUAL RESEARCH: STAGE FOUR

An important stage in my Journey Through Post-Processual Research involved discovering to what extent my understanding and application of research methods (especially symbolism and contextualism) were borne out by the organisational/IT literature. This not only helped to establish to what extent my approach was novel, but also to clarify my beliefs and values.

SYMBOLISM

As was the case with archaeology (see Stage Two), the organisational literature suggested that the concept of symbolism had been applied within positivist and processual
frameworks, and was by no means a new idea.

Frischknecht and Gigch (1989), for instance, were self-confessed realists believing in a "natural, causal, continuous, parallel, and analog influence of object on subject". They suggested that the information revolution had produced a more idealist view where a representation of the world was computed by the mind resulting in an artificial, intentional, discrete, serial, and digital relation between subject and object, called 'information processing'. They further argued that the tripartite concept of information- system-processing could be detected at the core of every discipline, and aimed to demonstrate, thereby, that 'systematization' was a universality. It was in this context that they identified symbolism:

> *"Today, informatics, computer science, systems theory, artificial intelligence, and cognitive science give similar accounts of symbolic phenomena in terms of the structural equivalence between object and subject. This structural equivalence is mediated by symbol systems which span a double relationship with represented objects, on one hand, and with processing subjects, on the other... In philosophy the term 'object' may designate anything real or ideal carrying INFORMATION, i.e., meaning. On the other hand,*

> *the term 'subject' generally represents any natural or artificial entity (e.g. cells, organs, institutions, computers) capable of PROCESSING, i.e. manipulation. The term 'symbol' refers to the SYSTEM mediating between object and subject, i.e., the common structure relating meaning and manipulation."*
>
> *(op. cit. p240)*

Hence, symbolism was part of a systemic theory. They declared their focus of interest to be the theoretical triad information-system-processing, and to be neither the subjects nor the objects themselves.

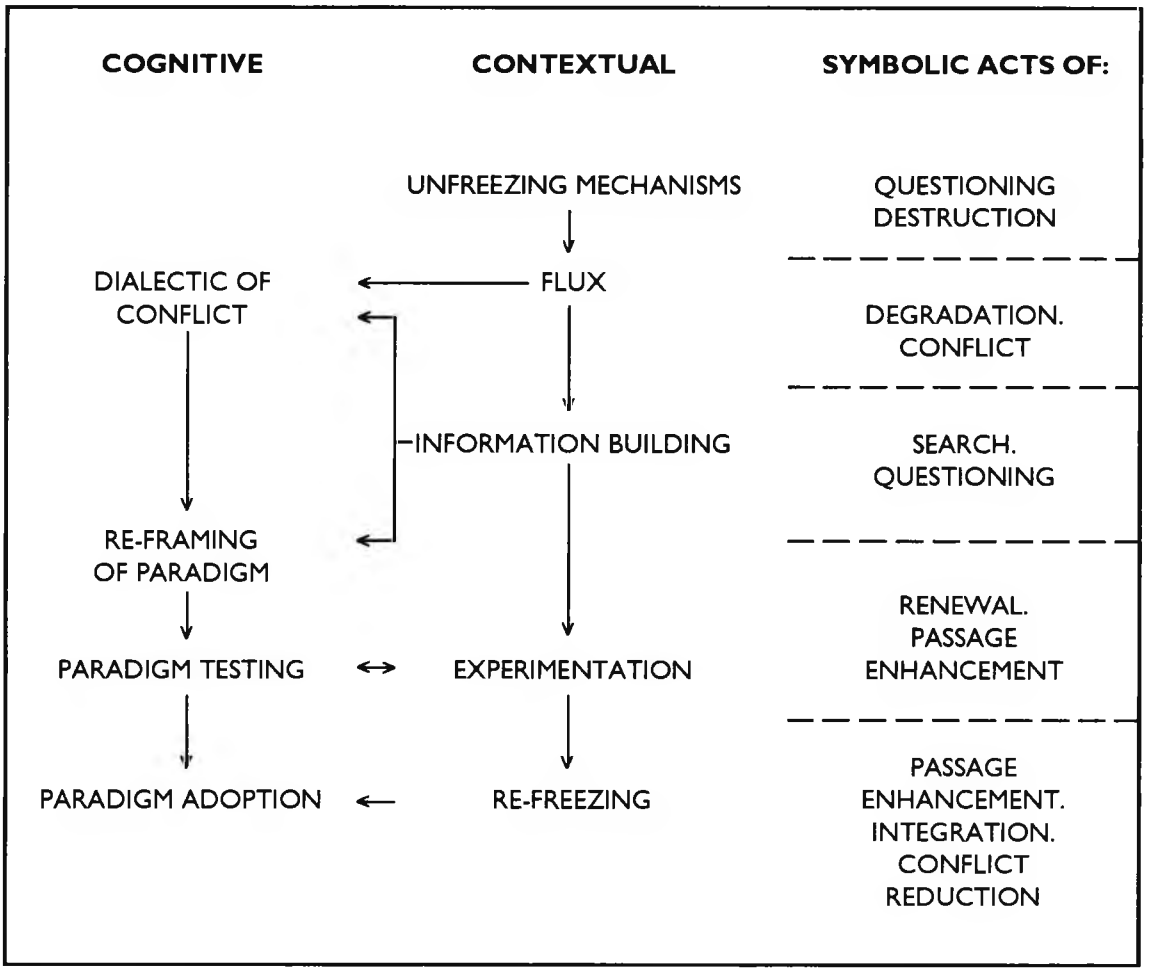
This approach differed from my own in several fundamental ways: the separation of subject and object, the systemic framework, the dis-interest in the subject (in my case, individuals). My task became to review the literature with the aim of identifying any links with my own post-processual perspective.

In this respect, a paper by Gerry Johnson (1990) proved to be an interesting discussion of the contribution which 'alternative' research methodologies could make to an understanding of strategic change within organisations. He acknowledged the role of traditional positivist methodologies, but commented:

> *"However, the field also calls for a wider range of methodological options to be considered... The study of symbolic action could also usefully be accompanied by a move into interpretative fields hitherto little espoused by management researchers. There have been attempts to understand aspects of strategy through textual analysis. However, few have gone beyond this to employ, for example, semiotic analysis, though Fiol (1990) argues that such an approach 'allows the analyst to reach below the immediately perceptible surface of a text towards hidden patterns and themes'... The point is that the methodologies of value... could benefit by not being constrained by the traditional methodologies of the researcher into strategic management."*
>
> *(op. cit. pp196-197)*

In particular, he pointed to a "lack of contextual and strategic specificity" in most existing research.

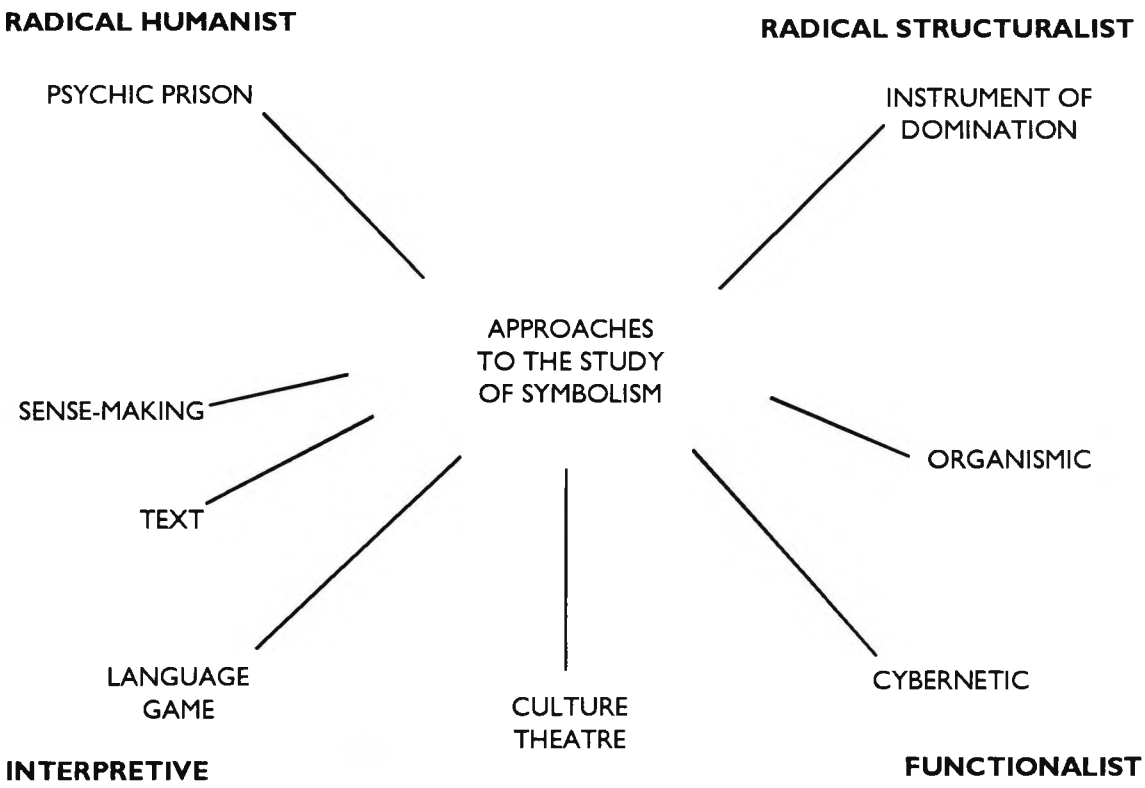
Johnson's discussion contrasted in one important way with my own work, however. He adopted a processual focus for his models of understanding, seeing symbolism as a way of explaining and delineating processes of change, rather than as an interpretative tool for the researcher. His ideas were illustrated in a diagram, reproduced as Figure 17.



BASED ON JOHNSON, 1990

FIGURE 17: CONTEXTUAL AND COGNITIVE STEPS IN ORGANISATIONAL RE-LEARNING

In "Organisational Symbolism" (Pondy et al, 1983) the editors outlined four main ways in which they perceived symbolism was applied in the literature: functionalism, interpretivism, radical humanism, and radical structuralism. This is shown in Figure 18 (compare to Figure 3).



BASED ON PONDY ET AL, 1983

FIGURE 18: PARADIGMS AND METAPHORS: SOME POSSIBLE APPROACHES TO THE STUDY OF ORGANISATIONAL SYMBOLISM

Each of these approaches accorded a different metaphorical state to symbols. In functionalism, symbols were carriers of information and meaning which functioned to maintain social order. Radical humanism viewed symbols as a medium for the enactment of individual reality and as being oppressive and alienating. Radical structuralism saw symbols as the manipulative and controlling tool of the elite which suppressed social change and masked inherent contradictions. In interpretivism, symbols were how people made sense of the world, and it was the processes by which this occurred that were of central concern.

It was clear that my theoretical beliefs were not in line with functionalism. On the other hand, humanist and structuralist radicals both appeared to accord a pessimistic role for individuals acting within the world and, to some extent, their beliefs echoed those of a marxist philosophy. My approach saw much more autonomy for the individual. In this sense, I had more in common with interpretivism, and noted its links with phenomenology (action was always symbolic) and symbolic interactionism (how action was made meaningful).

Like interpretivism, I accorded a fundamental role for symbols in the sense-making process. Mangham (1979) described the situation as I perceived it:

> *"Since we can only understand the world in terms of the symbols we create and since everything in the world is symbolically mediated, it follows that others may perceive the world differently (in terms of their own cultural or sub-cultural symbols or invented categories) and that access to the perceptions of others may cause us to modify our own perceptions."*
>
> *(op. cit. p27.)*

Looking at Figure 18, I could see that the interpretivist references to text, language, and sense-making were more in accord with my values. However, I had some reservations about its processual focus. My aim was not, like Johnson's, to produce a generalised model of how individuals made sense of their world but to employ symbolism as a personal tool and a means of uncovering potential meaning within unique contexts.

I concluded that the main difference between my approach and interpretivism was the level of generalisation which we claimed for our end products. My claims were at a more specific level; and, therefore, my validity criteria were different (see the chapter on Conclusions and Recommendations). The end product of my research would apply at two levels: pragmatics and methodology. The first would relate to findings which could be implemented by the individuals in context, and which would be specific and meaningful only to those individuals in context. The second would relate to a method of conducting research and would be transferrable across contexts.

I was also interested to note Prasad's reference to symbolism in the context of the pessimistic and optimistic schools of IT; which were mentioned in a previous section (Prasad, 1990).

He believed that these two positions arose out of a focus on the material and tangible aspects of IT, ignoring the domains of symbolic and subjective experience. Unless this situation were rectified, he argued, the opposing groups would continue along their present courses, painting positive versus negative pictures of IT. This discussion

of the role of the subjective domain compounded my belief concerning IT as a socially value-laden product and as, therefore, neither pre-determinedly good nor bad.

METAPHOR AND METONYMY

I found it helpful to consider the differences between research methods in respect of their use of metaphor because it alerted me to its role in my own work.

Morgan (1986) reminded me that terms like 'system' and 'culture' were all metaphors in their own right. I had adopted metaphors in my research in several ways: theoretically ('reality' as a world of personalised symbols), methodologically (symbolism and metaphor as means of making sense of the data), and literally (the journey metaphor as a means of recounting the research). Therefore, I had to address the question of why I had accepted some metaphors (including culture) and rejected others (e.g. systems).

My reasons were rooted in an earlier stage of the theory journey (Stage Two). The systems metaphor suggested to me all the baggage that I associated with positivist, scientific, objectivist paradigms of inquiry, whereas culture re-affirmed my archaeological and anthropological background. Culture had been investigated by both processualists and post-processualists within an archaeological framework, but the systems model had been found inappropriate by the latter.

This mental exercise also led me to to re-assess systems theory in the light of 'softer' systems metaphors; in particular, those presented by Checkland (1984). His work resembled efforts in processual archaeology to develop more open and soft systems models (e.g. Renfrew, 1984).

Some of the more obvious ways in which Checkland's systems methodology differed from those I had previously encountered included:

- no single (testable) account of a human activity system, only a set of possible accounts all valid according to a particular *Weltanschauungen* (which means 'philosophy of life')

- a model of social reality that was phenomenological in its nature

- an acknowledgement of the role of values in scientific research

Despite recognising that there was no "once-and-for-all substantive account of social reality", the soft systems approach was still founded on the scientific bedrock of "rationality applied to the findings of experience", and a realist ontology (an external world independent of us). For this reason, the focus for the research was on method and process rather than on findings and content. Once again, I found myself disagreeing both on philosophical grounds and in terms of the prime importance which I accorded to individuals (and, therefore, the findings and their content).

Wittig's semiotic exploration of the metaphor of text as applied in computing (Wittig, 1978) was informative in underlining ways in which such 'traditional' research methods had proved to be inadequate in their focus.

I was disappointed that her plea had not been taken up more noticeably by academics. She claimed that computer-based criticism was:

> *"... directed to the message itself, cutting off from consideration the larger context of the literary communication, the larger context of the signifying act... Indeed, this focus is so sharply delimited that it can be said to virtually ignore the sign as a component in the signifying process and to concentrate instead on the features of the signal and the signal system... ... each receiver... organises the text out of their own system of values ... The text, then, becomes the projection of their individual ordering processes: their reconstruction of the received signal, their act of signification, their foregrounding processes. It becomes meaningless, then, to talk of the text, autonomously, as signal; we can speak only of the reader's act of achieving signification."*
>
> *(op. cit. p214, Wittig's emphases)*

Although Witting placed her own arguments within an objective, scientific frame of reference, they highlighted for me the contribution which alternative, text-based methodologies could bring to the realm of information technology, particularly in balancing the technological focus with the human. It also served to re-inforce my beliefs in the socially mediated nature of information (see Stage Three).

I gained a deeper understanding of my own use of metaphor when I read a paper by Bourgeois and Pinder (1983).

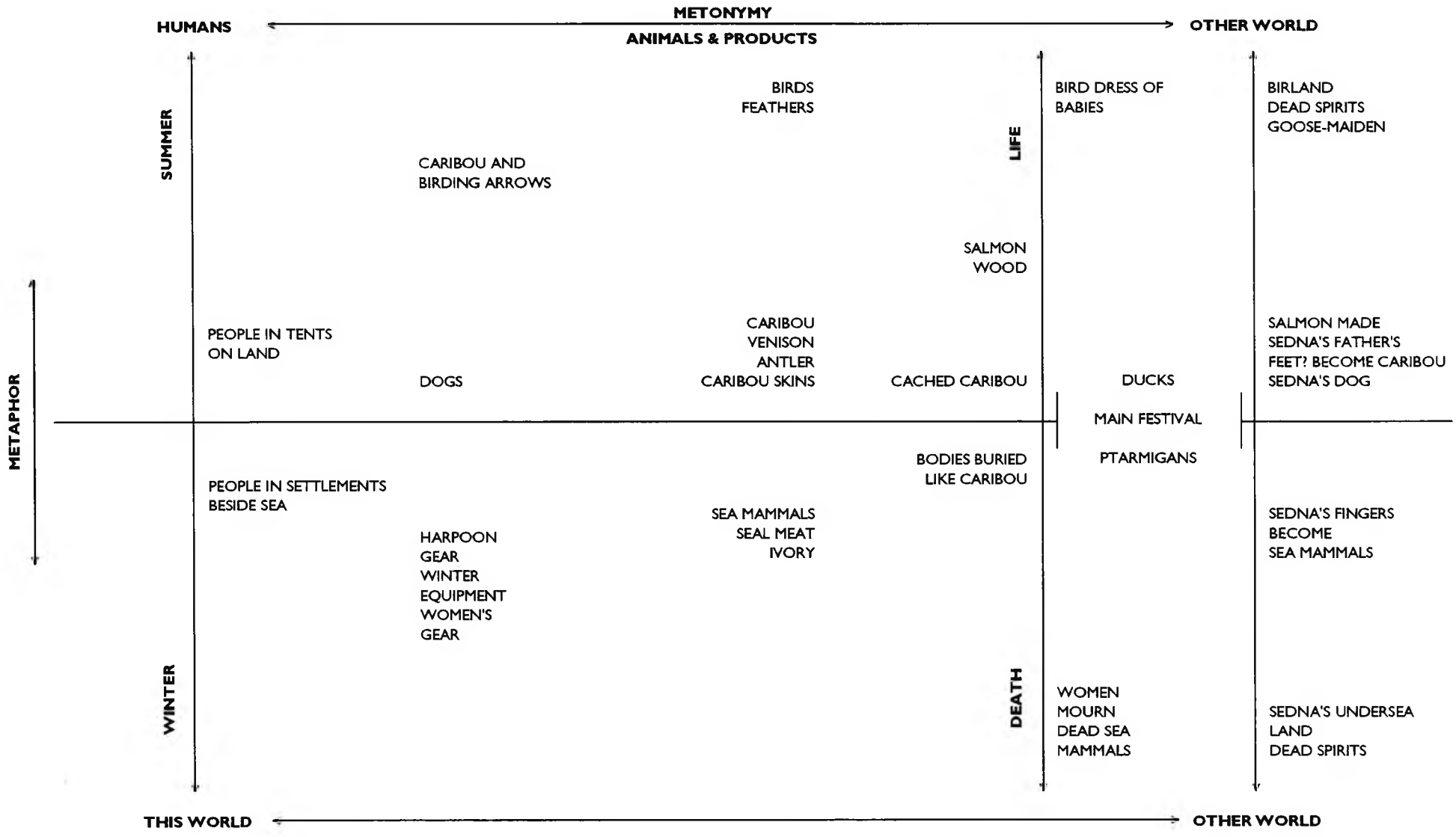
This paper referred to the metonymical aspects of metaphor; that is, their ambiguity of reference. Some applications of metaphor (such as that by Bourgeois and Pinder) sought to avoid such ambiguity, aiming instead to "develop precise literal terminology - a lexicon based on operational definitions" (op. cit. p612). This contrasted with the post-structuralist notion of polysemy and the inevitable plurality of meaning involved in the interpretative process (see Stage Two). As Morgan pointed out, this difference resulted from two ways of applying metaphor: as a mere textual embellishment or as a form of experience through which humans made sense of the world (Morgan, 1983). I felt more comfortable with the second mode of usage.

Morgan went on to distinguish between metaphor and metonymy by saying that metaphor prepared the area for study through
metonymy. Barley (1983) expanded this to:

> *"... metonymical signification occurs when expression and content are both part of the same domain or context, whereas metaphorical signification mixes domains or contexts."*

A practical archaeological/historical example of the use of metaphor and metonymy is represented in Figure 19 (Pearce, 1989).

Sackmann (1989) stated that the use of metaphors could have a powerful role in organisational change. This was partly because they evoked story-like images; stories having a stronger affect on people than 'facts' alone (op. cit. p482). This seemed to fit with my own method of inquiry, especially in terms of how I expressed it on paper.



TAKEN FROM PEARCE, 1989

FIGURE 19: METAPHOR AND METONYMY

I did not believe the power of metaphor was restricted to organisational life, however. Its pervasiveness was expressed by Mangham and Overington (1987) in their term 'metaphorical framing'. They maintained that all experience was metaphorical in that every moment was experienced in terms of something that had gone before; thus, new experience drew upon past activity as part of the sense-making process.

Within the organisational context, Sackmann distinguished between two types of metaphor: 'targeted' and 'adaptive'. Targeted metaphors were cybernetic in nature (e.g. 'engineering') and suited to situations with a deterministic outcome. Adaptive metaphors (e.g. 'gardening') were more flexible and suited to contexts where end goals were unclear.

I identified the subject matter of the IT Skills Project as being in the latter category. This was another justification, then, for my rejection of the cybernetic-oriented systems metaphor.

I also noted with interest that she espoused ethical conduct as a pre-requisite for the use of metaphors in organisational research (Sackmann, 1989, p483). The reasoning behind this was that the ambiguity of metaphors (metonymical potentiality) could lead to deliberate deception on the part of management. This latter point would no doubt have been assumed in a radical structuralist treatment. I, like Sackmann, regarded it as plausibly avoidable within a collaborative and mutually trusting research relationship, but I also added to this the potential for the researcher to deceive. In so doing, increased the importance of making values and beliefs explicit throughout the whole research process.

CONTEXTUALISM AND GROUNDED THEORY

Contextualism, like symbolism, was approached in at least two different ways in the organisational literature, according to whether or not the research pursued the 'scientific' aim of producing generalisable statements. Within the latter framework, contextualism referred to an approach which recognised the importance of particular contexts but, nonetheless, abstracted data to a 'general' level and suggested its wider applicability.

Pettigrew (1985) used a contextual method in conducting a processual study of organisational change. Clearly, as a post-processualist (see Stage Two) I could not claim to share his application of the term.

Pettigrew quoted Pepper (1942) when he said:

> *"Contextualism is concerned with the event in its setting; the truth theory has to be qualitative confirmation since the context will change and knowledge will need to change also, and the root metaphor is the historic event."*

In making the latter reference to metaphor, Pepper was emphasising that contextual knowledge is specific to the timing of the research and cannot be extrapolated chronologically. Nevertheless, Pettigrew (1985, p69) said generalisations could be made:

> *"...where multiple case studies are used [together with] contextualism as a mode of analysis, i.e. by seeking to relate variability in context to constancy in process or outcome, then generalisations in terms of propositions may follow."*

Although my own research highlighted similarities between the two organisations where I conducted my field work, I detected a distinction between this definition of contextualism and my own. Pettigrew's focus was on the ability to make generalised statements, whereas mine was on the specific features in context which gave rise to a particular situation. Hence, I argued similarity in outcome should not detract from variability in context. I did not attempt to make propositions as such, only personal observations in relation to individual's experiences as interpreted by me, and the potential consequences of certain recruitment policies, etc.

Furthermore, Pettigrew's unit of study was not the individual but the process (hence, his processualism). For him, one of the major questions of the research was:

> *"Are the social mechanisms operating to guide, develop, and alter the processes under analysis clearly specified and empirically established?"*
>
> *(op. cit., p75.)*

This processual focus was illustrated in his discussion of the components of analysis as: context, process, and outcome. Context was divided into two: inner and outer, and a decision had to be made by the researcher as to how much of the outer context should be included in the study. This suggested a systemic model. Process could be e.g. decision-making. Outcome referred to observable effects. The process under study was traced across the different contexts and its variability within and between each one assessed; the final question being what were the relationships between variability in context, process and outcome?

A use of contextualism which was more closely allied to mine appeared in the DTI Guide to Usability (1990). Here, 'contextual inquiry' was described as an approach to evaluating IT and problems experienced by its users, where users and researchers worked collaboratively in a partnership of equality. Key to this method was the 'contextual interview', the contents of which were analysed collaboratively by both researcher and user.

In my own research, I avoided use of the word 'interview' because of its connotations of control on the part of the interviewer (see Journey Through Two Organisations). However, analysis of the content was not done with direct input by the participants; this only occurred at the point when the presentation and feedback sessions took place.

The DTI argued that collaborative methods would increase as a result of the changing nature of technology such as multimedia systems and collaborative/shared working practices. This was an interesting argument and could be more persuasive than theoretical ones for positivist researchers assessing the contribution of collaborative frameworks.

Whilst I was still refining my contextual approach in the IT field, several colleagues advised me to explore grounded theory, since they thought it had a number of similarities. The exercise (January 1990) proved to be very useful and helped me to crystallise my ideas. What follows, therefore, has a dual purpose: to illustrate what I meant by contextualism and to show to what extent it had links with the established principles of grounded theory.

I defined contextualism as: a theoretical framework formed by the unique features of a context, whose inter-relationships could be identified as recurrent patterning, the patterns or relationships forming the strength of argument for a particular contextual interpretation.

Grounded theory is usually associated with the work of Glaser and Strauss (1967). They portrayed the method as essentially inductive (Archer, 1988). Rather than analyse their account, I decided to consult some more recent descriptions of the application of grounded theory.

I found Martin and Turner's paper (Martin and Turner, 1986) to be a helpful overview with which to compare my definition of contextualism. It revealed that, whilst there were many points of similarity and difference, it was not a question of how many, but how deep? I found the differences to be more fundamental than many of the similarities.

According to them:

> *"Grounded theory is an inductive, theory discovery methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data."*

Grounded theory was presented as particularly appropriate for case study and action research, both descriptions of which could have been applied to my own work.

There were numerous other similarities, too, not least its inductive and qualitative approach. Its inductive qualities were reflected in the fact that relationships between the data formed the theory resulting from the field work rather than vice versa. Mainly for this reason, data collection took an unstructured and unpredictable form. This latter point was particularly evident in my research and is reported in the Journey Through Two Organisations. Similarly, the process of building up ideas concerning the data was not regarded as a neat or coherent exercise, but as a non-linear, iterative process. Complexity of the data and attention to detail was emphasised.

Grounded theory accepted that the preconceptions of the researcher could not be put aside during the research process. Nevertheless, it exhorted an attempt not to adopt pre-assumed interpretations based on material previously read and referred to the researcher's biases as 'imperfections'. I accepted the first notion to a point, but believed that, since it was impossible to eliminate all prior influences on knowledge acquisition, it was more honest to be explicit about them. As for the second notion, I did not regard bias as a flaw. Indeed, I celebrated its role in my sense-making. (I noted with irony the authors' comment that being explicit was something which grounded theorists self-confessedly lacked.)

The research framework of grounded theory stressed the importance of recording the order in which ideas and interpretations arose. Again, this was an approach which I adopted, using a notebook to record my thoughts and events as I perceived them during the field work. It also reflected my feelings concerning the need to be explicit about the 'topic' for research and the methodology to be used. However, it was implicit that this applied at the academic level, rather than at the level of those who formed the basis of the study. There was no discussion of the role of 'co-researchers', for example.

The researcher was encouraged to maintain an open mind and a variety of options with regard to the interpretation of incidents. Grounded theory warned against the over-enthusiastic labelling and classification of data. Nevertheless, the objective of classification suggested to me that pre-conceived notions were being applied. Therefore, it contradicted the earlier stated aim of avoiding previous influences.

Contradictions in the data were expected since they existed in notions of 'reality' itself. Note-taking would resemble story-telling and, thus, interpretations would be free-flowing. However, it was not clear how this could be reconciled with its objective of rigour in the handling and interpretation of data.

Perhaps the most obvious link between grounded theory and my own approach was the importance of context to the interpretative process. The context of the study must be fully described and common traits between incidents identified therein. (I added

to this the caveat 'as far as possible', since 'fully' was a value-laden criterion and probably unachievable.)

This is where difference was most noticeable. Grounded theory saw contextual completeness as a possibility. It also claimed that by increasing the number of contexts studied, the number of concepts relevant to form a theory would be reduced. The discovery of additional incidents gave meaning to the researcher's concepts rather than that the discovery (of symbolic interpretation) gave meaning to the data. Leading from this was the assumption that theory was generalisable and applicable to other contexts, rather than that traits would be unique to a particular context.

This point seemed to contradict the inductiveness of the approach - that the data formed the theory and not the other way around. If the data formed the theory once, why not for all other contexts? What made the other contexts less worthy that they should be subjected to the generalised theory of another?

This generalisability led to a situation whereby 'quality' of results took precedence over the method of analysis. This explained in part why some grounded theorists were said not to be as explicit about their methods as their paradigm exhorted. It also resulted in a move away from a focus on individuals towards roles, generalising along the way, rather than seeing value in individuals themselves and emphasising the importance of understanding them for role-playing and future developments. Data collection followed an hierarchical format - working from the specific (low level) to the general (high level).

It was surely not unique to grounded theory that it identified useful ideas for further research and development. However, it also claimed to achieve this in the form of encouraging alternative interpretations and scenarios. This accorded with my own beliefs about multiple realities and polysemy. Some researchers would consider this a weakness of the theory, seeing it as a way of avoiding making any concrete or refutable statements. In contrast, I felt that it set itself up as a 'straw model' exactly to encourage such a challenge. To this extent, I was strongly empathetic to its aims. It was a brave researcher who invested their energy in inviting criticism, and some-

times an arrogant one who invested in protecting themselves from it.

However, once again grounded theory seemed to contradict itself. Whilst encouraging alternative interpretations, it still saw the necessity to integrate theories resulting from the field work with the existing literature. A different, and perhaps more novel approach, would have been to use the existing literature as a springboard and ideological aide during the methodological stages, rather than during the closing ones. Nevertheless, we shared the same sort of validity criteria; seeing all concepts as more or less valid rather than truthful, and usefulness as indicated by their recognition on the part of the participants in the organisations. (See the Conclusions and Recommendations chapter for a more detailed discussion of criteria for validating this thesis.)

This seemed to contrast with another 'scientific' principle of grounded theory, that social phenomena could be accurately described and that the collection of more data led to more precision. The emphasis was on goodness of fit and scope of coverage and on the production of definitions rather than interpretations. Relationships between the data, once identified, were then tested. This would indicate conditions under which concepts had relevance, cause and effect, rather than seeing the context (as I did) as the conditional boundary, and the meaning as having a different shape and relevance according to the reader of the text; 'text' here referring to either the organisational situation itself or the researcher's written interpretation of it.

Grounded theory also embraced a notion of organisational reality which could be improved by the study. It claimed to form the basis for discussion or change implementation. I saw no such organisational reality but recognised contextualism as an interpretation method which could promote mutual understanding by all involved in the research (c.f. the self-help of action research below).

I concluded that the differences between my approach and that of grounded theory were related to the latter's positioning within an essentially 'scientific' research framework. This was most apparent from its objectives of generalisability, testability and robusticity, stated as they were in the style of the traditional positivist paradigm.

The impression I gained from my examination of the literature on issues of 'context' was much the same as it had been for symbolism and metaphor. These concepts could be applied at two different levels: either as superficial aides to the analytical process, or as fundamental constructs from which the sense-making process itself was formulated.

It was the latter of these two which I espoused.

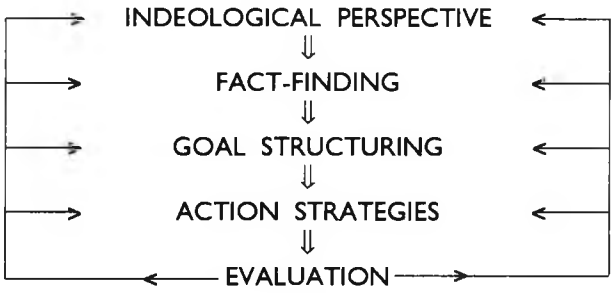
ACTION RESEARCH

The IT Skills Project had adopted this method of research at the outset of the study (see the Project Information Sheet in Appendix 5). At that time, it was collectively understood that it would be an iterative process, and would entail constant feedback between the Team members and the sponsoring organisations. As is stated in the Information Sheet, this gave the sponsors the opportunity to capitalise on the findings before they were made more widely known after the completion date. Beyond this, no re-examination of the method was made. I decided, for my own purposes, that it would be necessary to make a comparison between my PhD approach and that adopted for the wider Team work. What follows is the outcome of that comparison made after my field work was completed.

The term 'Action Research' was introduced by Lewin in 1946 (Sanford, 1970). Like me, his initial focus was on minority and interest groups. His interests were anti-semitism, fascism, inter-group conflict; mine were analysts versus programmers, development staff versus maintenance staff, etc.

Lewin formulated a spiral model of research where the stages included analysis, fact-finding, more fact-finding or evaluation, and then their repetition. Since then, other models have been produced based on this idea. One which interested me was Cassell and Fitter's because it added a new dimension -the ideological perspective - the value framework within which the research was being conducted (Cassell and Fitter, 1989). The model is illustrated in Figure 20. From my perspective, I found this to be a useful addition and would have suggested this to the rest of the Team if I had

been aware of it at the time. Their study (the SPRITE project) also demonstrated that action research was appropriate for exploring the changing environment of IT.



CASSEL AND FITTER, 1989

FIGURE 20: AN ACTION RESEARCH MODEL

The IT Skills Project produced its own model of action research which was based on Bryman (1989). I mapped my research journey onto it in order to assess the role and influence of my work in the context of the rest of the Project and this is shown in Figure 21.

Most of my analysis of action research was based on papers by Bryman (1989) and Susman and Evered (1978). The characteristics which these papers gave are listed below followed by my own observations on how they related to my work:

1) Most action research was based on the case study approach.

This certainly applied to my own work although not necessarily to the rest of the Project.

2) Collaboration existed between action researcher and client in respect of diagnosis and solution; the findings contributing to knowledge in a particular area. It was, therefore, problem driven.

According to Susman and Evered this collaboration required the researcher to be explicit about their own ethics and values, so that they could serve as guidelines to the work. This coincided with my approach in that I believed the personal values would inevitably influence the research outcome.

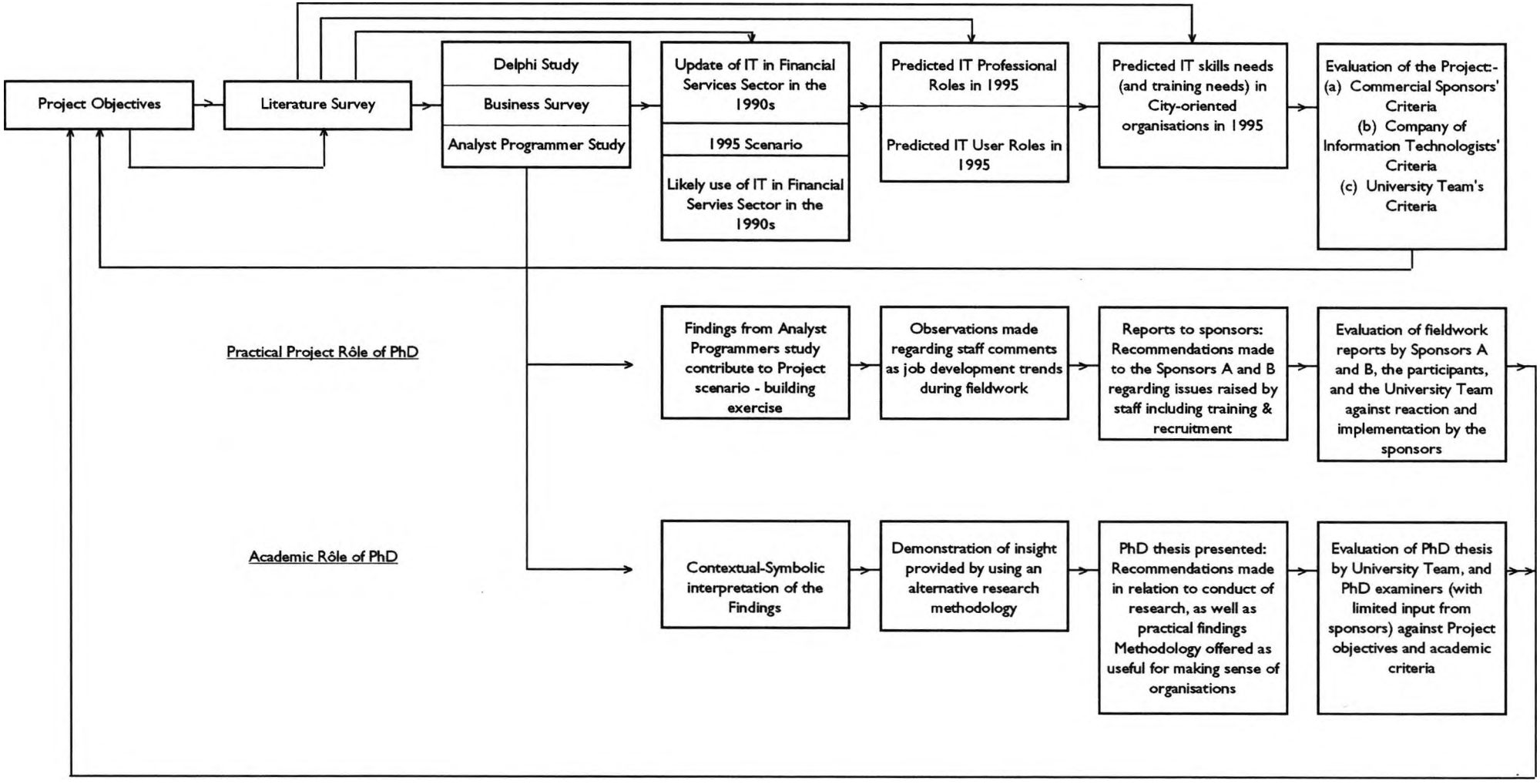


FIGURE 21: ACTION RESEARCH AND THE PHD JOURNEY

The overall Project was reasonably collaborative, having a Team which consisted of both researchers and sponsors. I was not entirely collaborative in my own research, though. I could have included people I worked with in the sponsoring organisations a lot more closely.

I believed the IT Skills Project was problem-driven in that it was set up explicitly to address the problem of the 'IT skills crisis'.

3) Understanding of a total entity was required; therefore, probably only one case study would be undertaken.

I was encouraged to conduct more case studies than I did but I decided that more than two would require a much longer time scale due to the detailed qualitative nature of the data collection process.

4) As a research design, it could accommodate many different approaches to research.

The IT Skills Project encompassed a number of different research approaches, including qualitative and quantitative methods.

5) Action research was meant to be participative: the researcher was accountable to the 'rank and file' as well as senior management; staff participated in the research design including reporting the findings.

The Project Team members were not senior management. In my PhD work, I encouraged ownership of the information to staff levelsby giving a presentation to them of the findings before passing them on to senior management. A few staff in each organisation contributed towards the presentation but this input was limited. Bryman was, therefore, right to distinguish between apparent participation (senior management as client) and full participation (involvement of a large percentage of staff). He pointed out that only the former type was an <u>essential</u> ingredient of action research, although I would have preferred the latter in retrospect.

6) Implementation was immediate and monitored. This was partly aided by a tendency for action research to become holisitic rather than constrained to a specialised area. This related back to the point about studying a whole entity.

This accorded well with my own experiences because I had extended into all areas of the organisation, causing one senior member of mangement, in particular, to comment that I had over-stepped "expected boundaries".

I noted Bryman's reference to a study by Pasmore and Friedlander (especially as he labelled it quantitative research) because he said:

> *"... data collection strategies were based on their delineation of various hunches about possible causes of the problem."*
>
> *(Bryman, 1989, p181, my emphasis.)*

This sounded familiar. I had had no explicit research design at the outset either and had been guided really only by intuition. Perhaps, as Bryman suggested, this was a symptom of the lack of 'full participation' in the earlier stages of my field work?

As for implementation, it was certainly not immediate in my case (see the Conclusions and Recommendations chapter)! It could be argued that this was another consequence of incomplete participation, but I felt implementation would also vary from company to company depending on size, bureaucratic traits, motivation, political changes in climate, etc. It may also have been because the Team members were not senior management and, therefore, did not have the same amount of influence within their organisations. Also, my PhD status would have influenced the way the work was perceived and the reactions which I encountered to my reports.

7) Ethics played an important role in action research since implementation of the research proposals and/or findings could be refused by the client if they were not 'agreeable'.

Bryman said that action research could be seen as an ethical alternative to consul-

tancy; perhaps because it often dealt with people 'lower' down the organisational hierarchy. I found this interesting in the light of my comments on the consultancy literature in the IT field during my second literature survey (reported above). Since ethics (values) were important to my work, and since I had identified gaps in the work of consultancies, this rang true for me, too. Bryman also concluded that the investigator virtually became part of the arena being studied. This compared with my subject-subject epistemology.

Bryman observed action research's lack of popularity, linking it to a "taint of manipulation and an excessive managerialism" (op. cit. p187). I felt this could be where an even more collaborative, 'lower' level approach might contribute. As for my own perspective, I believed it was partly affected in this way; note, for example, my references to 'compromise' in A Journey Through Two Organisations. Nevertheless, I maintained that my close contact with the staff served to raise both their self-awareness and awareness of higher level organisational structural issues, helping them to express their own individual positions without manipulating them into a particular situation.

8) Action research was future-oriented and committed to creating a desirable future, recognising that people's actions were guided by ideals, goals, etc. Most action research met with the ethical dilemma of giving something beneficial to the staff and not just taking from them (data).

The IT Skills Project was future-oriented, having a time frame of 5-10 years. Desirability, again, introduced the notion of an ethical practice. It was difficult to say to what extent this applied to the rest of the Project but for my field work, I had maintained a code of ethics, particularly in being open about my motivations.

I partially agreed that the ultimate sanction of action research was its ability to produce desirable consequences for an organisation. After all, my research had been validated in terms of the feedback I received; but in another sense I disagreed. Who decided what was desirable? Since everybody constructed their own view of the situation, it might not be possible to reach a consensus.

In respect of giving to the staff, I encouraged ownership of information by the participants, as set out in point 5 above.

Susman and Evered remarked that action research developed individuals, especially their interpersonal skills. This was interesting in the light of the PhD findings relating to the interpersonal skills of IT staff (see Findings chapter). I was in no doubt that the researcher's behaviour would inevitably influence, and form part of, the data itself. Yet, their suggestion that the researcher be used as a role model by individual staff seemed to be adopting a superior attitude. I hoped my research had made individuals more aware of themselves rather than imposing upon them a model of how they should act. However, I believed the research approach itself could be viewed as a 'model' of how to resolve problems within the company.

9) Action research implied 'system development'.

I found it difficult to consider this point since it used a systemic metaphor. In that Susman and Evered suggested setting up a self-help procedure, then I concurred, because it passed control to the client. I had a problem with the contextualism, though, in that different circumstances would call for different forms of self-help and a particular coping strategy would not necessarily be applicable on a recurrent basis.

I also did not agree with their implication that the focus should be on the processes of the organisation instead of the people themselves. This was too functional.

10) Action research generated theory grounded in action. The diagnosis and the solution were guided by the theory (as was the case with general systems theory).

This dictation of outcome by theory was not applicable to me. My research approach had been intentionally open-ended, led by data on a real-time basis and not by a pre-established theory.

11) It was an 'agnostic' method; each research situation was unique in respect of the diagnosis and solution that might be applied;

and, linked to this:

12) It was situational, and had some links with symbolic interactionism. How the actors involved in the research defined situations would be temporally and con textually dependent and dynamic. It was not a teleological approach - it could not be extrapolated to previous events. The 'appropriateness' of action was, therefore, based on actor's current views and a consensus on how things could be done.

These points highlighted the importance of collaboration and time-scales in reaching implementable solutions. It was also clear that there were links with my contextualist approach.

13) Action research was not an objective approach and this had implications for its scientific status.

As Cassell and Fitter said:

> *"It is more fruitful to show the extent and manner in which the researcher influences the project.*
>
> *As long as an action researcher can describe his/her input into a program and analyse the implications of that input, there is no more, and possibly less threat of bias than in other less overtly interventionist research methods."*
>
> *(Cassell and Fitter, 1989, p22)*

Bryman echoed this point about scientific criteria when he discussed action theory's lack of 'conventional rigour'. Using Pasmore and Friedlander's study as an example, he said that it was difficult to quantify and measure the effect of their research. However, as the authors of the study pointed out, a more rigorous method may not have been as effective, because it probably would not have involved the employees themselves to the same degree. I felt this was important and underlined my view that, since the ends might be non-material and non-quantifiable, it was the experience of the research that was more important.

In fact, Susman and Evered compared action research to positivist science and found it incompatible. They examined its 'validity' within an organisational science context based on two themes.

Their first theme centred around the nature of human action, (a reflection of its symbolic interactionist links) features of which included:

- it was not explainable simply in terms of functional laws
- the need for knowledge of the unique context in which the action occurred
- the target of most proposed changes involving the conceptions and ideas of individuals
- the role of communication in action as polysemous and subject to re-interpretation by the sender and/or the receiver
- the need for mental or actual experience of change by individuals in advance of statements about reactions to change

The emphases are mine and draw attention to links with my own beliefs. These links were further strengthened by Susman and Evered's second theme of philosophical underpinnings. They identified action researchers as coming from a number of different philosophical backgrounds (and this tied in with Bryman's point about encompassing different research approaches). These included: praxis, hermeneutics, existentialism, pragmatism, process philosophies, and phenomenology. Reading their definitions revealed that I shared some of the values expressed by these different philosophies.

Praxis: Crudely put, this stressed the necessity to act upon a situation in order to change it.

I gave more primacy to the power of thought, believing, for instance, that positive thinking could change how an invididual perceived 'reality' as well as their actions.

Marx made a useful extension to praxis, arguing that actors themselves were also changed by the action. (I certainly felt as though the experience of the research had changed me; hence, my journey.)

Hermeneutics: The art of interpreting texts - especially of historical texts, and its role in the interpretation of language, culture and history. The 'hermeneutic circle' proposed that no knowledge was possible without pre-suppositions. The hermeneutic tradition also warned the action researcher that their perception of an organisation would not be the same as its members.

This last point was not as relevant to my own approach, since I believed there was no one 'correct' interpretation of an organisation, and that even organisational members would differ in their perspectives.

Existentialism: The importance of human choice and values, and the avoidance of causal explanations of action.

This was in line with my ideas but Susman and Evered's notion that human interest was behind every individual choice of action was not. 'Human interest' was not explained, though, and so my understanding of it to mean self-interest may have been at variance with theirs.

Pragmatism: The most useful point from this was the view of the researcher as actor within the world rather than as spectator. However, it did not extend this to an explicit subject-subject statement of the nature of the research process.

Process philosophies: I found Heraclitus' comment that "you cannot step into the same river twice" illuminating. Although processualists would argue that a sense of pattern can be obtained even from a moving river, for me the quote not only highlighted the dynamic character of the world but also underlined the temporal qualities

of context. It also resonated with Figure 3, where I had located myself along the order:conflict index.

Phenomenology: In the broadest sense, this saw the primacy of immediate subjective experience as the basis for knowledge. Knowledge acquisition could proceed either by minimising the affect of bias on understanding or by being more explicit about that bias.

The latter was how I had proceeded as I did not believe the former was possible. Phenomenology also proposed that no objective reality could be empirically determined in terms of the biases of organisational members, yet the role of bias was fundamental to understanding their actions.

I had already read some phenomenological works (e.g. Merleau-Ponty, 1965, and Boland and Day, 1982) and was aware of similarities between our values. Nevertheless, I found the pre-condition to understanding of knowing the ends towards which the action was taken, as well as sharing the same time-frame and moral concerns, too limiting. For example, it implied that understanding between two contrasting cultural groups would be seriously constrained. It also had negative consequences for my archaeological beliefs.

In concluding that action research was incompatible with positivist science, Susman and Evered proposed alternative criteria for assessing action research's contribution:

- understanding (as opposed to explanation)
- making things happen (as opposed to prediction)
- conjectures (as opposed to deduction/induction)
- engagement (as opposed to detachment)
- action (as opposed to contemplation)

I accepted these criteria, particularly conjecture. As with the 'hunches' referred to by Bryman, I agreed with their description of Popper's approach:

> *"... significant advances in knowledge occur when the inquirer goes beyond the data; performs a conceptual leap of the imagination to consider analogies, metaphors, myths, etc., as a way to explain the data."*
>
> *(Susman and Evered, 1978, p598.)*

I would only replace 'explain' with 'understood'.

I noted that Torbert (Torbert, 1972) was quoted in relation to action (versus contemplation) to show how consequences can only be assessed as a result of action rather than purely thought. He said that inquiry in action could lead to learning from experience. I had come to hear of Torbert more recently through a new paradigm method called Collaborative Inquiry (see Thoughts of Writing Up). Nevertheless, my previous comment concerning the power of thought applied here, too.
The authors concluded that action research was more appropriate than positivist science:

> *"... when the unit of analysis is, like the researcher, a self-reflecting subject, when relationships between subjects (actors) are influenced by definitions of the situation, or when the reason for understanding the research is to solve a problem which the actors have helped to define."*
>
> *(Susman and Evered, 1978, p600.)*

I found it more appropriate to consider the problem as being defined by whoever was involved in the research at the time; i.,e. the researcher as well as the actors, allowing for differences of perspective between each person. It was, therefore, the polysemic nature of reality created and re-created by each person, that constituted the most fundamental argument in favour of adopting an alternative to the scientific method of inquiry.

Although I identified in a number of ways with accounts of action research by both Bryman, and Susman and Evered, the latter had argued that action research was valid within a scientific frame of reference. This may have been a reflection of the type of science paradigm which was dominant at the time their paper was written.

For all the reasons already discussed of the values attached to it, I was not prepared to subsume my methodology beneath the label of 'science'.

PART

THREE

A JOURNEY THROUGH TWO ORGANISATIONS

ROUTE MAPS AND SIGNPOSTS:

A JOURNEY THROUGH TWO ORGANISATIONS

This journey was to be a cultural experience of living inside two different organisations. The chapter relates how I formulated my fieldwork proposals and the factors that shaped the future direction of my work. The role of compromise was highlighted as I struggled to find a balance between what I thought would be necessary to conduct the fieldwork and what the organisations themselves were prepared to accept.

In order to make the values and vested interests more explicit, I have analysed in depth the contents of the various proposals. Detail is given of the types of information which I gathered and how they were found to be illuminating.

A brief outline is given of how contextual-symbolism was applied within each sponsor and how the results were presented to the organisations. However, because it was the data which suggested the route to sense-making, rather than vice versa, the methodology was only fully demonstrable after the data had been collected. It is the Findings chapter, therefore, which combines a review of the issues arising from the field work, together with a discussion of how they were analysed.

INTRODUCTION

This chapter addresses method as opposed to methodology (which was covered in the previous chapter). The purpose of this chapter is to describe how I put my research methodology into practice and to analyse what was involved. I am, therefore, making a distinction between theoretical and applied research.

The analysis is important for at least three reasons; firstly, in order for the reader to understand how the Findings came to be formulated; secondly, so that the reader may be able to see more easily that the theory and practice of the research conflicted in many ways; thirdly, and in some ways most importantly, as an integral part of that philosophy itself, by giving attention to the biases and value judgements which shaped the study. The conflict between theory and practice is a theme developed through the final chapters.

FORMULATING THE INITIAL RESEARCH PROPOSALS

The objective of my first formal written research proposals (discussed in Stage Three of the previous chapter) was to get the backing of the sponsors, particularly as I would eventually have to go into some of their organisations to conduct the research. This objective might sound somewhat unusual in the field of academic research. Usually, a research proposal is formulated at the commencement of the PhD with the objective of securing the acceptance of the examining institution, not to mention funding.

The IT Skills Project, however, operated within a slightly different context. The broad area of research and the funding were already established **before** I enrolled. The first year of the PhD was oriented towards refining a focus for the work, and it was this which formed the content of these first major research proposals. The sponsors had collaborated on the assumption that their organisations would be closely involved in the research; not only by being members of the research team but, also by being '**subjects**' of the research (to use positivist phraseology).

Thus, it was implied from the outset that the sponsors would be willing to co-operate

in providing information for the research study. However, this did not mean that the University had 'carte blanche'. Research within the sponsoring companies would mean demands on their time and resources as well as ours and, so, whatever research proposals were presented, they would have to be seen to be relevant, practical and effective. Of course, the criteria might vary between organisations. I realised that this would be an important political aspect to my research and this was reflected in the way that I analysed it.

The research proposals were originally produced on 24th April 1989 but were modified several times later in the year, and the final version produced on 3rd December, 1989. In fact, by the time I came to conduct my research within the sponsoring organisations, I had shifted my goal posts. Originally, I had intended to adopt a two-pronged approach. This would have been carried out by first employing a systemic analysis, and then contrasting with it my own methodology, in order to demonstrate the latter's effectiveness. When it drew nearer to the time to conduct field work, however, I (and my supervisor) realised that the timescale would be too short for this. Ultimately, only my own methodology was implemented.

PUTTING THE RESEARCH PROPOSALS INTO PRACTICE

My original research proposals were tabled at a Research Team meeting on 1st June, 1989. This represented a considerable time lag since they had been first written. Unfortunately, not everybody turned up to the meeting. Some copies, therefore, had to be mailed. The next meeting was held on 12th July but, other matters higher on the agenda took up most of the time at the meeting so that discussion on the research proposals was carried over to the next meeting in September. Again, there was very little comment. The thought occurred that they may not have fully scrutinised them and it was to transpire that the organisational members of the Team, though keen to do something for the Project, had not fully realised the time and effort involved.

Nevertheless, my proposals were accepted. By the time the Team met again (7th November, 1989), the topic of which groups of people the IT Skills Project should focus on had become a separate issue for agreement. Whilst my work was to focus

on analyst programmers (and analysts and programmers), it was recognised that this would be too limiting a brief for the rest of the project.

There then ensued a debate as to whether it was wise to narrow the focus too much at that early stage since we might later find we had 'cut off our noses to spite our faces'. It was finally decided to keep the options open but, two main areas of interest were confirmed: professional IT workers and constructive users. These categories were produced as a result of the work completed for the report on definitions of IT (reported in Stage Three, previous chapter).

From this point onwards, I felt as though I had much more of a concrete focus for my work. Although I was still involved in the work of the rest of the team, I felt I needed to immerse myself in the analyst programmer realm within the sponsoring organisations by experiencing it myself.

I decided to focus on a group of IT workers because, as Umpleby had said (Umpleby, 1987) this would be meaningful for addressing recruitment and development issues of the future. I wanted my area of focus to be sufficiently small to allow me to develop my qualitative, individualistic approach, without making it so specific (e.g. a study of one individual alone) that the sponsors would not recognise its contribution to the business.

The focus on analyst programmers was very amenable to the sponsors. This was not a surprise. The reasons I gave in my research proposals for choosing that group were as follows:

- They were one of the skills groups in shortest supply, and predicted to be in increased demand in the future according to the business literature and media (e.g. Buckroyd and Cornford, 1988).

- They formed one of the largest staff groupings in IT (Virgo, 1987, Connor and Pearson, 1986).

- There was arguable potential for recruiting these people from new areas (NEDC, 1989) and, indeed, several projects existed around the country to train 'non-traditional' candidates (e.g. The MicroStudy Project at Thames Polytechnic, and The Syscom Project at The Springfield Centre in Lambeth).

- The Team agreed that there was likely to be basic similarities between the sponsors in their deployment of analyst programmers, by virtue of the focus of the job around the software development cycle (notwithstanding potential differences of a more specific nature due to context).

The level and nature of skill groups to be studied was not pre-determined, since I believed this should be guided by the research itself. However, it was broadly recognised that an analyst was responsible for the problem-solving and design side of software production, and the programmer was responsible for translating this into computer code. An analyst programmer might, therefore, be involved in both or either of these, depending on the organisational set-up.

Towards the end of 1989 my academic supervisor suggested that my first venture into a sponsoring organisation to carry out my methodology should be, in effect, a pilot study. In retrospect this was a reflection of his 'scientific' background. I agreed that it would be useful to conduct a 'trial run' of my methodology, simply because I had not conducted this sort of field work before. However, to what extent our understandings and expectations of this exercise coincided is questionable.

My only previous experience had been a two-day IT training course in which I had fully participated with staff and management from a non-sponsoring organisation. I now believe that even this limited experience had an influence on my later field work. I learnt how important it was to integrate with the other participants in order to obtain a perspective of what their organisation was like and what issues concerned them most. I also discovered that the 'richest' qualitative information seemed to be gathered in informal rather than formal contexts (e.g. the pub, coffee lounge, etc.).

I had planned to visit all four of the IT Skills Project sponsors because I was being

pressurised by them into doing so. Ultimately, however, time and resource constraints led to my limiting my research to two of the sponsors. (For the purpose of maintaining confidentiality and anonymity, these two organisations are hereafter referred to as 'Sponsor A' and 'Sponsor B'.) When I embarked on the first study it was with the intention of conducting the 'pilot' or 'trial' but, in fact, this never happened. It developed into a full-blown piece of research. I believe this was for two reasons, one being pressure from the sponsors to complete the work as quickly as possible, and the other because I felt confident in my work once I had begun.

In order to highlight similarity and difference between the two pieces of research, I shall discuss them alternately.

FORMULATING RESEARCH PROPOSALS FOR SPONSOR A AND SPONSOR B

Sponsor A

THE FIRST RESEARCH PROPOSAL

It was relatively easy getting the first verbal offer of help from a sponsor (Sponsor A). So easy, in fact, that I can hardly remember how it came about. I think it happened during one of our Research Team meetings after the proposals had been absorbed. What was not quite so easy was overcoming the bureaucracy in making the necessary arrangements to enable me to get into the organisation. It was at this point that I began to sense a divergence in our objectives. I have referred to this as the qualitative/quantitative phenomenon, and it was to appear at several points throughout the field work.

I was asked to produce a written proposal for the 'pilot', which I duly did (Appendix 6) and attached to it a copy of the IT Skills Project Information Sheet (Appendix 5).

The proposal was laid out under several headings: Background, Aims and Objectives, Methods, Resources, etc., and Results. An analysis of this proposal revealed its qualitative nature.

(Please read what follows in conjunction with Appendix 6.)

BACKGROUND

This section reflects my anxiety to initiate the research as soon as possible. I was concerned about timescales and securing the necessary support from the sponsors.

AIMS AND OBJECTIVES

Paragraphs 2-5 set out the "Aims and Objectives" of the pilot study. By the time of this proposal (dated 1.1.90) Sponsor A had declared a vested interest in focussing on the IT grouping of analyst programmers. The main reason for this was that they were in the process of introducing a new job family of 'analyst programmer'. One of their motives for hosting my research was to discover the reactions of their staff to this new addition to the career structure and to see how the role might develop in future. Both these aspects were reflected in the topics covered with staff in the one-to-one sessions, as discussed below.

Paragraph 3 included the following sentence:

> *"Another specific objective will be to produce findings that will aid Sponsor A in planning, recruitment, training and deployment of staff over the next five years or so."*

This was a wide-ranging statement and it was interesting to note that, after the research had been completed, this aspect became a cause

for concern. As is reported in the Feedback section (Conclusions and Recommendations chapter), once the research report had been produced and digested, the senior management concluded that the content had over-stepped expected boundaries.

It was agreed that in-depth job analyses would not be conducted. Not only did this reflect my own personal lack of job analysis skills, and the fact that this approach did not fit into my overall methodology but, it also reflected a request made by the organisation itself. They had, at that time, a job analysis programme underway and felt it would only duplicate effort if my research adopted a similar approach.

The phrase "research will focus on the profiles of individuals" revealed my person-centred methodology. What I meant by the term 'profile' was not detailed in this proposal. I believe I chose the term carefully, mainly for its broadness of scope, in the hope that I would then be able to explore whatever issues arose from the study as being of importance; possibly even including issues relating to life outside the work context. Together, with the quote from paragraph 3 above, this served to highlight my attempts to produce a proposal which would provide as much flexibility as possible. This need was rooted in my methodological position of avoiding pre-set, formalised research frameworks.

Hidden behind paragraph 4 was the hope that I would be able to visit more than just one other sponsor. It transpired, however, that there would not be the time to do this and that I would have to compromise my plans.

The 5-year project history which I requested in paragraph 5, was a direct reflection of my original research proposals. Although my ideas had been modified considerably by this stage, the historical

aspect to my study was still important. Also, I felt it would be easier to make assessments of future change in work practices if there was a historical backdrop against which to contrast them.

The request for an area which had up-to-date technology and methods reflected my desire to work in an area where changes would be leading-edge rather than 'catch up' in terms of the rest of the business world. However, this criterion was not to be fulfilled, and the project's use of technology fell more into the second category. This contributed towards the impression that the project I was assigned to had a relatively low status within the organisation.

METHODS, RESOURCES, ETC.

In the first part of this section, paragraph 6, it was stated that a maximum total of 30 staff on the project "is considered to be a manageable size for study". Unpacking this phrase, I was referring, not just to timescales but, also to the amount of qualitative detail which I would collect. However, it was a political decision on my part not to make this point explicit.

The comment on "the minimum of disruption" reflected the priorities of the organisation and my attempt to allay their fears. This theme is no doubt common to all businesses who host researchers in their midst. However, I also believe it is a feature of IT departments. Generally speaking, the IT departments are under so much pressure to produce to time, and the tasks have become so critical to the running of the business' systems, that any disruptions in their work could have serious consequences.

The paragraph concluded with the phrase "more observational than participatory". This term appeared to be in contradiction to my desire to involve staff in the research and treat them like co-

researchers. If, though, I had said the opposite, it is unlikely that I would have had the co-operation necessary to enter the organisation at all. Therefore, I was guilty here of modifying the 'truth' for political reasons. In trying to balance the political interests involved in the research I, too, had to play politics.

Nevertheless, I could justify my phraseology by saying that my research was more observational than participatory. Although I have nowhere claimed to have carried out fully collaborative research, this is something which I would reconsider next time around.

My "data collection methods" (paragraph 7) were, indeed, varied. I tapped many sources of communication in various forms: spoken, written, visual. Wherever this involved the time of individuals, I always ensured that I approached them through the appropriate channels. Again, this revealed the politics of the situation.

This paragraph also showed that I recognised the potential for consulting those who no longer worked in the particular area under study. My need for flexibility in approach was highlighted once more here and is worth bearing in mind in relation to the Feedback comments received concerning over-stepped boundaries.

The final point in paragraph 7, on confidentiality, was an important one. The theme of confidentiality ran through the whole of the IT Skills Project. For example, this thesis will probably be filed as Restricted Access when submitted to the library, because the sponsors consider the information I have collected to be of a sensitive nature. Confidentiality was one of the first issues tackled at the Research Team meetings. This was entirely understandable since the sponsors who collaborated on the project were in strong competition with eachother as well as with others external to the project.

RESULTS

The mention of action research in this penultimate paragraph related to the overall IT Skills Project definition of it and not to my own personal beliefs (discussed in the previous chapter). The attraction of such an approach for the sponsors was that it suggested findings could be kept in-house more easily and be acted upon much more quickly. Underlying this, of course, was their desire to achieve a competitive edge. The choice of the term 'action research' in this context, therefore, was, in my opinion, an appropriate one for the project.

The final paragraph echoed the first in that it underlined my anxiety concerning timescales and my desire to begin the study as quickly as possible. It was also a political one. I believed that reference to the Steering Committee would lend authority to the statement, and that underlining the fact that the deadlines had been set by all parties (including Sponsor A) would lend credence to moving on quickly.

To conclude the analysis of these research proposals, they were more descriptive than quantitative. This was an issue which I had not considered at the outset but, which was to prove a major concern. Unfortunately, the form of these proposals was not acceptable to Sponsor A. I was asked to provide something more quantitative. Therefore, a second set of proposals were produced.

THE SECOND RESEARCH PROPOSAL

The second proposal was produced in association with the sponsor's Team representative (Appendix 7). This arrangement was the result of a mutual agreement between us, and I feel I was fortunate to have this 'interpreter' to assist me because I sometimes found it difficult

to know what was expected of me. I have attached for interest (and with the permission of its author) the 'mind map' which was produced as a result of these discussions (Appendix 8).

This second proposal encompassed two main sections: Output, and Resources, and also had an Appendix, and these are analysed below. One of the most striking features that resulted from this analysis, and which was hinted at in the first set of proposals, was that of compromise.

OUTPUT

This first section addressed the issue of 'deliverables' (a term used often by the sponsor's Team representative). Deliverables related to what would come out of the pilot study, particularly in terms of benefits to Sponsor A. On reflection, it was reasonable to assume that this work would have a 'domino effect' since, until it was underway, my role in the IT Skills Project would be limited.

The research was described as contributing to the project at 4 different levels. Each of these is examined in turn below.

LEVEL 1:

Level 1 referred to a report to the sponsors themselves, in addition to the continuous feedback during the research; that is, the 'Action Research' approach adopted by the IT Skills Project at its outset.

It was stated that the report would include: a) an account of the research process itself in terms of "what had been done and who had been seen", and b) the findings leading from the work.

a) In retrospect, it was clear that in talking of the 'research process' I was referring to the more quantifiable features of my work with which the sponsor would more readily identify, such as: from where I had obtained my information, with whom I had communicated, how long I had spent with them, etc. I was not referring to the academic aspects of the process, such as methodological reasoning, analytical techniques, etc.

In other words, right from the beginning, I had taken a decision not to involve the sponsor in this aspect. In retrospect, I had made a sub-conscious decision that Sponsor A would be neither interested nor amenable to these academic details. I would make sure I checked this perception were I to repeat the exercise.

Information about the research methodology as it was presented in the final report to the sponsor was very restricted (Brooke, 1990a). This is evident from the extract below:

> *"The Research Methodology focussed on qualitative techniques of information gathering: extensive note-taking, observational research, recorded interviews, and examination of documents. The amount of time spent with any one individual member of staff was minimal (approximately 90 minutes). The research did not disrupt the work of [the department].*
>
> *The research commenced on 15th February, 1990. Four weeks were spent collecting data on-site followed by four weeks analysing the information off-site.*
>
> *The original intention was to interview up to a dozen members of Project X. However, once research began it became clear that a larger number would provide a more representative sample (4). 19 staff were interviewed in total, including the Manager and several members of contract staff.*

In addition, it was necessary to collect information which put Project X into its organisational context, and to follow up sources recommended by staff. Consequently, another 17 interviews took place outside of [the department] itself.

The research methodology required that staff be allowed to highlight issues which they felt to be of importance, rather than have these suggested to them by the researcher. There were a number of recurrent major themes, however. Since this was the case, the researcher attempted to discover the views of interviewees on these points."

"(4) Selection criteria included: age, sex, time with Sponsor A, seniority, IT experience, educational background."

[Note that the selection criteria were based on my own ideas of how I could ensure I talked to a group which was as varied as possible, both as individuals and as employees of the company.]

b) The findings were described as relating to specific and general levels, and I gave a few examples of these. At the time, of course, I had no information on which to base these and so the suggestions were purely speculative. They were:

<u>Findings specific to the project:</u>

- technological distribution
- future skills

<u>Findings general to the company:</u>

- observations relating to skills issues
- take-up of technology within the company

The extent to which these were actually addressed in the final report is considered in the chapter on Conclusions and Recommendations.

LEVEL 2:

The second level of contribution was the PhD thesis. The proposal stated that the pilot study would form the "testing ground for the research methodology itself". This was certainly the case, and the approach was modified as is demonstrated by comparison with the analysis of the method carried out within Sponsor B.

Again, the importance of getting the 'pilot' off the ground in order to progress the PhD work was stressed. This was further evidence of my anxiety that the bureaucratic processes involved in the research would prove to be an obstacle.

LEVEL 3:

The Milestone Report (which I later re-named the Millstone Report) was almost an historic legacy by this stage of the project. It was originally conceived following the first Steering Committee meeting (21st December, 1988), and regarded as one of the prime 'deliverables' of the IT Skills Project. This was at a time when I was the only researcher working on the Project.

The Milestone Report was mentioned in the proposals to Sponsor A as being targeted for October 1990 for presentation to the Steering Committee, and as focusing on the pilot study and the Delphi exercise. In fact, due to pressure of work, missed deadlines (external factors beyond our control - i.e. the sponsors), and developments in project strategy, it was to be postponed; first until December 1990, and then until early 1991.

LEVEL 4:

The major report represented the last (and ultimate) level of the pilot's contribution. The deadline for this report (September 1991) was to coincide with the end of my funding (the Company of Information Technologists' bursary). This was a historical reflection of discussions at the first Steering Committee meeting. Later, this deadline was also to be the completion and presentation of the Delphi exercise, and the end of the second year of the third member of the research team. The following year was to be regarded as 'writing-up time' for the latter member and not as a further research year for the remainder of the Team.

For Levels 2-4 a major concern of Sponsor A (and, indeed, all the sponsors) was confidentiality. When the second research proposals were discussed with Sponsor A, this point was raised again and assurance made that their permission would be obtained before any information was put in writing and distributed. The nature and content of these writings would need to be tailored to the intended audience. At each of these four contributing levels it was apparent that a different style and approach would need to be considered. This indicated that considerable demands would be made upon the skills and resources of the Team members.

RESOURCES

This second major section related details of the resources required on the part of the researcher and Sponsor A in order to conduct the pilot study. On reflection, this could have provided an opportunity to give more detail on the research methodology. On the other hand, my assumptions concerning the disinterest and disinclination of the sponsor were reinforced by the fact that these second set of proposals were required at all; that is, the request to present something more

quantifiable. This accounts for the fact that there were many more numbers in it.

The pilot was estimated to take 8 weeks in total, with 4 weeks spent on-site at the sponsoring organisation, and 4 weeks off-site analysing the data. The first 4 weeks only were of interest to the sponsor (by request of the 'interpreter', sponsor's Team representative) and so a breakdown of these was provided.

WEEK 1:

This week would include discussing work with the manager of the project to which I had been assigned, understanding how the project was organised, and setting the project into its organisational context.

It seems absurd now that I should have been so specific about the time taken to discuss the project with the manager: 2 hours maximum. Yet this level of detail was what was required by the sponsor. In the event, it did not seem to matter that it took less or more time, only that it satisfied their need for quantifiable information.

I recognised the inadequacy of this specification, and regarded the phrase "The Manager will be kept informed of progress made, thereafter, as often as requested" as a 'let-out'. However, flexibility in this respect not only accorded with the overall strategy of Action Research but, it also enabled me to feel more positive about the amount of time I would be able to dedicate to keeping the project manager involved.

Understanding how the project was organised was described in these proposals only in terms of the physical and high-level aspects of seating, office plans, major communication channels, etc. Although

this seems an inadequate objective now, at this point in the proposal, the aim was to give the impression that as little time as possible would be taken up on the part of those working within the sponsoring company. The resulting impression was of a very detached, superficial piece of research. The only part of this section which accorded with my inner motivations was:

> *"It will also provide an opportunity for the staff to get used to a non-team member being present".*

I was very aware of the fact that I was an outsider and that it would take some time for the project staff to accept my presence. This was not the same thing as saying that after a week in their organisation, their activities and behaviour would be exactly as though I were not there. On the contrary, I wanted to become involved in what they were doing and to enable them to become involved in my work. (To what extent I achieved this is discussed in the Conclusions and Recommendations.)

The reference to drawing up an 'organagram' of how the project team fitted into the IT department and the sponsoring organisation as a whole, together with main lines of communication, was a reflection of my very first research proposals. These proposals had outlined a two-stage framework, a biological classificatory approach being the first, and contextual-symbolism being the second. The idea was to illustrate the advantages of my approach over and above the more 'traditional' method. Unfortunately, this scheme had to be discarded due to lack of time, although organisational 'tree' diagrams were collected and drawn up in order to understand how the organisation perceived the project and its role.

The final sentence in this section on Resources struck a negative

chord upon re-reading. So much so, that I think it is worth reproducing for discussion:

> *"At this stage, discussion with staff will not take place. Since this part of the research is non-participatory, it is called 'observational research'."*

In the light of my Journey Through Post-Processual Research this sentence may seem in contradiction to my philosophical beliefs. The only way in which to understand it is to consider it in the context of the research proposal and the interests of the sponsors.

One of my prime considerations at the time of presenting the proposals was that they should be acceptable to the sponsors and, thereby, get the 'go-ahead'. It was certainly the case that I did not intend to have in-depth discussions with staff during that first week, since I wanted it to serve as a familiarisation process for all of us. However, I recognised that this would also be a <u>two-way learning process</u>. Even without detailed discussions with staff, we would all be assessing eachother and making judgements about eachother in relation to our roles, motivations, and objectives within the work-place. A lot of information would be acquired in this two-way learning process.

I used the term 'observational research' and this sounds very positivist - very scientific and objective. What I have described above, however, demonstrated that this was far from the case. Two influences accounted for my use of the term in the proposals. Firstly, observational research was a familiar term, both in academic research literature, and to an extent, within organisations themselves. I saw it as an advantage to use a term which was perceived as 'user-friendly'. Secondly, it explicitly suggested that the person doing the observation was detached from the 'subject' of the research.

Although, in practice, this was not in harmony with my research methodology, I felt it would help to reassure the sponsors that disruption of their staff's work would be kept to a minimum.

This is another example of the politics involved in organisational research. Taking account of the different interests involved in the research project led to certain compromises in the way I presented my research. Although these compromises were not fully manifested in the actual carrying out of the research, no doubt they had an influence on the way in which I collected my information. For example, I was restricted in the timing of, and the amount of time given to, my discussions with staff.

WEEKS 2-4:

This section focused on the time taken to talk with staff on a one-to-one basis. This, again, reflected the main concerns of the sponsors i.e. staff time spent away from their desks.

The use of the term 'initial sample' sounded positivist, too. In fact, the only reason why this quantification was made was that the sponsor wanted a figure from which to assess the amount of commitment required. I wanted to leave open my criteria for talking with staff and I was amenable to the idea of having input from others as to who would be interesting and useful to talk to (the example given here was the sponsor's Team representative). Once again, the language used in this section appeared to be positivist:

> *"If the initial sample size proves not to be large enough to provide a reliable information base, then it may be necessary to request additional people."*

I had an ulterior motive here. I felt I was restricting myself in

print by having to quantify a number of 12 staff for discussions. The sentence quoted above was intended to provide a 'loophole'. Since my research methodology did not utilise quantitative sampling methods, I needed to give myself the opportunity to talk with as many staff as possible. The 'loophole', though, had to be couched in language which would be acceptable to the sponsors.

The time taken to talk with each member of staff was again quantified: 'about one hour'. I could not possibly have foreseen this and, so, it is a 'guesstimate' which I felt the sponsor would find reasonable and practical, especially as it was to be spread over a period of three weeks.

The last sentence regarding the de-briefing of the Project Manager (and others) was included for two reasons: firstly, to underline the 'action research' features of the research and, secondly, to reassure the sponsors in terms of the information which would be taken away (especially in the light of their concerns regarding confidentiality).

APPENDIX : DISCUSSIONS WITH STAFF - AN OUTLINE

The issue of confidentiality also accounted for this Appendix.

The sponsor was concerned to know what kind of questions would be asked of their staff and the sensitivity of the areas to be covered. It was difficult to envisage exactly what would be addressed, since my research methodology was not based on a pre-determined and structured framework. However, I envisaged that there might be some common areas of interest, and it was these which I listed in the Appendix. The use of the word 'might' in the first sentence was an important part of the phraseology in this respect!

A brief comment is appropriate on why I included these items on the list.

- Job Title and Areas of Responsibility:

To provide information on individual's roles within the project, and the range of skills.

- How the Project Team Fits into the IT Group and the Organisation:

To provide information on how the project fitted into the wider organisational context, as well as its relationship/status/image within the IT Group itself.

- Personal Details including: Age, Education, Training, Previous Experience, Career Aspirations:

To provide information concerning the personal profiles of individuals in relation to their roles and skills on project, their career potential within the organisation, and to highlight any connections between individual backgrounds and the way in which the organisation perceived them.

- The Work of the Project: Exposure to the Technology, Staff Experiences:

To assess to what extent the project was involved in leading edge technology, exposure to new skills and roles, and to have access to their views on the future of the analyst and programming roles.

- How Much Staff Know about the IT Group:

To provide information on the extent to which staff were aware of

what developments were taking place elsewhere in the Group, to check their perceptions on their role within the wider context and, perhaps, to see if they could identify their future potential roles outside of their current project.

- How Much Staff Know about Sponsor A:

To provide information similar to the above but at organisational level.

The latter two areas were also included in order to explore differences in CULTURE at two levels:

1. Differences between the culture of the IT Group and Sponsor A.

2. Differences between the cultural image portrayed at the organisational level, and the perception of the culture as experienced by the staff.

As was mentioned earlier, no explicit reference to culture was made within the proposals for political reasons. This aspect of my agenda was of a covert nature and, so, could be regarded as another compromise in the presentation of my research.

Sponsor B

THE FEASIBILITY STUDY

The feasibility study was the process by which I secured a suitable project for study within a second sponsor. After the first study was completed, I decided to conduct a feasibility study to see which of the three remaining sponsors of the IT Skills Project would be willing and able to offer help. The main reason why I adopted this

strategy was that I was conscious of certain political forces at work which were threatening to restrict the choice of its location. The intention of the feasibility stage, then, was to open up the possibility of participation to all three sponsors on an equal basis.

The first step in conducting the feasibility study was to compose some correspondence which would inform the sponsors of the current stage of the research, interest them in offering their participation, and encourage them to submit some suggestions for project areas. The correspondence was, therefore, prepared with a political motive; I responded to politics with politics.

I decided to involve my two other research colleagues in this stage by consulting them about what form this should take. One main reason for this was that I did not want my involvement in the first organisation to influence its content too much.

It is interesting to note the term "Instrument" to describe the correspondence which was distributed. This was coined by my research colleagues whose backgrounds were in psychology. It had specific, scientific connotations and, on reflection, I do not think it sat easily within my research framework. It was perhaps an unfortunate choice in the sense that it may have given the reader certain impressions concerning the motivations and expectations related to the feasibility exercise.

What follows is an analysis of the Instrument and it is hoped that this will clarify the position.

(Please read it in conjunction with Appendix 9.)

THE FEASIBILITY INSTRUMENT

The Instrument consisted of 5 parts: covering letter, time schedule, list of criteria, research proposal, and project information sheet. Each of these are discussed in turn below.

COVERING LETTER

According to this letter, the purpose of the mailing was two-fold: to appraise the organisations of the criteria needed to complete my PhD study, and to help them decide whether the work would be attractive and relevant to their company.

Under point 1. I said:

> *"In the event that no area can be found which fulfils all these, a decision will be made on the basis of 'best fit'."*

This was an expression of compromise and flexibility. I was critically aware that the organisations may find my demands too onerous and that, if I was not careful, I could find myself with no offer of co-operation at all. However, the sense of urgency in getting the research underway, was apparent from the reference to "the very tight time horizon". This was also seen in the proposals presented to Sponsor A. As a result of a delayed start to the first piece of research, the timetable was now quite restrictive.

THE TIME SCHEDULE

This was self-explanatory. It should be noted that there was a delay in getting replies from the three sponsors, so that the research, once again, did not commence at the planned time. This, and other factors (including illness), contributed to the fact that Sponsor B's report was not completed until three weeks after the preferred deadline of 30th July, 1990.

LIST OF CRITERIA

This was broken down into two sections: practical, and scenario-based criteria. These terms arose from the discussions I had had with my research colleagues about formulating the Feasibility Instrument.

The practical criteria related to what could be seen as the more quantifiable aspects of the resources needed to complete the study: time (mine and theirs), numbers of staff, and deadlines.

The scenario-based criteria were selected to reflect major research issues and interests. The first three items were rated as 'vital'. The request for leading-edge technology was triggered by my work within Sponsor A where the project had been largely involved with old technology. I wanted to balance this for my second study. The second two vital points reflected my PhD focus i.e. the study of analysts and programmers, as well as the fact that Sponsor A had been in the process of introducing the new job family of analyst programmer. Thus, it was clear that the focus for this second piece of research was strongly influenced by the first.

The 'desirable' criteria also related to my experiences within Sponsor A. My main objective with these items, again, was to balance the data I had collected from the pilot exercise. I wanted to ensure I could access perspectives from a range of employees in terms of age, sex, experience, seniority, business/technical expertise, etc., as I had done within Sponsor A.

The request for the involvement of business analysts was, perhaps, the best evidence for arguing that the Findings from Sponsor A had had a strong influence over the feasibility study. Those Findings had suggested that developments in the role of analyst programmer would be mirrored by developments in the role of business analyst. The basic premise was that former programmers would become analyst programmers and former analysts, business analysts. I wanted the opportunity to explore whether this had occurred in another organisation (see Findings chapter).

RESEARCH PROPOSAL

This proposal was based on the second research proposal presented to Sponsor A. Therefore, many of the points have already been analysed and will not be repeated here.

The proposals were divided into three sections: research contribution, resources, and discussions with staff.

RESEARCH CONTRIBUTION

As with the proposal to Sponsor A, the research was presented as contributing in a number of different ways. Instead of referring to these as levels, however, they were expressed in terms of the reports which would result: i.e. in a quantifiable way.

1. Sponsor's report:

In discussing this I, again, talk of "a brief account of the research process". In other words, I was still not adopting a very collaborative approach. Yet, ironically, the final report did contain quite a large amount of detail as to how the information was analysed.

The examples given of specific and general findings were different from those in the second proposal to Sponsor A. These were modified in the light of the Findings from the first study.

Findings at the specific level:

- training and retention of current project staff
- future skill needs of the area under study

Findings at the general level:

- recruitment issues for technical staff in general
- future role of analyst programmers within the organisation

The main difference was the emphasis on recruitment, training and retention. This

reflected the importance of the lifecycle of the employee as it had emerged from the first study. I saw this as a shift away from the 'hard' areas of technology and skills towards 'soft' issues. Experience had shown by this stage that in order to understand what technology and skills would be of importance to organisations in future, the whole arena of an individual's entry into, and exit from, that institution had to be examined. This would include how people were selected, how they were trained and deployed, and their personal development. The culture of the organisation was at the heart of this; although, again, I did not mention it explicitly for the same reasons I did not include it for Sponsor A, i.e. politics.

2. PhD thesis:

The phrase "Until the fieldwork has been completed, progress on the PhD will be severely restricted" indicated my continuing anxiety to keep to project deadlines.

3. Milestone report:

As explained earlier, the deadline for this report was later postponed.

4. Major report - IT skills project:

The subject of confidentiality was always of central concern to the participating organisations.

RESOURCES

Week 1: The only significant difference to Sponsor A's proposals was the omission of the reference to drawing up an organagram and lines of communication. The first study, in line with my philosophy, did not involve these functionalist approaches to interpretation and, therefore, I decided not to include them.

Weeks 2-4: It will be noted that, following my work within Sponsor A, the length of time taken to conduct an interview had been extended from one hour to 90

minutes. Also, I included staff as well as management in the de-briefing stage. Since I had made a presentation to staff for the first sponsor, I thought it would be appropriate to offer the same to the second.

DISCUSSIONS WITH STAFF - AN OUTLINE:

These items were much the same as for Sponsor A's proposals but more succinctly expressed.

INFORMATION SHEET

This contained the same information as for Sponsor A.

SECURING AN OFFER

There was a difference between the processes involved in acquiring projects for study within Sponsor A and Sponsor B. In Sponsor A, the offer of help came before the research proposals were submitted to them. In Sponsor B, however, the offer of help was acquired after the proposals were submitted.

One possible implication of this was that Sponsor A was more enthusiastic to take part - they offered help before they had anything in writing. This idea was an interesting one in so far as it informed a comparison between the two companies' reactions and responses to the final reports. It is, therefore, worth bearing this in mind when reading the section on Feedback (Conclusions and Recommendations chapter).

THE PARADIGM YAKS

"Your thoughts wound slowly round the room like beasts rubbing against the drowsy walls. And outside the walls the winds rubbed like drowsy beasts. Half-way between the inside and the outside walls, winds and thoughts were both drowsy...

You had run away from huge, terrifying world outside these four walls against which your thoughts rubbed themselves like drowsy yaks. Yes, that was what they were like. Yaks. Exactly like yaks."

(Gibbons, 1932, pp113-114.)

Yaks are pretty solid creatures.

Although long-haired they are distinctly lacking in the livelier aspects of the hippy stereotype. I wouldn't want to have to broach a yak. Even less so a whole herd of yaks. (Is 'herd' the right term or would 'yawn' be more appropriate?)

A yawn of yaks would certainly be a considerable barrier to innovation. How to shift all that solid, heavy weight? A bit reminiscent of the researching part of myself (see Thoughts on Writing Up). A positive deterrent.

Positivism feels a bit like that. Unyielding. Dense.

When I come up against that sort of barrier it drains the energy. 'So much effort, and will it make any difference?' One against the many. The positivist deterrent.

A sort of dullness descends accompanied by despair. Hand in hand they bring a guilty defeat. The yaks form a wall-like barrier to your progress. 'Leave your offering at the edge of the wall', they say, 'we can't be penetrated'.

So you do. And then you retreat. In defeat.

That's how it was. At least, that's how it feels it was.

I brushed the dust from my hands and returned to my corner. Would the yaks take the offering? Or would the passage of time see it trodden into the ground by those massive hoofs, unregarded?

I tried to justify my actions. The onus was on them to accept or reject my work, I couldn't decide that for them. Theirs was the responsibility. Mine the sacrifice. Oh, what a marvellous martyr! I had fulfilled my own prophecy (see Thoughts on Writing Up).

Paralysed by the positivist paradigm. Catchy title for an author? No. Just the despondent admission of a researcher. So often do we fail to put into action what we put into words and even less so what we believe in our hearts. That was the sacrifice. It was no good trying to externalise the process. Blaming the yaks was not enough, I had to come to terms with my own yakness, my own heaviness. The heaviness of unfulfillment.

Once I had done this I began to see where I had taken on yak-like form. In trying to become 'acceptable' to the sponsors' paradigm I had compromised my message. In compromising, the message was diluted. I had separated myself from my offering. The subject had withdrawn from the object of her labours. In Pirsig's terms (Pirsig, 1974), I had let quality slip from me. The irony of the situation was that without quality the message had no hope of penetrating the paradigm walls anyway.

Sponsor A

The second set of research proposals to Sponsor A proved to be more acceptable than the first, and arrangements were put in train for my entry into the organisation. A project had been selected as suitable for my research (hereafter referred to as Project X) and I felt a sense of great relief that I would be able to begin my study. Later on, however, an interesting aspect occurred to me with regard to this scenario. When the details of the proposals were first discussed, a number of options had been suggested by the 'interpreter' (sponsor's Team representative) as being possibilities for the location of my work. None of these had included the Project X. Yet, when the go-ahead eventually came through, these choices had been removed and the project location was presented as a *fait accompli*. I made gentle enquiries about this at the time but, never received a full explanation. I concluded that this was for political reasons.

Once within the organisation (13th February, 1990), I discovered that the project area assigned to me had a low profile within the organisation and, indeed, this issue was deemed of sufficient importance to the staff to be included in the final report to the sponsor (see Findings). In terms of studying the future of IT, the selected project area did not seem the most obvious choice. I wondered whether I had been assigned to the project for some other reason. Perhaps it was felt that the least amount of damage could be done there, or the least amount of disruption to important work, etc?

After completion of the research, I discussed my thoughts on status with the sponsor's Team representative and received a completely

different perspective on the matter. Apparently, Project X had been added to the list of possibles after discussions with me, and that is why I had been unaware of it. On the other hand, some choices on the original list had been excluded. Contrary to my beliefs, Project X had been viewed as a very important project and one which would provide a suitable spread of areas; i.e. covering old and new developments, and incorporating the introduction of structured working methods which were being rolled out through the organisation. It was also considered to be small enough in terms of staff numbers (i.e. 30 staff) to fit my research requirements, as well as having the time necessary to co-operate with me. Also mitigating against my view that Project X was of reduced importance within the company was the fact that Sponsor A took my final report very seriously.

I found it interesting, though, when the staff told me later that my research had been the most exciting thing that had happened to them for a long time. Sponsor A's representative commented, too, that it would not have been possible to assign me to their 'flag ship' project (for which Project X was acting as a development tool test-bed), since they would not have been able to 'spare the time'. Clearly, even though my original impressions may have been wrong, there were certain priorities accorded to projects in terms of their criticality, and Project X did not fulfil these criteria.

A good example of the perceived low status of the project was demonstrated by one of the software developments in which they were involved. It was known as an 'icebreaker', testing out some technology on behalf of another, larger project (with higher accorded status). I designed a picture to encapsulate the feelings of the project staff. They found it expressed the situation well and 'adopted' it by displaying it around the office. It was still there a year after the research was completed. The picture is shown in Figure 22 (thanks to Mark Simpson and Nick Mandis for the art work).

ICEBREAKER PROJECT

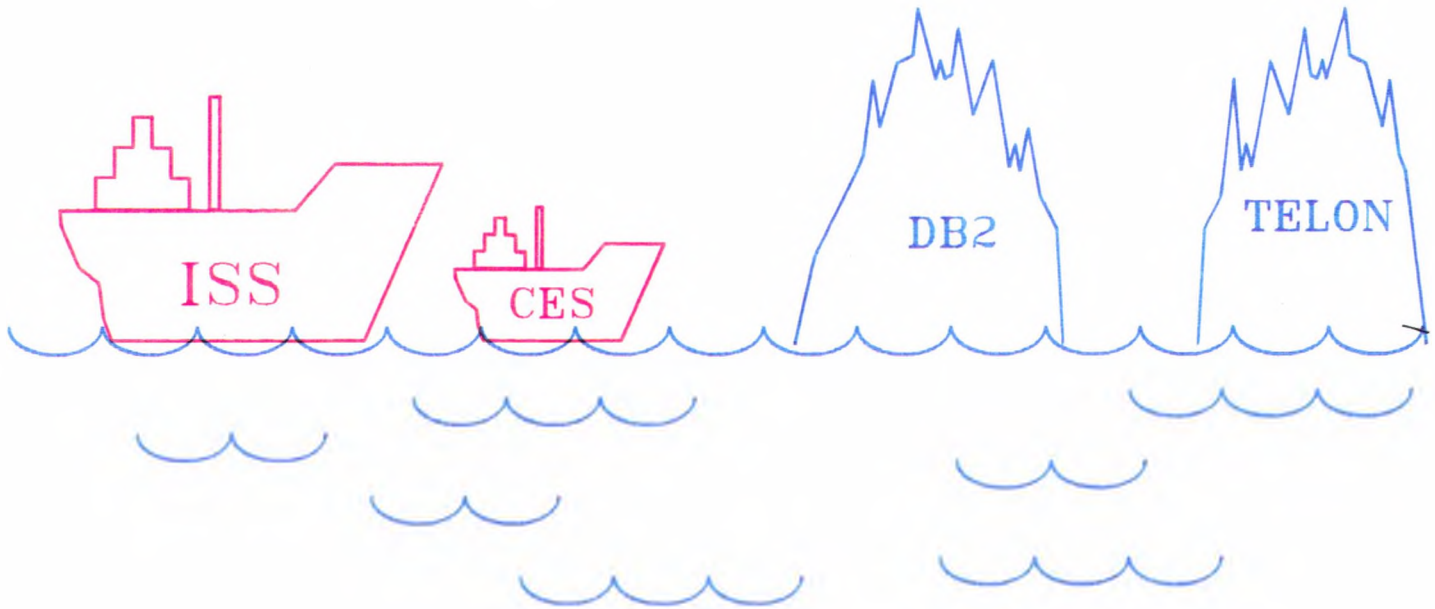


FIGURE 22: STATUS OF PROJECT X

One of the most convincing pieces of evidence in favour of interpreting Project X as low status came in response to the report on findings. Sponsor A agreed that Project X had a low profile and accepted my suggestion that they make a video which would help to address this problem. (These points are reported in Conclusions and Recommendations.)

Sponsor B

Completion of the feasibility study was considerably delayed whilst waiting for the final decisions from each of the three sponsors concerning their project offers.

I had conducted the feasibility study in order to ensure that everyone had an equal 'bite of the cherry'. I was concerned that pressures were being brought to bear which would restrict the choice of organisation to just one. The irony of the exercise was that the only organisation who did manage to provide a suggestion for a research area, and to put the necessary arrangements in order, was that very one!

It would be tempting to suggest that this result had itself been the result of political maneouvres but, I am convinced that this outcome was entirely coincidental. The two other sponsors were in the process of undergoing quite radical organisational changes and were not willing to share the nature of them yet. Sponsor B, on the other hand, had gone a little further down the road in this respect, and had already gone to the national newspapers over their re-organisation.

When Sponsor B contacted me in response to the feasibility instrument, a project had already been selected (hereafter referred to as Project Y). I did not, therefore, know much about the process that went into choosing it. Nevertheless, there were some interesting similarities with project X concerning its perceived status.

Project status within Sponsor B was inferred from something called a 'project priority rating'. As the term implied, this rating indicated how critical a project was to the

business. Because IT support was organised centrally, this meant that projects had to compete for their resources. Naturally, projects with low priority ratings were less likely to receive immediate support than those which were of a high rating. Project Y had been given one of the lowest ratings.

Low ratings had an affect which went far beyond the practical considerations. It also had a severe affect on individual morale and motivation. This was compounded by the fact that low rated projects had a tendency to be wound up ("de-scoped") and the staff relocated across different departments. Two comments which illustrated this situation were:

> *"We might limp on to next year ... it is so bad for morale."*
>
> *"It's the not knowing that is so awful."*
>
> *(Taken from discussions with members of staff.)*

It was not surprising to find, therefore, that morale was generally low on the project when I arrived. I was tempted to believe that my assignment to the project reflected its likely demise.

FIRST FORAYS INTO THE TWO ORGANISATIONS

Sponsor A

The first visit for my pilot study to Sponsor A (12/2/90) was made in order to talk to the manager of Project X. The team representative accompanied me on this trip in order to make the initial introductions but he did not stay for the remainder of our discussions.

The project manager was not aware of much detail on my work or that of the wider IT Skills Project, of which it formed a part. A number of issues were covered at this meeting including: what the research was about, its aims and objectives, and the second set of research proposals.

This discussion was taped, as were all the non-casual discussions I had with staff. The manager gave me a thorough overview of his project. He told me who the staff were, their roles, a little bit about their background, and his opinion of their performance on project. The latter was particularly useful since it gave me an 'official' view with which I could later compare my own and those of the staff.

Other areas which we covered briefly were arrangements for staff appraisal, training, the new analyst programmer job family, and future skill requirements.

The project manager seemed quite excited and interested and very willing to offer as much cooperation as possible. I made a point of saying that I would keep him informed of progress at regular intervals. We arranged a time for our next meeting and agreed that we would play the rest 'by ear' as and when we felt it necessary. We both preferred a flexible approach.

After our talk, the manager escorted me to the desk where I would be located for the period of my research. He commented that they had removed "the pornographic picture" for me! (My preconceptions relating to sexism had been confirmed.)

I learned that there were monthly Project Communications Meetings at which staff were informed of work going on both inside and outside the project. The next one was to be a few days after my first visit (14/2/90) and it was agreed that it would be an ideal opportunity for me to find out about work in progress and to meet a number of staff.

I attended the Project Communications Meeting and heard a presentation on the work of the groups with whom I had acquired desk space, and

had most contact during my research. Attending this meeting, therefore, was very useful in helping me to understand their work and to relate to them more closely at an early stage of the research.

I was formally introduced to the staff at this meeting. They had been made aware of my arrival only the day before via a memorandum which was circulated round the office. The penultimate sentence is worth repeating here:

> *"In April when the research is complete and analysed, we hope that Carole will be able to present her findings to us."*

This related to a suggestion I made to the project manager at our first meeting. I decided the Communication Meetings would provide an ideal forum for presenting my research. It would not only be a good opportunity for two-way discussion on the work between myself and the staff of the project but, would also show that I was adopting a participatory and open approach to the research rather than keeping it 'under wraps'.

It was re-iterated at the Communications Meeting that I would be presenting the research to the staff at the end of my study. This received a favourable response and I believe it instilled confidence and trust in the staff concerning my role.

Sponsor B

When I was contacted by Sponsor B with an offer of a project (but before a decision on the remaining sponsors had been made), I was advised to contact the project manager direct. When I did so, I discovered that he was keen to be involved and willing to offer whatever help was needed.

There is no doubt that my work within Sponsor B was influenced considerably by my experiences within Sponsor A. This has already partly been demonstrated by the analysis of the feasibility instrument.

Before it had even been agreed that I would be conducting my research within Sponsor B, I had been invited to attend a planning meeting with the project manager in order to get a feel of the context (31st May, 1990). This open attitude contrasted with the more risk averse one experienced within Sponsor A.

I visited the project manager again after the final agreement had been made in order to discuss my research needs and to agree on an initial framework for the exercise (14th and 18th June, 1990).

These meetings followed much the same format as for Project X, with Project Y's manager giving me some background to the staff, the project, and the organisation in general, especially relating to skills and roles. The first of these meetings also involved my sitting in on a discussion with one of the project section leaders concerning software development guidelines for programmers. This was to highlight issues relating to development methodologies (see Findings).

By the end of the second meeting, it was also apparent that a major culture change was underway and that this was having an ambiguous affect on the staff. So much so, that the project manager asked me specifically to warn him if any of the team were thinking of leaving.

This raised the question of ethics for me. To what extent would I be cast in the role of management 'informer'? I felt that there may be occasions when it would be in the interests of the employee for the manager to know about their dis-satisfaction. However, I decided that I could not convey information of a specific nature, e.g. actively looking for another job, or going for an interview, etc. I was anxious to develop a relationship of trust and confidence with project members. My dilemma was eased by the fact that the project manager was very much a people person, and his caring skills were considerable. It would have been unusual for his staff to

avoid expressing their feelings, anyway. I viewed his request as more of a symptom of the changing and uncertain atmosphere than of his own self-doubt.

OUTLINE OF THE APPLIED RESEARCH WITHIN SPONSORS A AND B

FIRST OFFICIAL ARRIVALS

Sponsor A

The first official day of this study was 15th February, 1990.

Remembering that the first week of the pilot was to be 'observational research', I made no attempt to arrange one-to-one discussions with the staff. Instead, I concentrated on getting to know who was working on project, the general atmosphere in the offices, the accommodation layouts, etc.

The layouts included plans of where project staff sat. On arrival in the morning of the first day, I was impressed to find that there was an updated seating plan (for my area of the office) on my desk with my name and extension number added to it (Appendix 10). This was an early example of the project staff's efficiency. Also, by incorporating me into the documentation of the project, I was encouraged to feel part of the team.

The project staff were located in two different areas. The majority of the staff, together with the manager, were located within a main office. The rest (the group with whom I had my desk) were located in an open-plan arrangement, along with a number of other projects. This fragmentation of the project team gave rise to practical communications problems.

The reason given for my desk being within the latter area, was that there was no spare room in the main office. When I arrived this certainly appeared to be the case.

When I began the research within Sponsor A, I thought it might be interesting to compare the background noise levels between the main office and the open-plan area. The manager and the staff did not object. Noise tests were repeated over a range of days and times. I did this almost intuitively, hoping that it would help me to appreciate the workplace context of my research. I was struck by the interest of the staff in this exercise. It was queried, with verve, as to whether or not I would be making recommendations concerning the accommodation situation. It transpired that the whole issue of accommodation was a priority concern with the staff and had been the subject of a number of debates between them and management. The project manager had been lobbying his superior on the subject, too. The importance of this issue was reflected in the fact that it represented a separate section in the final report to Sponsor A. It is also worth noting the political nature of this area and the fact that it was one of the areas Sponsor A criticised as being of irrelevance, as reported in the section on Feedback (Conclusions and Recommendations chapter).

Sponsor B

The first official day of the second study was 18th June, 1990.

It was suggested that I use one of the section leader's desks while he was away. I got to know his staff more quickly than the others because of the way the office was arranged. Each section was divided up by screens which were nick-named 'six-packs' (six people to a section, including section leader). I noted with amusement the connotations of drinking beer since the whole software division were

known to spend most of their lunches and some evenings in the pub. This was something which they had in common with Sponsor A.

Once the absent section leader had returned, I moved to another six-pack. There was no other member of the team seated here, so I felt a little isolated at first. The six-pack was intended for the users of the software to come and 'practice' or ask questions. This rarely happened and underlined the problematic relationship which existed between them, as is reported in the Findings.

Despite the seating arrangements, I got to know all the project staff quite quickly, especially as there were fewer staff than on Project X and they were all within the same office.

COLLECTING INFORMATION

Major sources of information which I utilised within both sponsoring hosts were:

1. Information produced at organisational level

2. Personnel records

3. Media cuttings and reports on the two companies

4. In-depth and casual discussions with management and staff

The first three categories comprised mainly secondary sources (information conveyed through a third party, etc.), whilst the fourth was a primary source (directly recorded from the originator). It was partly for this reason that I accorded particular importance to the discussions.

INFORMATION PRODUCED AT ORGANISATIONAL LEVEL:

As with most large companies, a vast amount of information was generated by the two sponsors. One of my major concerns was to keep what I collected to a minimum in order that it could be analysed effectively. However, I later realised that I had collected too much to analyse it all in depth.

The information fell into the following main types: literature produced by the organisation for general circulation, information provided through managers outside the project, and memoranda and papers produced by the project staff for circulation within the project.

The internal project information helped me to gain an insight into what work the staff were currently focusing on, their main concerns and problems. The organisational literature helped me to understand the overarching organisational culture and to compare staff reactions with it. The information provided by managers outside the project helped me to understand links between the project and the wider context, and to discover if there were any themes of common concern.

Although the types of information I collected from each sponsor were similar, I found the amount was reduced in Sponsor B. This was a conscious modification of my activities in Sponsor A, where I had collected far too much for proper consideration. Even so, the documents from Sponsor B tended to be longer and more formalised than for the other host. This was because their culture change and re-structuring had given rise to the publication of numerous guidelines for management and staff.

A brief example of each of the different categories of information is given below in order to demonstrate their usefulness:-

ORGANISATIONAL LITERATURE:

Sponsor A

Item: Induction guide for the IT Group.

Outcome: Many issues could be discussed leading from this material but, one which most impressed me concerned the organisational culture.

The induction package contained a number of documents including two small booklets. The package conveyed the impression of a strong, unified culture. One quote from each of these illustrates the point:

> *"What holds us together is a shared history, a shared belief in what we are and a shared vision of where we are going."*
>
> *"Our aim must be to provide our customers with first class service all the way and to develop the Quality Service values into a way of life."*
>
> *(My emphases).*

The first quote was taken from a booklet entitled "The Sponsor A Way". This in itself showed that the organisational culture was intended to be a way of life for staff. This convinced me further of the importance of discovering the staff perspective.

Sponsor B

Item: A management handbook on Total Quality Management

Outcome: The following quote encapsulated how the organisation envisaged TQM:

> *"Our primary goal is to serve our customers well in every respect. That means identifying their specific requirements*

and then meeting them - first time, every time. This is what Total Quality Management is all about."

The introduction of Total Quality Management (TQM) into the organisation was a major issue for the staff I talked to and was an integral part of the overall culture change taking place. The extent to which staff felt they were able to meet user needs under the procedures in force at that time was also one of the major questions addressed in the Findings and explored through the theatrical metaphor.

SPECIFIC INFORMATION FROM
MANAGERS EXTERNAL TO THE PROJECT:

Sponsor A

Item: Tour of the department which utilised the software which the project was developing.

Outcome: This tour provided an insight into the criticality of the software which the project was developing. It highlighted the importance of meeting development deadlines, of avoiding computer system failures, and of improving system response times. The function which the project supported was critical to the business. If the system were to crash, the business could have been bankrupted overnight, and it would have had severe implications for the national economy, too.

Ironically, the department utilising the software had a very poor image within the organisation, and a low informal status rating. This was in clear contrast to the criticality of its operations.

Another area of interest within this department was the use of the colours red and blue. I had noted this symbolic theme during work within and around the project. Partly as a result of this tour I

decided to explore the use of these two colours as the basis for a symbolic analysis. This is reported in the chapter on Findings.

Sponsor B

Item: Reports on the re-structure of one IT division

Outcome: A review of a software development division had been carried out as a TQM project and recommendations made on how to improve quality of service for customers. The main recommendation was to centralise a number of functions relating to systems production and systems assurance and services. It was noted that one of the objectives was to "improve the effective use of scarce skills".

At the time of the field work, the re-structure had already taken place and received a mixed reaction from staff. With the prospect of the same changes occurring within their own division, the questions which centralisation versus de-centralisation raised for members of Project Y featured in the final report to the sponsor.

INTERNAL PROJECT INFORMATION:

Sponsor A

Item: A program specification written by a junior programmer.

Outcome: This document highlighted problems at two levels.

At the level of the project, it showed that new entrants were finding it difficult to integrate technically into a project environment. The project staff were not utilising to the full the Logical Structured Design Methodology (LSDM) techniques which were supposed to have been introduced as a company standard. New entrants, however, were coming fresh from training courses with no other methodology under their

belts. This realisation caused a slight shock to the system for the newcomers, who felt compromised and were unsure as to how to continue with their work.

At the level of the organisation, it highlighted the need for the use of case studies, taken from current projects, in order to illustrate how to put LSDM standards into use. It also revealed the lack of commitment on the part of staff to put LSDM into practice. Both these points were included in the report to Sponsor A, and were subsequently taken on board for action.

Sponsor B

Item: 'Real Programmers Don't Use Pascal'

Outcome: This document was one of a number of jocular items circulating the project as symbols of more serious opinion. Indeed, it would almost have been possible to suggest what were the most important issues for staff just by examining this collection of literature.

This particular joke concerned the 'macho' image accorded to real programmers. As it said:

> *"If there is any truth in the cynics' claim that programming is a sex substitute, then this article represents the first genuine piece of computer pornography.....*
>
> *Like all truly great smut, it expresses those forbidden and immoral thoughts that all good citizens (i.e. structured programmers) have learned to suppress."*

The underline is mine and draws attention to the main point of this joke, which was that structured programmers had not only given up their right to be called 'real programmers' but also that they had been suppressed in the process (actually, by the process). This might be a view with which writers like Kraft would concur. Certainly, the idea of suppression and the elimination of the creative aspects of

programming were evident from the training videos which the sponsor showed to trainee programmers.

Structured methods presented a number of problems for project members and these are discussed in the Findings.

PERSONNEL RECORDS

Sponsor A

In order to gain some insight to the organisational view of individual staff, I requested access to the personnel records of those working on the project. The project manager gave me permission to view his records, and cleared access to the rest of the staff via the Senior Personnel Manager.

I did ask staff if they would provide a copy of their performance appraisal documents during the one-to-one discussions. Nobody objected to this.

The personnel records gave me a useful base with which to compare the comments of staff concerning their personal career development, skills, and aspirations. Performance appraisal forms were examined to compare the comments and views of their superiors to those of the staff concerned. Some interesting issues emerged. An example was team work which was presented at corporate level as a major part of the dominant culture. The general organisational literature often expressed an appreciation for the range of skills and abilities required within a successful team. The personnel records, however, together with casual remarks by management, revealed that this did not apply at the individual level of performance appraisal. It became clear early in the research that certain skills and personality

attributes were accorded high esteem at the expense of others, e.g. extroversion (an outgoing personality) versus introversion (a more reserved personality). This theme was also found to link into the symbolic colour analysis of red and blue (see Findings).

Sponsor B

The situation within Sponsor B was somewhat different. I was not given permission to see personnel records *per se* but some of the staff gave me duplicates of their appraisal forms.

Without the same detailed access to information as Sponsor A, it was not possible to make the same sort of inferences concerning the wider culture. Nevertheless, they generally contributed towards building up a picture of areas concerning the whole lifecycle of an employee (recruitment, training, development and retention), which became a prime focus in the Findings.

MEDIA CUTTINGS AND REPORTS ON THE TWO COMPANIES

Both companies were regularly in the media because of their large size and connection with the general public. Nevertheless, during the period of my field work, both received a higher than usual profile, due to the fact that they were experiencing re-organisations and changes in culture.

It was useful to compare how the companies' presented their future plans in the media against experiences of them in the work place. Perhaps unsurprisingly, the two did not always coincide.

In the case of Sponsor B, one incident made a strong impression. There was an announcement in the press of which the staff previously had been unaware. It proved to be a shock for them. This event did nothing to instill confidence and became part of a wider mistrust of the motives behind proposed changes.

WHAT DO YOU WANT?

INFORMATION.

IN-DEPTH AND CASUAL DISCUSSIONS WITH MANAGEMENT AND STAFF

CASUAL

Throughout the field work my note-taking was fairly extensive. When I began at Sponsor A I wrote my ideas down on an A4 note pad. After a few days, however, I decided to use a smaller notebook which I could carry around with me at all times. I developed a technique of writing down my observations and ideas in private, either at my desk, or during break times in the canteens/restaurants (provided I was sitting alone).

In both organisations information gathered from casual remarks was incorporated into my private notes at the first available opportunity, to reduce the chances of delay erasing what had been said.

At the time, I felt I did not want to share my private views on individuals. This private note-taking was one of the main factors which mitigated against any claim I could have made to being collaborative in my research approach.

IN-DEPTH

In-depth discussions formed the main basis for the information gathering exercise, both in terms of volume and in terms of providing suggestions for further sources.

In this thesis, the use of the word 'discussion' rather than 'interview' is deliberate. 'Interview' suggests a structured session between an interviewer (the person in control) and an interviewee (the subject of the interview). The structure is usually formalised and revolves around the pre-preparation of a set of questions, or themes, which the interviewer wants to ask, and assumes a certain power relationship in terms of the way a session is conducted. The interviewee is usually assumed to have given permission to be 'examined' by the interviewer.

The in-depth discussions which I had with staff contrasted with this scenario in a number of ways:

- There was no pre-prepared schedule of questions, only an indication of general areas (see below).

- The set-up was always informal: for example, one session was in a local pub, whilst many others took place in canteens, restaurants, etc.

- The subject of 'control' was discussed at the start of the session, where it was made clear that they would be guiding the discussion as much as possible. That is, I was aware that there might be moments when they appeared to 'dry up', or where they raised interesting points which I wanted to probe further. At these times I wanted to be able to continue the discussion if possible but without making them feel that I was directing it. Nevertheless, it is always difficult to draw the line between facilitating and biasing.

In so far as there was a set-up common to all discussions, it is described below.

At the beginning of each session I explained to the individual that I was not intending to conduct an interview. I said that the idea of the discussion was to give them the opportunity to mention anything which they considered important in the context of their working life.

Every discussion began with confirmation that the person had understood what my research was about and the aims and objectives involved. (Every member of the project had already been given a copy of the IT Skills Project's latest information sheet and one of my business cards.) One of the aims stressed at the beginning of the session was my desire for discussion to be directed by their concerns and ideas rather than by a schedule which I had prepared. There were, nevertheless, certain areasof interest to me, of which I appraised them. These were:

- education and training background
- interest in IT
- role within the project
- the role of analyst programmer
- career aspirations
- views on the employing organisation/current issues

Once a number of discussions had taken place, certain issues began to emerge as being of general concern. Although I did not want to compromise my informal approach, I did sometimes introduce an idea, which had been raised by others, in order to compare responses. I described this technique as 'prompting'. However, I did not draw up a list of these items for reference. I wanted to keep the sessions as free-flowing as possible. If an individual had not yet referred to one of the areas on which I particularly wanted their views (e.g. the new analyst programmer job family), then I probed for these responses but, only when it seemed appropriate to the subject under discussion at the time. Therefore, it is fair to say that I did influence the direction of the discussion at certain points.

In general, I invited questions concerning my work and that of the University. I also encouraged spontaneity; that is, if something occurred to them during our talk, it should be raised, even if it seemed to have nothing to do with what we were focusing on at the time.

The vast majority of individuals took an historical approach, beginning with the oldest information they could remember and progressing through to the most recent. I believed this was their way of making sense of the information they held, of structuring their views and recollections. It was a logical order, reflecting the tendency for people to recount experiences chronologically. It was not a structure which I imposed.

There was only one person (within Sponsor A) whose approach contrasted with the rest. It was intensely personal, recounting aspects of life before joining Sponsor A. It was the longest discussion. The information which they gave me provided a context for issues such as matching individual personalities and skills to IT roles; issues which were to feature in the Findings.

The actual content of discussions varied most between those who were working on Project X/Y and those who were not. This was largely due to the fact that the latter were often at management level within the organisation and that their management 'agendas' were different to those at lower levels. Discussions with these 'external' people tended to be pitched more at an organisational level, providing a useful overview. Since they were not able to speak personally in terms of working on the project itself, discussions focused on their experiences within the organisation, and what contact they had had with, and their perception of, the project.

I was pleasantly surprised at the willingness of people to discuss their own personal backgrounds and experiences within the company and IT in general, rather than just conveying their official 'party line'. This ensured variety within my information base. Despite the inevitable variability of individual opinion, I was collecting a similar spread of information from both the internal and external project sources.

Given the large number of people with whom I was dealing within the two sponsors, the chances of being refused an in-depth discussion were quite high. This proved to be the case within Sponsor B when one person was very reluctant to take part, saying that they were much too busy. Towards the end of my field work I drew up a list of the themes which colleagues had raised and asked if they had any comments. The response was that the themes were very typical of their own feelings but that they had nothing to add.

Initially, I had been concerned that the refusal was a result of suspicion or a feeling of alienation concerning my work, and I wondered whether my lack of full collaboration had brought this about. However, I was pleased to find that this was not the case. At the end of the field work, they expressed their regret at not being able to participate.

In the research proposals to Sponsor A, I had suggested the number of people I wanted to talk to would be approximately one dozen. In fact, the number of in-depth discussions which took place with people on the project was 19, 17 taking place with people working outside the project; a total of 36. Once the research was completed, however, I felt too many sessions had been arranged to enable me to fully analyse them in the available time. I, therefore, decided that when I ran the methodology again in another sponsor, I would attempt to reduce this number.

As already indicated, Sponsor B's project was smaller than Sponsor A's and so my selection problem was reduced. I applied the same criteria for targetting staff: age, sex, time with sponsor, seniority, IT experience, and educational background. In-depth discussions took place with 10 staff internal to the project, 11 external to the project, and two from other organisations who were recommended by Sponsor B as having useful information; a total of 23. These last two were mainly concerned with training and development issues.

Appropriate timing of discussions was agreed with each individual member of staff, normally based on a one-hour duration. The length of sessions varied, though, ranging from just under one hour to two hours. The majority, however, lasted one-and-a-half hours. This time period seemed to be a 'natural' dis-engaging point for many people.

Every session was taped but, conducted in complete confidence. There were no objections to the use of the tape recorder, either at staff or management levels. The tape recorder was placed centrally so that either of us could switch it off easily. On several occasions members of the management team took up this opportunity in order to relate something which was of a sensitive nature.

One interesting observation I made concerning these talks was that very few people went into them feeling they had much to say but, that most of them discovered this was not the case. My impression was that they often left feeling more positive about themselves. Sometimes the sessions felt therapeutic. Individuals were letting go of feelings and thoughts during the discussions which appeared to make them more relaxed. It was something like a pressure valve being released. I concluded this was

because my research approach gave staff the opportunity to air their views in a way which they rarely had the opportunity to do. By contributing to a project sponsored by their senior management, they were able to feed their perspective into the higher level organisational one, and to have it incorporated into a report presented at senior level.

CONTEXTUAL-SYMBOLISM IN ACTION

Sponsor A: Thematic Networking

Once the project area had been agreed with Sponsor A, I went to meet the project manager. I took the precaution of mentally re-affirming my preconceptions about the organisation beforehand but, I did not write these down until 15/2/90 (a few days after first entry). It is possible, therefore, that my ideas altered, and that I did not record on paper exactly what I had been thinking before I arrived. Indeed, I could not hope to exhaustively record the role of my subconscious in the process of forming prejudices but, at least the exercise helped me to identify some major biases in my personal baggage. Some of these preconceptions were to be fulfilled. I added to, and altered, my list as I got to know the people better, so that it reflected my personal impression of the organisation resulting from experience.

The decision to create this list of characteristics was linked to my research methodology of networking the data (adopted from symbolic archaeology and discussed in the previous chapter, Stage Two). This list was used much later when I began to try and make sense of the data which I had collected.

Once I had completed the information gathering I identified the issues which had occurred most often and which were the most emotive for the staff, and I wrote them down one side of a sheet of paper. On the opposite side, I wrote the characteristics of the organisation

from my personal list. I then compared the two columns, noting links with eachother, ways in which they were in conflict, and common themes. In other words, I networked them. (Details of what was networked is discussed in the chapter on Findings.)

In adopting this technique, I made my biases an instrument of analysis rather than trying to eliminate them; I attempted to practice my belief that, contrary to positivism, it was valid to celebrate the role of values in research.

Sponsor B: Metaphorical Networking

I did not adopt exactly the same form of networking for Sponsor B. With the second study it seemed appropriate to adopt a metaphorical approach to analysis. This was indicated to me by the terminology used in the company and influenced by the fact that a professional actor was working on the project. It was largely he who helped to clarify some of my ideas.

The networking exercise conducted here consisted of making a list of theatrical concepts on one piece of paper and drawing up the process of software development in projects on another, since this was where most of the issues discussed with me were located. I then networked the two together. The result was that the theatrical metaphor became the vehicle for making sense of the data. It suggested incompatibilities of organisational procedure and highlighted some possible causes of problems raised by staff.

I did not draw up a list of characteristics for Sponsor B. I do not really know why. It was certainly not because I had no preconceptions. I had expected there to be a Civil Service style culture, emphasis on documentation, bureaucracy, risk averse and conservative culture, and a split between IT and business functions. It may have been because my expectations were not so strongly felt, or that I expected to find much the same situation as with Sponsor A. It is difficult to be clear on this.

What I am sure of is that I would have done so if it had seemed appropriate, especially once I was inside the company.

This difference in approach between the two sponsors is not a problem for me. It is, rather, an example of the contextual nature of my methodology, whereby different contexts call for different modes of constructing meaning.

PRESENTING THE FINDINGS TO SPONSORS A AND B

In each case, I presented my interpretation of the information at two levels: a staff presentation, and a senior management report. The reasons for this have already been referred to in the previous chapter (Stage Three): I wanted to encourage ownership of the information by the staff and provide an opportunity for further feedback and comment before the findings were seen by senior management.

Both presentations were taped and I encouraged the staff to view this as an 'equalising' mechanism; they had been taped sharing their ideas with me, now I was being taped sharing my ideas with them. The major differences between the two organisations related to the format which the presentations took, and the reactions of their respective senior managers.

FORMAT

My reluctance to be open with Sponsor A concerning the academic details of my research methodology, had repercussions for my mode of presentation. I adopted the formal approach expected within the project's Communications Meeting framework. I had been much more open with Sponsor B, though, and this expressed itself in the fact that I extended the theatrical metaphor I had used in analysing the information to the way in which I presented my thoughts (see Findings). The presentation took place at a completely informal session. The most appropriate comment on this situation came from one of the staff at Sponsor A:

> *"Why did you give them [Sponsor B] a more interesting presentation than you gave us?"*

I had long been aware that there was a sense of anonymous rivalry between the two groups. When I started work within Sponsor B, I was often asked questions about what the staff were like at Sponsor A. Similarly, when I met up for social occasions with groups from Sponsor A, I not only received post-research feedback but also questions concerning how they 'matched up' to the staff at Sponsor B. There was concern on both sides relating to notions of being 'good' or 'bad' at their jobs. I believed the question posed above reflected a fear that my treatment of Sponsor B was in some way more favourable because they were more 'deserving' of it. At another level, it may also have been a consequence of my less collaborative approach within Sponsor A.

I support the notion of presenting findings in a way which most suits the context from which they sprung, but I regret this particular view on difference now and would be careful to avoid it in another study.

SENIOR MANAGEMENT

It was characteristic of differences between cultures that the senior management of Sponsor A reacted in self-defence to the findings, whereas the senior management of Sponsor B was much more open to the perspective of an 'outsider'. Unfortunately, this also affected the way in which the reports were utilised. Sponsor A ensured that the report was not read by other members of the organisation, except the manager of Project X. Sponsor B disseminated the report to other levels of management, with the aim of distributing the management summary to every manager in the division, and obtaining their comments.

The feedback I received from the sponsors is detailed in the Feedback section of the Conclusions and Recommendations chapter.

THE FOLLOWING CHAPTERS

The theoretical beliefs underpinning this thesis prevent any clear-cut division between a discussion of methodological application and findings arising therefrom. Rather, the contextual and symbolic aspects of the methodology were only fully demonstrable after data had been collected.

The next chapter, therefore, will combine a review of the major issues arising from the data gathering process, with a description of how they were interpreted for each organisation.

The final chapter will include conclusions which draw together the findings from both Sponsors A and B, plus comments on the research methodology, and recommendations for further research.

PART

FOUR

RESEARCH FINDINGS: RE-CONSTRUCTIONS WITH THE HELP OF SYMBOLISM AND METAPHOR

ROUTE MAPS AND SIGNPOSTS:

RESEARCH FINDINGS

The Findings chapter presents some of the main issues arising from the fieldwork and their analysis using contextual-symbolism.

In Sponsor A, there was a perceptual gap between the cultural beliefs of top management and those of staff at lower levels. This was most apparent in management perceptions of analysts and programmers, and their respective suitability for progression through the career structure.

This dichotomy was evaluated through an analysis of the symbolic use of red and blue in the workplace, and the established stereotypes challenged. The findings suggested that a change in attitude was needed in order to provide a satisfying employee 'lifecycle'.

The organisational changes required in order to provide an appropriate environment for such a lifecycle are considered in more detail in the Conclusions and Recommendations chapter.

In Sponsor B, a similar cultural divergence was detected which manifested itself in the way that Total Quality Management had been introduced into the organisation. A focus on written rules and procedures predominated at the expense of an appreciation of individual commitment and contribution. The latter was deemed to be essential to achieving full TQM.

Using the metaphor of a theatre production, key relationships were clarified at project level, and a conflict in role-playing identified as a major cause of problems. The challenge which these problems posed for Sponsor B were thought to be symptomatic of a common tendency to ignore the value of people.

TQM emphasised autonomy and creativity at the individual level. Where organisational cultures were bureaucratic, risk averse, and conservative, the changes required to successfully implement TQM would be significant. The latter point is taken up and discussed in more detail in the Conclusions and Recommendations chapter.

INTRODUCTION

This chapter will combine a review of major issues suggested by the information gathering process, with a description of how they were analysed. It is approached from a methodological angle rather than that of practical outcome (in contrast to the final reports to sponsors). The reason for this is two-fold: firstly, because of the methodological focus of the thesis and, secondly, because there were far too many items to include them all here.

The final reports to sponsors were fairly lengthy and covered a wide range of issues. The Contents list from each report is reproduced in Appendix 11 for interest. However, for the purposes of this chapter I have had to be more selective. I applied two criteria in making the choice: the strength of emphasis put upon an issue by the staff themselves, and its appropriateness for demonstrating application of the research methodology. For collaborative reasons, I have drawn fairly heavily on relevant material from the presentations which I gave to staff. The chosen topics are discussed below for each of the two sponsors.

SPONSOR A

(WITH COLOUR)

As mentioned in the previous chapter, I produced two lists of items from my research within Sponsor A. One represented the major issues suggested by the information gathering process, and the other my personal views of the organisation, modified in the light of my experiences there. Here they are:

List One: Major Issues Suggested by Information Gathering Process

Analyst Programmer Job Family

Consultancy Job Family

Status of Project X

Status of IT Operations

Accommodation and Office Environment

Quality Service Action Teams

Documentation (revealing a systems approach to everything, including training)

Prestige of the Analyst versus the Programmer

Status Accorded by Age

Sexism

Culture of IT versus the rest of Sponsor A

The 'Us and Them' of IT Division

The Stereotypic Recruit/Culture

Fast Software Response Times

Overtime Issues

Suspicion of Bought-In Staff and Software

'Sponsor A Standards' within IT

List Two: Personal Views on the Organisation

White, Male-dominated, Young Workforce

Working Class with Upwardly Mobile Intentions ('The Cockney Boys Who Made It')

Pub Oriented

Cigarette Smoking

Gambling and Competitive Sports

Sexism and the Use of Bad Language

Strong White Shirt/White Sock Brigade Syndrome (Squeeky Clean, 'Wide Boys' Image)

Extroversion

'Having a Laugh' Approach to Life Admired by Peers

Team Spirit Given High Priority

Relaxed Atmosphere

Qualifications Oriented with Intellectual Aspirations

Business Knowledge Emphasised

Three Letter Acronyms (TLAs) as a Display of Knowledge

Management Oriented

Command of Respect as Ultimate Accolade for Individuals

Bureaucratic

Conservative and Risk Averse

8.30 a.m. - 5.00 p.m. Hours of Work

'Home-Grown' Staff (Hangover of 'Job for Life' Attitude)

The lists contain some terms which require elaboration. I shall attempt to sketch in some of the axiological background in the following paragraphs.

The image that I had of bank employees grew from my engagement with a number of different sources. Like many, I had had personal experience of bank staff by virtue of the fact that I had a bank account and conducted transactions from time to time with counter staff. I had noticed that there tended to be a high proportion of women amongst the total number of (visible) branch staff. This is a generally accepted point, I have found. Furthermore, the vast majority of bank managers and senior staff are men. This seems to be another generally accepted point. Added to this, however, was my notion that 'back office' functions, like IT, were accorded a higher status within the banking world than the more visible teller roles.

I think my reasoning went something like this:

Women are not well represented amongst the more senior positions in the banking world.

The area I am about to research (i.e. IT) is accorded a high status by most companies. This was echoed in the literature and by the Team Representatives on the IT Skills Project).

Therefore, I should expect a low proportion of women to be working within IT.

Perhaps because of my feminist beliefs (see Stage One of the Journey Through Post-Processual Research), I extended this package of expectations to include the assumption that, if they were absent, it would be due to some form of bias in recruitmentand development policies.

In discussing my feminist beliefs ealier in the thesis, I also argued that women have been generally under-valued in the technological domain. Since IT implied technical expertise of some sort, I believed a gender bias within these departments was even more likely to exist.

'Pub oriented' is meant to imply a drinking culture. My own sexist notions included that a male-dominated environment would tend to orientate its socialisation around public houses, wine bars, and so on. But is also went beyond this. As mentioned before, Sponsor A had a civil service-type culture: risk averse, paternalistic, etc. (see below). I had worked for such an organisation for five years. It, too, had been a very male-dominated place. Staff spent many lunch times and evenings socialising with work colleagues in the local public houses. It was part and parcel of the organisational culture.

I had no reason to expect Sponsor A to be any different. So, in this instance, I expected confirmation of my prior experiences.

The 'wide boys' concept was a very visual one. It, too, was allied to what I had seen of staff in bank branches but it was also influenced by the views of Sponsor A's Team Representative. The image was one of young lads with white socks, trousers just a little too short to cover them, smart suits, white-white shirts, and hair slicked backwards. These were the type who dreamed of making it big in the City and concentrated on graft in the workplace rather than on intellectualism. For me, the classic representation of this stereotype can be seen in yellow coats taking a smoking break outside the Stock Exchange in London at certain times of the day.

The expectations I had in terms of general organisational culture relate to experiences of both a personal and impersonal nature. At the personal level, I myself had worked for five years within a very large, ex-Civil Service organisation. Whilst there, I became imbued in its culture. The features of the culture were in line with what I have since gleaned about many other large organisations in the UK. Indeed, as discussed in the chapter on conclusions, there is an argument to support the case that UK business in general is of this type.

The type I am referring to is often coined as 'bureaucratic' but it goes beyond this. The complicated hierarchical organisational model with which I became familiar as part of my own working life, carries with it consequences such as slower decision making processes, a profusion of paperwork and rule-compliance. Living by rules excludes the possibility for acting on instinct and this, perhaps above all other traits, is the one which contributes towards the scenario I outline in the final chapter of the thesis.

For the moment, it is sufficient to say that my expectation of the culture within Sponsor A was along these lines. I found that other researchers within the same organisation had been of the same opinion, too (Lawrence, 1987).

Lawrence's study included comments such as 'risk averse', 'paternalistic', 'bureaucratic', and 'convinced by numbers not arguments'. This latter quote was of particular interest in the light of the qualitative/quantitative phenomenon I had experienced when submitting my research proposals (see the previous chapter, "A Journey Through Two Organisations").

However, one of the traits in the second list contradicted what I had expected to find. I had thought there would be a predominance of introverted (reserved personality) staff within IT. As the list shows, I found much more evidence of extroversion (out-going personality). This issue is expanded further below because it formed part of an important finding concerning the skills profile of analysts and programmers.

I had expected to find a narrow range of skills of individuals (see pre-research expectations). This was partly borne out in that staff tended to get locked into a project and were unable to develop themselves fully in the vertical plane. The training of staff was standardised, their Systems Approach to Training ensuring that no-one adopted a 'nice-to-know' policy, instead tying all training strictly to an obvious demand at the current time. The staff development and the Systems Approach to Training is discussed further below.

Having set down on paper a synthesis of both the major issues which staff had raised during the research (List One), and of my personal views on the organisation and its members (List Two), I began to formulate ideas about the relationships between the two. The process was primarily a cognitive one and it proved to be very stimulating because it led me to crystallise a number of areas where the perceptions and practices of Sponsor A were hindering development of their human resources. These areas are discussed next. Traits from both lists are brought together in the material that follows.

A CHANGE IN CULTURE AND THE IMPORTANCE OF THE 'TEAM':

At the time the research was conducted many companies were attempting to demonstrate their ability to meet and respond to customer need. Most of them approached this by way of cultural as well as structural changes.

Sponsor A was no exception. Their declared objective was to improve customer service; customers being both internal and external to the organisation. The emphasis was on everyone's job being a means to providing a better service for someone and, therefore, a more successful business. Competitive edge was presented as attainable through the efforts of all staff, and team work as essential to ensure this.

The organisation had introduced a number of work procedures in an attempt to ensure that 'quality' was achieved throughout the business (the concept of Total Quality Management is discussed in more detail in later sections of the thesis). There were also a number of videos produced on the subject of changing to a 'quality' culture and which promoted the notion of team work andteam skills. I watched some of these. One, in particular, caught my attention for some reason. I discovered that, by slowing down the video, the slogan "Quality Teams" had been used in a subliminal way, flashing across the screen very quickly. Thus, I quickly realised how important the concept of team work was to Sponsor A at that time, and the theme of team work and team skills appears frequently, as will be seen.

Two of the work procedures which were introduced and which proved to be popular topics of conversation with staff were Quality Service Action Teams, and Formal Methods. I shall discuss these next.

QUALITY SERVICE ACTION TEAMS (QSATS)

QSATs were groups set up within projects in order to explore and solve problems encountered in the work context, thus enhancing overall quality.

A consideration of the concepts behind the term QSAT itself illustrated some important cultural traits of Sponsor A:

QUALITY ~ SERVICE ~ ACTION ~ TEAMS

Quality: a better product, better staff, good business, competitive

Service: the nature of the business and the business sector

Action: doing not thinking, getting things done, speed

Teams: the key concept of co-operation, working together, agreement

The procedural aspects of QSAT were well documented. Roles for the participants were created and described in manuals for staff. They included Team Leader and Team Member. A role of Facilitator was devised to oversee the running of a QSAT without actively intervening in its work.

The precise documentation of QSAT was typical of the organisation, mirroring other areas of documented standards and work procedures. Team Leaders were given the appropriate training to enable them to, in turn, train Team Members in problem-solving and communication skills. Membership of QSATs was voluntary.

There were a number of advantages to QSAT. It encouraged staff to take a deeper interest in the work of their project, the working

context, procedures, etc., and developed in-house skills; especially inter-personal, leadership, time management, and meetings skills. It also provided a forum for staff to discuss issues without management supervision, and gave them the opportunity to comment on their general working environment.

This chance to voice unfettered opinion imparted a feeling of empowerment to the staff, at least initially. Unfortunately, however, many people became disillusioned.

Although it was presented as voluntary, the organisational directive was that every project in the company should have a QSAT. Hence, there was pressure on managers and staff to form one in their area. Neither was QSAT a guarantee for change. Its affect was still largely dependent upon the responsiveness and support of management. QSAT recommendations could easily be blocked by superiors and bureaucratic regimes. When staff failed to see their suggestions being implemented, they lost their enthusiasm.

The focus on teams was interesting and could be interpreted in at least two ways. The marketing strategy for the culture (especially evident from the company videos) was to convince employees that their jobs were important and that they were making valuable contributions as individuals. On the other hand, the business could not have operated without employee co-operation. The organisation had to promote an image of solidarity and mutual respect in order to maintain its market position (management control in disguise?). It was noted, though, that the emphasis of the quality culture was not on employee well-being as such, and not on improvements in the working environment. It was with irony, therefore, that I discovered the very first QSAT held on Project X had focussed on this topic and that it had had limited affect when presented to management.

Staff highlighted two main influences on the work of the programmer at Sponsor A. One was related to technical developments and the other to the introduction of formal methodologies into daily work practice.

The affect of technical developments on the nature of the software development lifecycle and, hence, the role of analysts and programmers, is demonstrated by reference to the illustration of information engineering in Figure 23.

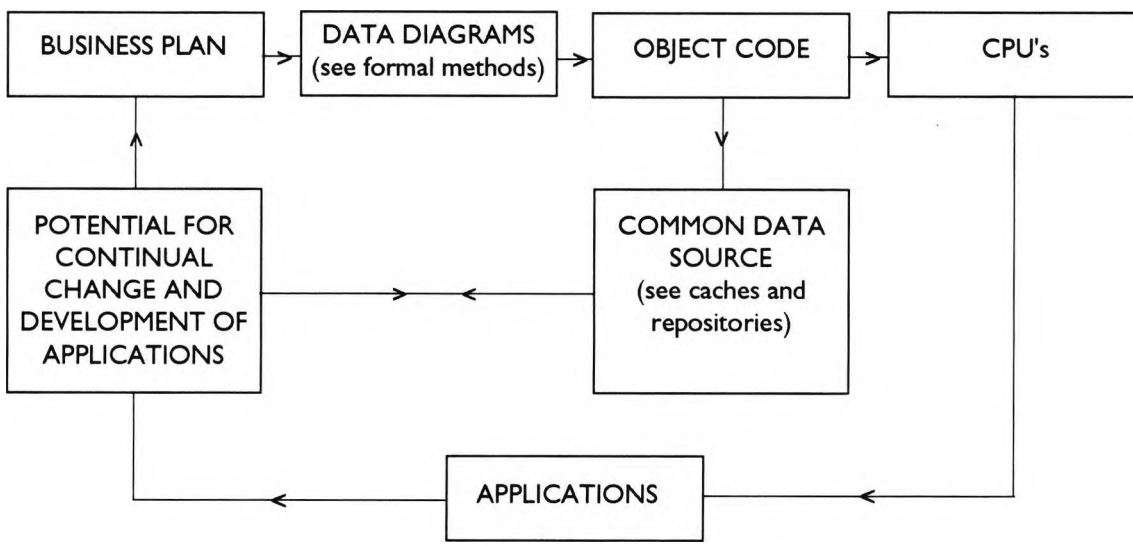


FIGURE 23: INFORMATION ENGINEERING: THE LIFECYCLE OF THE FUTURE?

In the information engineering scenario, the majority of development work takes place at the front end of the cycle (from the business plan, devised by business analysts, onwards). This is usually considered to be the domain of the analyst. The back end is almost totally automated, giving users the potential to update their own applications by drawing on a common data source (e.g. repository, etc.).

COBOL (a high level language), TELON (a code generator), and DB2 (a database management package), were all endorsed by Sponsor A as standards for future software production. These fitted into the information engineering scenario. One of the objectives of these tools was to reduce the level of technical skills required to use them. It seemed likely that the amount of manual code production would fall along with the number of pure programmers. A 'new' generation of analyst programmers was envisaged, whereby skills were focussed on the front end of the development, whilst still retaining some technical programming skills.

Both analysts and programmers recognised this potential for change and it was one of the factors which gave rise to their doubts about the new analyst programmer role.

As part of a move towards a quality culture, Sponsor A had introduced formal methods to the software development lifecycle. These were called Logical Structured Design Methodology (LSDM) and Jackson Structured Programming (JSP), both techniques of which were already well known in the business world.

LSDM was devised by a company called Learmonth and Burchett Management Systems (LBMS) and was described by them (in confidential literature supplied by Sponsor B) as:

> *"... an established approach for the analysis, design and specification of computer systems...*
>
> *LSDM is a method for the development of information systems projects providing procedures and guidance in the following areas:*
>
> - *what is to be done*
> - *how it is to be done*
> - *where and how deliverables are to be recorded*

Related issues such as project management and strategic planning are dealt with by other LBMS methods..."

(LBMS Plc, 1988)

JSP was created by Michael Jackson (who set up his own company), and was described by them in one of their own brochures as:

"...concerned with the design of programs and is used both within JSD and with other systems analysis method [including LSDM]. From a logical examination of the data to be processed, the design for the program is derived. Generation of the code in the chosen target language is a simple mechanistic (and automatic) process."

(Michael Jackson UK, 1989)

In theory, Sponsor A had standardised on formal methods for the whole lifecycle but, in practice, only the analysis followed this pattern (using LSDM). This was because programmers had a number of criticisms concerning the application of JSP.

The advantages of structured techniques such as these were acknowledged as:

- ensuring everyone worked to the same standard
- facilitating error-correction
- removing the necessity to 're-invent the wheel'
- enabling the developer to focus on novel features, thereby increasing the creative aspects of the job

However, these were thought to be more than outweighed by the disadvantages.

LSDM highlighted the physical divide between the work of the analyst and that of the programmer. One comment was that it gave the analyst the potential to do most, if not all, of the creative problem-solving. Some senior programmers might have the opportunity to focus on the 'novel features' mentioned above but, this still left the majority of programmers with little more than a repetitive code-cutting role.

Another criticism of structured methods was that they tended to shield a bad programmer whilst frustrating a good one. In other words, by following a formalised design, the abilities of programmers became obscured. Experienced staff felt JSP added little value to their output, arguing that they always applied structure to their work, anyway. The detail involved in following formal methods not only increased the amount of documentation but also extended the timescales involved. Supporters of LSDM and JSP argued that this loss in the short term was more than compensated for by gains in the long term relating to ease of maintenance and modification. In view of Sponsor A's 'ACTION' culture, promoting fast response times, the negative reaction was not surprising.

It was also suggested that formal methods did not necessarily improve communications with the users, this being dependent upon how the methods were applied. User communications were not deemed to be as much of a problem as within Sponsor B. Nevertheless, one of the project staff gave me a document which, whilst being humourous, managed to convey some of the dis-satisfaction associated with formalised software development (see Appendix 12). [Note that Chief Programmers were no longer always leading the team. Quite often it was an analyst.]

Another problem was the nature of existing software on Project X. In contrast to the organisation's future direction, the existing level of software sophistication on Project X was low. Formal methods were

not designed to be used in this context. The fact that they were not in use throughout the company compounded confusion for programmers when presenting code to the rest of the team for scrutiny (known as 'walkthrough exercises').

This was particularly evident amongst new programmer recruits who had arrived fresh from training. They found themselves in a dilemma. There was little in the way of guidelines on fitting the new methods to low level languages and few people on project applied them, anyway. I recommended that some sort of real live case study be introduced into training courses in order to equip trainees to deal with non-formalised project environments and to enable them to better integrate into existing teams. This was subsequently incorporated into training plans.

Comments on QSAT and formal methods suggested that there was a mis-match between the perceptions of quality culture held by staff and the application of quality methods imposed by management.

ANALYST PROGRAMMER JOB FAMILY

Sponsor A were in the process of adding a new job family to their IT career structure at the time of my research. Existing staff were grouped into the two main types of analysts and programmers. Now a new 'cross-breed' was being encouraged: the analyst programmer. This reflected an established and widespread trend linked to the changing nature of the relationship between users and development staff (Friedman and Cornford, 1989).

Broadly speaking, the role of the analyst on Project X was to liaise with the user to produce a specification for the required software, and the role of the programmer was to translate it into computer code.

According to management these two roles required different sets of skills, especially in relation to inter-personal communications.

The company argued that the new analyst programmer role would introduce more flexibility into the career structure, enabling staff to cross from one area of expertise to another with greater ease. Behind this was the general idea of encouraging a wider skills base in the face of existing and expected skills shortages in IT. However, staff were suspicious of the motives, for example, seeing the merging of roles as an indication of possible job losses and/or de-skilling (see Wood, 1989 for an alternative perspective).

This fear was certainly plausible in the light of technological developments. The move towards third and fourth generation languages called for greater analytical skills but fewer 'code cutting' ones. An organisational commitment to code generators would promote this trend (IDS, 1989). It was unsurprising, then, that 'pure' programmers felt insecure about their jobs.

Analyst programmer job definitions had been circulated to staff (via management) and staff had been surveyed to assess their potential interest in transferring. However, transfers were to be made only on the recommendation of managers. Meanwhile, staff wanted to know more about the purpose of the new addition, especially as many of the senior programmers believed that they were already doing an analyst programming role, delegating routine code-cutting to their junior staff. This comment highlighted the fact that job title (as seen by the organisation) and job content (as experienced by the individual) were not necessarily the same thing.

Based on personal experience, I believed a stereotypic view of the role of analysts as contrasted to programmers existed in the IT market in general (see also Pettigrew, 1973, for an historical account). I

had seen it manifested in debates between individuals at organisations with whom I had had contacts in the past. At the time, I had taken this situation for granted, regarding it as a feature of IT culture. Now my research suggested that a similar situation existed in microcosm within Sponsor A.

I believed the introduction of the new job family would call for a mental, as well as a physical, adjustment in terms of how teams were perceived. The analyst programmer role did not receive a warm welcome by staff, partly because of the underlying suspicion concerning motives, and partly because there was an analyst versus programmer rivalry. The organisational scenario, which was similar to that I had encountered before, was summarised as:

Analysts = Failed Programmers

Programmers = Failed Analysts

Therefore,

Analyst Programmers = Plain Failures?

Some people I spoke to felt that the analyst programmer role was a half-way state; as one person said:

> *"You won't know if you are a programmer or an analyst!"*

Yet this could be interpreted as an inappropriate criticism in one sense. The new situation was not black and white, as the comment suggested, but grey. The problem, as I saw it, was that the new job family was three-dimensional and would not fit easily into the existing two-dimensional mode of thought. One senior manager told

me that the organisation was not very good at dealing with 'grey areas'. How, then, would they tackle this one? It appeared that closer communications were called for between the senior levels and the staff affected by the changes. This gap in communications was symptomatic of what I saw as a gap between the organisational culture and the workplace context.

I was, therefore, triggered into considering the nature of the stereotypes, to what extent they were supportable, and how their existence (even if only theoretical) had affected the skills and performance of the roles in question within Sponsor A.

Exploring the published literature, I discovered that a number of studies (mostly American) had been conducted into the profiles of analysts (usually referred to as 'systems analysts') although little work had concentrated on pure programmers. Vitalari summarised the situation well (Vitalari, 1985):

> *"The studies are usually based upon a series of skill lists generated by introspection and expert opinion. The skill lists have not been based upon observed behaviour. As a result, we are unable to ascertain whether the skill lists are based upon the beliefs of the managers and systems analysts or the actual performance requirements of the job...*
>
> *In addition, ...each researcher has developed a skill list of their own, making comparisons difficult. Despite these difficulties, the skills studies consistently indicate that, in general, behavioural skills are more important to systems analyst's performance as compared to technical skills..."*

The characteristics of programmers were seen as being the counterpart to those of analysts. At the crudest level, the analyst was seen as the people person (user oriented) and the programmer as the machine

person (system oriented). This resembled the stereotype I had experienced both internally and externally to Sponsor A.
Cheney refers to studies conducted by the ACM (Association for Communication Management) and their recognition of the educational requirements of two types of graduate: technically trained systems designers, and management-oriented information analysts (Cheney, 1988). Cheney's own study was one of few which directly compared analysts to programmers. The comparison between the 1980 and 1987 surveys revealed little change in these profiles. The only significant shift related to the importance of human relations. In 1987 this was ranked higher up the analyst list, whereas it was not only lower for programmers but, much lower than it had been in the 1980 study. This finding was thought to be puzzling in the context of a move towards more user involvement in IT but, was explained by virtue of the perceived shortage of technical skills. As Cheney said:

> *"Evidently, the hiring practices of IS managers are more concerned about the immediate positions to be filled not the existence of skills for future possible management positions."*

He detected a somewhat better correlation in the latter respect between managers and systems analysts than between managers and programmers. This could be intensified with the shift in skills focus suggested by the information engineering scenario.

It seemed, then, that analysts and programmers were set in contrast to eachother in terms of skill requirements and personal profiles. Taking an overview of the published research, the following condensed profiles could be said to represent a general consensus (Joshi, 1990, Green, 1989, McCubbrey and Scudder, 1988, Cheney, 1988, Goldstein, 1988, Dos Santos and Hawk, 1988, Vitalari, 1985, Couger and Zawacki, 1980, Soloway and Iyengar, 1986, Cheney and Lyons, 1980, Szafraniec, 1975, Morris and Martin, 1972, NCC, 1970):

Analysts	Programmers
Good verbal skills	Good writing skills
Ability to deal with people	Analytical ability
A natural leader	Patience
Creative thinker	Good memory for places

Looking at the studies more closely, however, I found that this view could be challenged on several fronts.

It appeared that most studies had relied upon the questionnaire method of data collection. Questionnaires were usually directed at managers and sometimes also at systems analysts, and consisted of a list of attributes, which the recipient had to rank in terms of importance to the job being investigated (this also applied to studies where structured interviews had been conducted). The fact that the recipient was provided with a ready-made selection of attributes, rather than being asked to outline a profile from scratch, meant that the range and content of responses were fundamentally pre-determined.

Although McCubbrey and Scudder (1988) gave respondents the opportunity to add their own ideas, Vitalari's work (Vitalari, 1985) was more unusual in that it used the target population as the starting point; i.e. it was based on discussions with managers and systems analysts. It was, therefore, particularly interesting that his findings contrasted to almost all other studies, with the highest number of references concerning functional requirements of computer systems rather than behavioural skills.

The targetting of management groups with questionnaires may also have affected the outcome of the studies. For example, Goldstein (1988) pointed out that the ability to 'train others' was removed from the analyst programmer list on the basis of feedback from supervisors who

were piloted with the questionnaire. This may also reflect Cheney's point about the relative unimportance assigned to training by management employing IT staff.

The various studies shared fundamental similarities in approach and in the attributes which were submitted to management for comment, some actually basing their skill lists on previous surveys. Thus, methodological constraints were retained and compounded through a temporal span of almost 30 years. No wonder, as Vitalari had realised, their outcomes were so similar. The process had become a self-fulfilling prophecy. By failing to mount a critical self-analysis of the research methodology, each author had initially validated their work on an historical basis. By re-considering the foundations, I believed I had uncovered a methodological 'house of cards'. This was not the first time I had tried to over-turn an accepted interpretation based on a review of the methodological knowledge base. I had done a very similar thing when I conducted some archaeological research in 1987 (Brooke et al, 1991a).

My arguments suggested that previous findings had been covertly influenced by the nature of the research methodology and that a case could be made for basing future research on more collaborative and open-ended inquiry techniques. In retrospect, I believed my research approached this goal (though did not fulfill it). It may not be coincidental, therefore, that my findings, like Vitalari's, differed to prior research. I had revealed a discrepancy between the generally accepted profiles of IT staff and experience in the workplace context itself. Although Sponsor A had adopted a view of analysts and programmers which was similar to that of the dominant (published) stereotypes, this did not seem to be confirmed when dealing with the individuals themselves.

Within Sponsor A, analysts were, indeed, seen as possessing good inter-personal skills, an extrovert personality, a keen interest in the business, and a broad skills base, proving themselves to be 'good management material'. In contrast, programmers were seen as being bad communicators, introverted, and having an interest primarily in specialist technical areas, possessing a narrow base of skills, showing themselves to be 'poor management material'. It was, thus, unsurprising to find that almost everybody I spoke to (staff and management alike) agreed that, in practice, analysts would be unlikely to adopt a title that included the word 'programmer', whereas programmers might be willing to assume a title incorporating 'analyst'.

I wanted to know to what extent the skills and aspirations I perceived amongst staff were actual as opposed to perceptual stereotypes possessed by Sponsor A. I believed the answer to this question would be linked to the organisational culture: what qualities were looked for and how were they assessed?

A study by Green (1989) uncovered a potential source of conflict between users and systems analysts relating to the differences in how they perceived job skills and roles. Users placed high importance on analysts' technical abilities, whereas analysts regarded inter-personal communications to be their most valuable trait. One possible reason for this was that analysts believed they had to rely on behavioural skills in order to communicate with users, whereas possession of a certain level of technical skill (such as programming) was assumed, though not regarded as the most important part of application program development.

If the management at Sponsor A were assessing individuals on the basis of what they thought users expected from IT staff, then this conflict would be reproduced in the project team context. This would be most

likely to occur where the managers concerned had come from a technical, rather than a user, background. The manager for Project X had come from a technical background, as had the majority of other managers with whom I spoke in the IT department. This could, therefore, explain the prevalence of the stereotypes. As Green said:

> *"Management should recognise that successful systems development is dependent upon both behavioural and technical skills...*
>
> *Appropriate training ... should be provided."*

One of my recommendations concerned better recognition of the full range of skills necessary to form an effective team. My research indicated that the stereotypic profiles of analysts and programmers discouraged this. This needed to be considered very carefully in a UK context, since the country's reputation for training was poor (Leadbeater, 1991, p10). This was especially pertinent for me, since my field work suggested that altered perceptions of training would be necessary in order to address the so-called IT 'skills shortages', which are discussed later.

Once again, attitudes towards team work and team skills were of central concern. Certain expectations of teams which consisted of analysts and programmers were uncritically fed into, reified, and re-introduced into the cultural set-up. Thus, the dominant stereotypes served the same function within Sponsor A as in the published literature: a self-fulfilling prophecy.

If people within teams were being categorised by their superiors, this would have implications for staff development, especially in respect of those who saw themselves as being judged negatively (Ahn and Lee, 1988). One person with whom I spoke commented that:

> *"Managers like people who are like themselves."*

This would be one way in which managers (fulfilling the 'manager' stereotype) could help to perpetuate the self-fulfilling prophecy. The implications of stereotyping were evident within the wider framework of Sponsor A's recruitment and training, and it is to these issues that I now turn.

CAREER STRUCTURES FOR TECHNICAL STAFF

The need to create career structures for technical staff was recognised by business experts and researchers alike (Causer and Jones, 1990, Ruhl, 1990). Businesses assumed that not all technical specialists would want to progress through traditional management routes and, therefore, required special attention.

Nevertheless, technical staff were seen as having career needs which were no less demanding in some respects than those of aspiring managers. Rosenbaum (1991) outlined these as autonomy, achievement, participation in missions and goals, support, stimulation, sharing, and professional standing. In fact, this latter point highlighted the interesting situation that many technical employees identify more strongly with their own profession than with their employers (Rosenbaum, 1991). Hence, the importance of providing the right environment in which to develop and retain staff.

The need to provide career fulfillment for technical staff and, thereby, enhance chances of retaining their services, was re-inforced by two other important factors during the time of my research:

- the reported dearth of technical specialists ('skills crisis')

- the tendency for high staff turnover in response to competition for labour (reflected in inflated salary levels)

However, there was a challenging difference between recognising this need and actually providing an effective career path. For example, 'fast-tracks' for technical people only hastened the time when there would be nowhere left to go. All potential analysts and programmers in Sponsor A had to pass an assessment test in order to receive promotion. These exams were held bi-annually. One member of the project expressed this situation as:

> *"You can't grow into a job here now, you have to pass an exam first."*

Sponsor A had also attempted to meet the career path challenge by introducing a new Consultancy grade. The comments received from staff in this respect revealed problems typically associated with providing such infrastructures (Causer and Jones, 1990, and Seward-Thompson, 1990).

Most career progression involved promotion upwards through the organisation. It was generally accepted that promotion meant moving into management grades and that part of the management function was to manage people. A manager's status depended upon five characteristics: salary (linked to grade), position on the vertical hierarchy, financial responsibility, the number of people for whom they were responsible, and the seniority of the person to whom they reported.

Since the career paths were vertical and truncated towards the top of the hierarchy, it was assumed that the higher up the ladder an individual progressed, the more these five characteristics came into play. For example a senior manager would be expected to command a high salary, hundreds of staff, and report to an executive member of the organisation. This perception of seniority was not necessarily compatible with a technical career path, however.

As a result of promotion, there was a tendency for technical experts to become involved in people management to the detriment of their grasp of technical knowledge and, thus, to lose valuable skills (Brooks, 1978). According to the experts themselves, material rewards (such as company cars, higher salaries) did not compensate for this. It certainly did not compensate the company for the loss of their skills.

Some technical staff did not want to move into roles which were seen to be primarily concerned with the management of people (Morris and Martin, 1972, p37). Yet, because of the characteristics which were used to determine status, non-people management roles were viewed as less important by their peers. Brooks had identified this problem in relation to dual-track career structures long before:

> *"It is easy to establish corresponding salary scales for rungs. It is much harder to give them corresponding prestige... A reassignment from the technical ladder to a corresponding level on the managerial one should never be accompanied by a raise, and it should be announced always as a 'reassignment', never as a 'promotion'. The reverse reassignment should always carry a raise; over-compensating for the cultural forces is necessary."*
>
> *(Brooks, 1978, pp119-120. My emphasis.)*

The Consultancy grade was introduced by Sponsor A in March 1989 with the objective, according to management, of providing specialist technical experts with the opportunity to retain their technical skills, whilst progressing through the organisation.

The coming of the Consultancy grade was heralded by many staff as a solution to some of the problems outlined above. Unfortunately, two points had eluded them:

- Consultancy was a grade and not a job family. As such, it would have a limited affect upon alleviating promotional bottlenecks. The intention was to restrict appointment of this grade to no more than about one dozen people throughout the IT department.

- The job description and requirements for the grade were described in terms very similar to those of people management roles, particularly in putting a heavy emphasis on communication skills.

Causer and Jones (1990, p20) echoed this scenario:

> *"The point here is that the project-team based nature of technical work makes it difficult to establish organisational niches outside that structure, and that the provision of technical leadership within project teams normally carries with it a measure of managerial responsibility, even where that position is not formally designated as a managerial one. This is not to say that some organisations do not have scope for individuals who can operate as expert consultants to a range of project teams. However, whether or not this happens is to some extent independent of the existence or non-existence of a formal dual track structure, and even where such posts do exist they tend to be numerically limited."*

Dual track career routes brought their own problems, and these were recognised by the staff at Sponsor A.

The problems included the following:

a) Providing separate career paths for management versus technical oriented roles, resulted in a divergence of skills which was difficult to bridge. Seward-Thompson (1990) has referred to this situation as a <u>skills gap produced by Y career paths</u> (the Y representing the parting of the two tracks). The problem shifted

from being one of providing an upward route for technical staff to one of ensuring that managers and technical experts did not become so differentiated that it was impossible for them to communicate and maintain an appreciation of eachother's areas.

The idea of having a role which combined technical and management skills was commonly prescribed as a solution to the skills 'shortage'. This seemed especially pertinent with the increasing trend towards 'user-friendly' software. The term used to describe this role was 'hybrid'. Much was written about how hybrids should be developed. The British Computer Society set up a Task Group, chaired by Colin Palmer, to investigate the hybrid phenomenon (for a useful summary see Palmer, 1990). My own University launched an IT MBA course to help provide the City of London with suitably qualified people (Anonymous, 1991), and for which I ran a course on computer fundamentals .

However, in order to provide individuals with the necessary range of skills it was also necessary to provide an appropriate environment in which to learn and apply them. The large, bureaucratic nature of Sponsor A had given rise to rigid, formalised career paths, reminiscent of the Civil Service. An individual belonged to a class dependent upon their status, and skill or profession, and this membership determined their future prospects and the range of jobs available (Kellner and Crowther-Hunt, 1980). These sorts of structures did not provide for much flexibility of personal development. Smith (1989) discussed this problem and concluded that:

> *"Staff must be permitted to float up to their own levels of ability, rather than be rigidly pre-categorised according to formal, educational qualifications and recruitment tiers."*

The company training policy itself was rigidly systematic, as evidenced by one document entitled "A Systems Approach to Training", 1984. As it said in the Foreword:

> *"All training should be linked to the business objectives of the [organisation] and it is by this Systematic Approach to Training that we are able to check the cost effectiveness of training and its relevance to the needs of our staff."*

As a member of Training Department explained, this ruled out the possibility of training staff in the 'nice-to-know' skills. The systems model of training is shown in Figure 24.

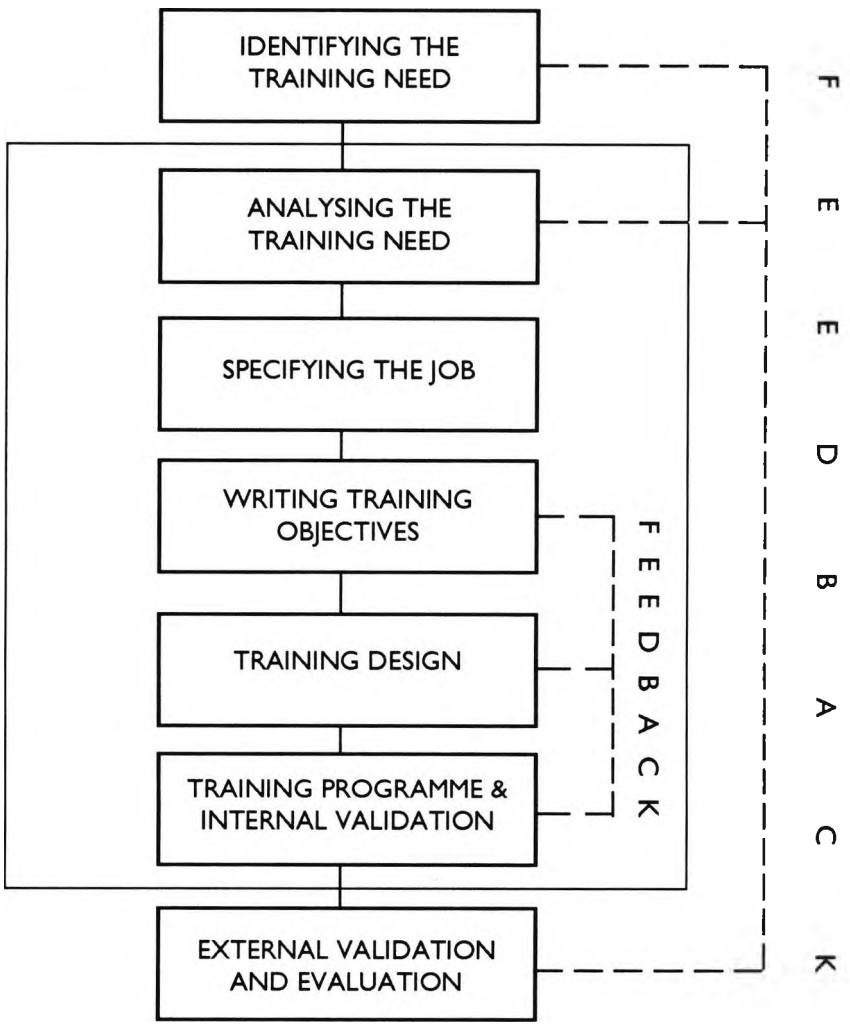


FIGURE 24: SPONSOR A: THE SYSTEMS APPROACH TO TRAINING

There was also a tendency for staff to receive too much training at the time of recruitment. A combination of the systematic nature of the training procedure and the rigidity of the career paths, meant that individuals often found they were unable to put their newly acquired skills into practice, leading to a need for refresher courses later on.

Since the organisation was trying to introduce a culture and a re-structure which would be more dynamic and proactive, it might have been appropriate, especially from the point of view of future hybridisation problems, to bridge career paths by introducing a more flexible approach to training and development.

b) If senior technical experts were promoted to the position of Consultant, it would be likely that they would advise and report to a project headed up by a Project Manager, i.e. a manager in a less senior position to themselves. This, together with the fact that the Consultant would not necessarily have any people reporting to them, created a problem of perceived status.

It could be argued that this was a cultural issue (see the earlier quote from Brooks, 1978). If the culture changed to recognising status in terms of value to the organisation rather than just the criteria outlined earlier, then non-people management roles would be accorded similar status to traditional management roles. Similarly, it was accepted in other organisations (e.g. Digital Equipment Company) that 'reporting' lines only affected the status of a Consultant to the extent that the reportee dictated how to do the job. If the culture at Sponsor A could accept this, then Consultants would be able to increase their mobility and bring their expertise to bear at all levels of the organisation without compromising their own position.

c) The reporting line was still an unresolved issue, however. There remained the question of who could oversee the work of technical experts, especially if they had acquired organisational 'guru' status. Once again, this pointed up the gap that could occur as a result of divergent pathways of skill development. A forward-looking organisation would have to prepare for this scenario, as well as consider how they were already affected by it. Consultants were reporting to their seniors, who often had business backgrounds rather than technical training. This problem was symptomatic of a much higher level one, which was common to many organisations, of the lack of integration between IT and the business.

This lack of integration had a long history in the UK. IT (originally known as Data Processing) had been an autonomous unit in most cases. A certain amount of mystery had surrounded it. The balance of power shifted as technology became more available, cheaper and easier to use. IT was seized upon for its ability to ensure competitive edge in the marketplace. Suddenly, it was important for all managers to understand how IT could work for them. It was, of course, part of this trend which led to the IT Skills Project being set up in the first place (see Abstract). It was also this situation which the hybrid solution was trying to address.

In addressing the nature of skills distribution and the general development of staff, a consideration of technical career structures also informed my perception of analyst and programmer stereotypes as self-fulfilling prophecies within the organisation.

It seemed that there was a perceptual gap between Sponsor A's beliefs concerning technical specialists ('techies') and the information I had gathered about the workplace context. In my presentation to the staff, I expressed this situation as:

CULTURAL BELIEFS CONCERNING 'TECHIES'	WORKPLACE CONTEXT
Prefer non-management roles.	Require promotion into technical roles which have equal status with management.
In general, do not possess good management skills.	All experienced staff are 'managers' in some respect; for example, in leading a team of programmers.
Often lack good communication skills and are rather introverted.	Often possess good communication skills, especially as teachers/ facilitators, spreading knowledge to junior staff.
Techies have a narrow view of the business context.	Technical staff will develop broad views of business systems if they are encouraged to gain experience/train in the appropriate areas.

This contrast raised my earlier concern: were the stereotypic skills profiles of analysts and programmers actually supportable? Were all analysts extrovert and aspiring to management, and all programmers introvert and of a non-management orientation?

The information and comments I had gathered in my research suggested that the answer to this question was 'no'. The situation was far more complex than the simplistic stereotypes allowed; and ultimately dependent upon individual's preferences. Yet, a self-fulfilling prophecy was being generated within the organisation as a direct result of its cultural beliefs. Efforts to provide a technical career path re-inforced these values. The effect was to consign technical experts to an isolated route, with little room for flexibility or self-development.

It was not only career structures which collaborated to reproduce the stereotypes. Recruitment and assessment procedures also contributed.

RECRUITMENT AND ASSESSMENT

A study of the recruitment practices of Sponsor A revealed that extrovert personalities with good communication skills were usually encouraged to train as analysts, even if this was not their original preference. Conversely, introverts with less confident personalities but good technical abilities were generally advised to train as programmers.

It was noted that mature recruits tended to be more confident, by virtue of their previous working experience, and this may have explained why this group was also targetted for analysis rather than programming roles.

This situation seemed to be reinforced during the staff assessment procedures. The managers (and some of the staff) I spoke to believed that extroverts with good communication skills would make good managers, whereas introverts with non-assertive personalities would not. By virtue of the selection process at the point of recruitment, it followed that analysts were more often targetted for management positions than programmers.

This underlined the implications of stereotypic assumptions for the development of individuals. As a result of well-entrenched stereotypes, the potential and development of an individual was being fundamentally pre-determined, reducing the chances for that person to expand into different skill areas.

The analyst versus programmer stereotype was not the only one reproduced through recruitment practices. There were also assumptions concerning the quality of internal recruitment pools, qualifications, and age.

The internal recruitment pools available to Sponsor A included one non-IT and two IT-related sources. The non-IT source was sometimes explored for potential recruits, and on occasions, one of the IT sources, too. However, the second IT area was very rarely considered. This area was also closely associated with Project X itself. In fact, it was for them that Project X produced most of their software systems. It could be argued, therefore, that these individuals would possess a good basic understanding of the business context, as well as a user perspective, on the technology. The apparently low status accorded to the department prevented these arguments being pursued in depth. It seemed that the negative prejudices over-ruled the positive potential.

The Civil Service features of the organisational culture meant that recruitment and selection were very qualifications oriented. This was a characteristic of many organisations, though, not just Sponsor A. Nevertheless, it was noted that many senior people in the company had not joined with many paper qualifications. It was also ironic that most people seemed to believe programming roles were more dependent upon motivation, application and sound training than anything else.

Another stereotype concerned the commonly held belief that it was very difficult to acquire new skills, especially technical ones, beyond a certain age (what age depended upon whom I talked to, but started as early as 28 years old). Comparisons which have been made of the IT learning abilities of older as compared to younger age groups, has failed to substantiate this assumption.

Academic research has been conducted into age-related differences in the performance of IT skills and concludes that less than 10% of observed variation is due to age (Gist et al, 1988). However, when considering the initial training of individuals rather than post-

training performance, the research revealed age-related differences according to the methods of training being used (Czaja et al, 1989).

Of course, other factors need to be taken into account here, such as levels of familiarity with equipment, self-confidence, transferrable skills. Nevertheless, this research highlights that qualitative issues of the type of learning environment and training methods are at least as important as the skills which are being taught, not just for older learners but for everyone. These points are significant for any organisation wishing to make the most effective use of their most valuable resource: people.

KEEPING THEM APART

LSDM, JSP, career structures, analyst versus programmer stereotypes - what did they all have in common?

It was my philosophical beliefs concerning holism which brought this into focus for me. Separation. That was what they all shared. What do I mean by separation? I mean the deliberate introduction of division.

I have already said that LSDM emphasised the physical division between analysts and programmers. It is just as fair to say that this division was maintained, supported, encouraged by the career structures in place within Sponsor A and, thereby served to reproduce the expected traditional stereotypes.

This theme of separation echoed the phrase 'divide and rule'. Essentially, this was what was taking place. Individuals were being distanced from their work by the introduction of very detailed rules and procedures. They were even being distanced from eachother, not only on a day to day basis, but also in terms of their long-term careers.

The full implications of this scenario became clearer after my fieldwork within Sponsor B, where I believed a similar situation existed, and is discussed in the concluding chapter. However, the theme of separation is a recurring one.

INCOMPATIBLE CHARACTERISTICS

The above discussion brings together many of the issues which were raised by staff and which link up with characteristics of the organisational culture. However, consideration of the twolists set out earlier also led to the identification of a number of features which were deemed to be highly desirable within the IT culture of Sponsor A but were not compatible with the notion of team work and the importance of team skills and, therefore, could be deemed to mitigate against a quality culture as entertained by Sponsor A. They were: individualism and leadership, competitiveness, and knowledge accumulation. All of these demonstrated the deep seatedness of the analyst versus programmer stereotype.

INDIVIDUALISM AND LEADERSHIP:

The expression of individualism was encouraged through traits such as ambition, extroversion, and aspiration for management.

During conversations with staff, frequent reference was made to an individual's abilities and talents via an affirmation of their popularity or their command of respect from other members of Project X. In addition, it was clear from in-depth discussions, and staff performance appraisal procedures, that management and personnel laid great emphasis on leadership qualities.

When groups of project staff came together, informal 'group leaders' emerged in two ways (according to my interpretation of the situation):

1. The amount of time one individual spent in terms of addressing the rest of the group. 'Addressing' here meant that they had the attention of the whole or the majority of the group.

2. The extent to which an individual's comments and ideas were accepted and ratified by other group members.

Interestingly, I observed a slight difference between the two main 'group leaders' of Project X. One tended to be very talkative (criteria one above) and is hereafter referred to as Red Leader, the other very thoughtful (criteria two above) and is hereafter referred to as Blue Leader (see Colour As Symbol below).

Blue Leader's command of respect was particularly evident in Quality Service Action Team meetings where, even though he was not designated the Team Leader, his ideas were given greater attention than others' and rarely challenged. Part of this was probably due to the fact that he was one of the older and most experienced members of Project X. He was well respected by the management team, and regarded as one of the most technically competent members of the project, with the rank of a senior programmer. Nevertheless, he was often referred to as 'simple-minded' in the wider business context. Yet it was he who made some of the most profound comments regarding organisational motivation for introducing the new job family. I believe this was an example of management not seeing the individual because of the overriding strength of their stereotypic prejudices concerning programmers.

COMPETITIVENESS:

This trait was reflected in the interests of the staff (especially football), as well as by the organisation's business objectives. A fairly large proportion of conversation was spent by staff harranging their colleagues concerning football team alleigances and recent performance. This spilled over into the work of Project X, too. Perhaps the most obvious example of this was the commentary that went on between staff regarding their colleagues' working standards and general capabilities.

A common, although extreme, expression of this aspect of the culture regularly took place between Red Leader and another member of the project, hereafter referred to as Blue Junior. Red Leader appeared to be very tough on Blue Junior, repeatedly calling him "shite for brains" instead of by his name.

Red Leader was representative of the Sponsor A stereotype of an IT Analyst. He was in his late twenties, well-educated, articulate, extrovert, popular with his peers, and quick-thinking. Blue Junior was the youngest member of the project. He was shy, had a relatively low level of academic achievement, and was verbally unresponsive. He was serving an 'apprenticeship' as a clerical assistant and, together with his senior colleague (hereafter reffered to as Red Junior), by their own, and others', admission enjoyed the lowest informal status rating on Project X.

I believed that competitiveness could be a positive characteristic, especially when encouraged at team level in order to produce cohesive results. This example showed that when the focus shifted to the individual level, it could become destructive, demoralising, and fragment and dilute the efforts of the larger group.

KNOWLEDGE ACCUMULATION:

As part of the quality ethic, Sponsor A wanted to encourage the acquisition of knowledge and skill. This was particularly evident in IT and the frequency, availability and quality of training appeared, on the whole, to be excellent. However, one recurrent theme during discussions was the tendency for staff to acquire deep knowledge of particular areas. This had led to some staff being regarded as indispensible to the extent that, for example, Project X's function could suffer considerably if particular individuals left or moved to another project.

During the quality culture change, a memorandum had been circulated to the effect that no new employee should remain on a project for longer than 18 months at a time, without the express permission of senior management. The principle behind this was that it would ensure a spread of knowledge and skills throughout IT and avoid situations such as that experienced on Project X.

However, a number of people pointed out that this was not practical. They argued that it could take two years for an individual to acquire enough knowledge to become a 'valuable' member of the team ('payback period'), simply because the systems with which they were working were so complex; partly a reflection of its age and second generation software elements. This was a particular problem for programmers, whose acquisition of technical skills made them more vulnerable to becoming 'locked in' to a project with the passage of time (Corbi, 1989). It was often felt to be easier to move analysts. Hence, analysts tended to acquire a broader range of skills. Unfortunately, this situation served to re-enforce the stereotype.

I suggested that the new transfer policy could have opposite to the desired effect; that is, to act as a skills drain on a project. I,

therefore, recommended that knowledge sharing be encouraged within projects first, making it feasible to move existing staff around it. As this procedure became established, staff could gradually be moved between projects, until the 18-month target was achieved.

COLOUR AS SYMBOL

The theme of colour has been introduced in the above discussions. The symbolic potential of colour occurred to me as a result of seeing the clothes people wore in the workplace, particularly ties. I had noticed, for example, that Project X's Manager always wore his brightest red tie when he knew he was having a meeting with his superior.

I found that red ties tended to be favoured by managers and analysts, whereas blue ties were favoured by programmers and those with an operator/programmer background. Once I had come up with this notion, I attempted to predict the career background and aspirations of my in-depth discussants based on the colour of tie which they usually wore. I was surprised when I turned out to be correct in almost all cases. Of course, there may have been other factors subconsciously affecting my chances of correct prediction, but my apparent success prompted me to pursue the notion that colour might help to clarify some of the key issues which had been raised by staff.

I mentioned the point about tie colour to some (not all) of the staff and one of them told me that he had read a newspaper article on just that subject. He said the article discussed a report by Tie Rack which suggested that tie colour revealed an individual's personality and attitudes. I then wondered if these colours might be associated with Sponsor A's concept of management-oriented versus non-management-oriented staff, or, more precisely, the contrasts between analysts and programmers. I decided it would be interesting to see whether

the Tie Rack report supported any of my ideas. However, it was not until June 1991 that I actually managed to obtain a copy of it.

The colour concept occurred to me approximately two weeks into the field work. From here onwards I noted the use of red and blue in the wider context of the work environment, too, and it was not only ties that appeared to display this colour contrast.

I spent one day being taken on a guided tour of the business function for which Project X provided the systems and software support. It, therefore, had close links with the project.

The staff working in this area were mostly operators and machine supervisors. In terms of the organisation, they did not have a very high status rating. In fact, the whole function was considered to be low rated, despite its criticality to the success of the company. This was probably due to its repetitive processing function.

There were several striking examples of blue ties and handkerchiefs in this area and very little red worn. I did not go around doing a tally of everybody's attire, it was a general impression that I got whilst walking through the department. Yet it was not only the colour of the clothes I noticed. The machinery was blue-red colour coded, too.

IBM were on contract to Sponsor A. Their staff were located on site to solve any problems which might arise with the very expensive IBM equipment which was being used in the department. IBM are colloquially known as 'Big Blue' and it showed. All the IBM machines were blue and performed a document processing function.

The trays which received the processed documents were red. This

documentation was then sent onwards in blue bags to a despatch room on another floor, where it awaited collection in more red trays.

The analogy occurred to me of blood passing round the body. In my earliest biology lessons, I learnt that blood is represented as being blue before it is oxygenated, and red afterwards. The processing and the circulation of the documents around the building triggered this analogy. Once I had thought of this, I then made the connection between this process and the movement of analysts and programmers through the internal career system of the organ-isation. Even the words I used to describe my thoughts became part of the metaphor.

The programmers, associated with blue, would be seen as somehow incomplete or lacking, and the analysts as the opposite.

Another aspect of the organisation where a colour theme was apparent was in the presentation of security passes.

The colour of permanent passes for staff was either blue or a pale red-pink. Blue denoted someone who had a low level of security access. No PIN number (Personal Identification Number) was issued with this pass to enable individuals to access secured areas of the building. It was also issued to operators working in the area discussed above.

A red-pink pass card meant that the person had a high level of security clearance and could access secured areas using their PIN number.

In addition to security rating, passes also gave information concerning rank within the organisation. Staff (excluding maintenance and cleaning) had their photographs taken with either a blue or a red background. These were then mounted onto the pass cards as discussed

above. A photograph with a blue background denoted a non-management person. Red indicated that the person held a management grade within the career structure.

I asked the head of security why these colour schemes were chosen and how long they had been in place. Although he was unable to explain the first point, he said the scheme was introduced approximately 11-12 years previously. I noted, with irony, that this was around the same time as when IT division had first been created.

EMERGENT THEMES

I found some interesting similarities between my perceptions and those in the published literature.

In 1982 a study of material culture was undertaken of a pet food company in the UK (Hodder, 1987b). I read the paper on this shortly after 17th June, 1989. It is, therefore, possible that the ideas contained within it influenced my research methodology within Sponsor A; although I was not consciously aware of it and certainly do not believe I entered the organisation with that particular form of symbolism in mind.

One of the reasons why the organisation was selected for study was because it was undergoing extensive technological change.
The research approach used was qualitative, consisting of in-depth discussions with staff and management, and lasted for three months.

Hodder decided to focus on one aspect of material culture in order to see how changes were negotiated. This aspect was the wearing of bow ties. Bow ties were worn as part of the working uniform and distinguished levels of authority amongst management.

Lower levels of management wore bow ties which were either wholely or partly red, and higher levels of management wore either grey or black.

The principle behind the colour scheme was that it made groups of individuals easier to identify on a large factory floor. One of several reasons for the eventual demise of bow ties as part of the uniform was that they effectively acted as "barriers to communication" (op. cit. p15). That is, the messages which were communicated by the bow ties got in the way of the messages that individuals wished to convey to eachother.

Technological changes impacted on the structure of the organisation. Lower management were recruited from amongst graduates and the shop floor workers became 'button pushers' instead of 'meat shovellers'. As Hodder said:

> *"So a new type of manager emerged ...wanting to erode the symbolic status differences, now seen as artificial."*
>
> *(op. cit. p16)*

This conclusion was particularly interesting to me. I had found the analyst versus programmer stereotype in Sponsor A to be a non-productive perception, being both an unfair generalisation and a block to making the most of staff potential. I also noted a similarity between the appearance of red bow ties amongst managers in Hodder's study and the appearance of red ties in Sponsor A, albeit not at the highest levels. However, the majority of managers with whom I had contact were not at those highest levels.

I reflected that the use of red and blue within Sponsor A was symbolic of the organisational culture but I also noted that major cultural changes were underway, notably with respect to the 'quality' organisation. I began to view the red-blue, analyst-programmer dichotomy in terms of a block to the successful cultural changes which were being attempted there.

I spent some time thinking about what the colour red and blue represented for me. Hodder's paper noted that a consultancy was called in to help the organisation negotiate change and that they recommended the use of a scheme publicised by an American psychologist (Clare W. Graves). The scheme was colour coded and related to strategies for coping. Another quote from one manager involved in his study serves to introduce some of my own thoughts:

> *"Then there are the red guys. ...They are mainly trouble-makers. They want unions, more money."*
>
> *(op. cit. p19)*

Although this sounded like a negative description, it showed that red was considered to be an active, powerful colour.

I made a list of the attributes which I attached to red and blue (not including those specifically indicated at Sponsor A), and these are given overleaf.

RED	BLUE
Blood (oxygenated)	Blood (de-oxygenated)
Alive	Dead
Hot	Cold
Danger	Serenity
Fire	Water
Emotion	Relaxation
Heart	Head
Male-ness	Royalty
Angry	Sad
Left-wing	Right-wing
Labour	Conservative

Whilst at Cambridge I had become familiar with some Eastern beliefs where different parts of the body were ascribed colours and represented different types of energy (as, for example, in the chakra system and yoga). I recalled that red was usually regarded as a physical energy and blue as a cognitive energy.

I found a link between these ideas and performance in the workplace in Lessem's work (Lessem, 1981). Figure 25 is based on one of the tables which Lessem produced to illustrate his argument. I have inserted the colours to show how they relate to the various attributes. What I found most interesting was that the chakras were used as a basis for a model of management, and that moving up the chakra hierarchy was related to the progressive development of management techniques. The notion that blue was of a higher, more developed, ranking than red was interesting because it seemed to contradict the stereotypes within Sponsor A.

I regarded the Sponsor A stereotype as over-simplistic and as negatively affecting the career development of individuals. Here was a perspective which suggested that 'blue' people might actually have an important contribution to make and, not only that, but in a way which could be seen as more advanced than 'red'. This notion that a 'blue' culture has something special to offer in term of quality management is discussed in the next chapter.

Support for 'blue' characteristics also came from another source which I have already mentioned - the report by Tie Rack, known prosaically as The Tie Report.

The Tie Report presented the results of an attitude survey of 1000 men in the UK (face-to-face interviews) and threw in observations by a colour psychologist for good measure. The survey was carried out by a company called VA Research, and I suspect that the psychologist was enrolled to add more 'scientific' weight and, therefore, positivist credibility. Nevertheless, I found it difficult to resist the connections between my ideas and the material set out in the report, so here they are.

Professional men were found to own far more ties than manual workers and, as part of a professional dress code, the tie was regarded as very important. Furthermore, tie colour was found to be more significant than either design or style, with blue asthe first choice (40% response) and red second (12%). However:

> *"Although blue remains first choice of colour amongst "power dressers", its popularity drops to 29% amongst men whose aim is success in their work, with red rising to a strong second place on 23%."*
>
> *(op. cit. p7)*

So, in the work context men preferred red to blue as a signal of achievement.

With regard to interpreting the 'meaning' behind colour choice, Tom Porter, Senior Lecturer in Design at Oxford Polytechnic (the colour psychologist) gave his views. He said:

> *"Red and blue represent opposites, red being aggressive and dynamic and blue being passive and soothing. Red represents warmth and blue signifies coolness."*
>
> *(op. cit. p12)*

He then went on to add:

> *"Blue as a first choice is a chromatic representation of a basic biological need - tranquility and contentment. Blue represents the bonds one draws around oneself, unification and the sense of belonging. Whoever favours blue wants a calm and orderly environment, free from upsets and disturbances. Choosing a blue tie implies a quietness of spirit, calmness of manner and a concern for ethics and integrity. The man who picks blue wants to feel he can be trusted by associates and those close to him."*
>
> *(op. cit. p13)*

This contrasts with red as a first choice which, he said:

> *"...can symbolise an urge to achieve results, to win success. Red is impulse, the will to win, vitality and power from sexual potency to revolutionary transformation. Red is "impact of the will" as distinct from the green "elasticity of will"."*
>
> *(op. cit. p14)*

I noted with interest the possibility that the presence of females in the work place could influence the use of tie colour. I also realised that, as a female myself, I may have influenced the situation, too, and this is a point to which I shall return later.

Porter also emphasised blue as a sign of quality. Naturally, this caught my attention in view of the quality management programme being implemented within Sponsor A where the colour concept had first occurred to me. I recalled the blue stereotype and the comment that technical experts put great emphasis on attention to detail and perfection. This, too, linked blue intothe quality theme.

83% of British men in the survey said that they could tell a man's social standing from his tie. That they may have calculated wrongly was not so important as the fact that they believed the tie had this symbolic potential. This echoed my research experiences of assessing someone's career history from the colour of their tie.

I discovered an article in New Scientist about red ties (Calabrese, 1989). The author noted the connotations of power in relation to the colour red, drawing on examples from the animal world. She asked men in an on-line computer conference for their views on the symbolism of red ties. Replies suggested that red was a power symbol and one person said that they deliberately wore their reddest tie when meeting their president in order to 'out red' him. This directly echoed my experience of the manager at Sponsor A who always wore his reddest tie when meeting with his boss.

The article also mentioned the sexual role of red ties in emphasising male-ness to females. This reminded me again of the fact that I had been a female working within a male dominated context at both Sponsor A and Sponsor B. It also alerted me to the fact that because of this my interpretative methods were focussed on male behavioural traits. I did not see any women with neck ties while I was conducting my research. Hence, by focussing on ties as a vehicle of symbolism I had ignored or relegated the role of women in the workplace. I was contravening my own feminist beliefs. Yet, was this my gender bias or Sponsor A's?

Was it not the case that, if neck ties were a symbol of power and status, and if this were part of the organisational culture, then it was the organisation that was biased not me? The fact that I had picked up this message and read it did not make me anti-feminist. On the contrary, it could be argued that, as part of the signification process I had constructed a feminist interpretation out of it whereas someone else may not have done.

My interest in women's issues and equality in the workplace meant that I took note of this in relation to the employment and progress of women within the IT departments. Staff told me that the numbers of women on Project X had always been proportionately low but that recently the turnover of women had increased. When I explored this issue further it seemed that one of the reasons for this was the 'male-ness' of the office atmosphere.

An example given was the display of material on the office walls which the women found offensive but for which they failed to get support in their complaints from senior staff. This situation was rectified after the research was completed. In the light of this, I found the notion of a male-biased form of status symbolism quite compelling. It would be yet another way in which women were alienated in the workplace.

Women were usually encouraged to go into analysis rather than programming. The reasons for this were that the stereotype offemale strengths centred on communications skills and this fitted with the stereotype for analysts. That being the case, their colour 'badge' would be more likely red than blue. However, red, as has been discussed, can symbolise male-ness. In addition, differences in dress code between men and women would make it difficult for women to use neck ties as a channel of expression, anyway. I wondered whether this might put women at a disadvantage in terms of job progression.

Klemp and McClelland (1986) highlighted the potential importance of symbolism for successful management. They conducted a study to establish senior manager competencies and came up with eight of these, one of which was 'symbolic influence'. They defined this as setting a personal example for an intended impact, and as using symbols of group identity. I concluded that if women did not have equal access to the symbolic code of a work group and, more importantly, were viewed differently in relation to that symbol (in this case, red neck ties) then their ability to develop within that environment would be hampered. Symbolic codes could, thus, be much more subtle than written organisational policy or observable attitudes in discriminating in the work place.

THEORIES AND STORIES

> *"...all theories rely on root metaphors and images. Storytelling... is one way in which root metaphors may be discovered and given form.*
>
> *...stories are a powerful way of communicating the findings of inquiry to other people. ...explanation and expression become married, and the progeny are theories born of story and stories born of theory."*
>
> *(Reason and Hawkins, 1988.)*

The theory underlying the story of Sponsor A contained both ontological and epistemological assumptions.

I believe everything has symbolic potential. I also believe in the power of symbolic attributes to suggest the route to sense-making of a particular context. In the context of Sponsor A this theoretical posture gave birth to an idea - the idea of colour as a symbol, communicating a message which could help me to synthesise the information I had already gathered. This became the story of red and blue.

The process initially was visual. I had to engage with the symbol in order for it to have meaning. The colours occurred in several contexts: clothes, the computing floor, the mail system, and the security system.

First of all I thought about what distinguished the red from the blue in each context. Then I considered the relationship between these across all the contexts. Did this suggest any links?

Of course, my interpretations were influenced greatly by the values I ascribed to the colours red and blue. The product ofthis exercise was a list of structural oppositions. It was red versus blue. This categorisation owed much to the structuralist notion of symbolic theory which I had learnt about much earlier in my theory journey.

Since I had adopted a structuralist approach, was it so surprising that my contextual networking should suggest a theme of division? Especially as I had already been exposed to the rivalry that existed between analysts and programmers, and management and technical staff during the early stages of the research.

My visual reading, therefore, merely confirmed my conceptual reading. My dualistic framework made it so. I had used the symbol of colour to re-inforce what I saw as the main areas of conflict encountered in Sponsor A.

As Cirlot (1978) said:

> *"...there is no such thing as 'ideas or beliefs', only 'ideas and beliefs', that is to say that in the one there is always at least something of the other - quite apart from the fact that, as far as symbolism is concerned, other phenomena of a spiritual kind play an important part."*

His reference to spiritualism was a clarification for me of something which I had not previously made explicit in my research interpretations. My ontology acknowledged the existence of spirit; this much was clear from my chapter on theory. However, I had also utilised it within the context of my research methodology, too.

I had been aware of the chakra system when I was in Cambridge. I had also been aware of the way in which colour had been interpreted to represent different personal states. Coming upon the work which Lessem did, therefore, only served to confirm what I had implicitly already wanted to do - produce a theory which gave a spiritual dimension to the management of human resources.

Two 'models' are discussed in the final chapter which detail how I see current resource management and how I believe it could be improved so as to achieve total 'quality'. As will be seen, my vision of quality had a spiritual dimension in that it encompassed emotions and values, not usually considered in traditional management styles.

WHEN IS A TIE A HAT?

> *"They use statistics as a drunk uses a lamp-post - for support rather than illumination."*
>
> *(Anonymous, Evening Standard, 1990.)*

In the final chapter I shall argue that I (like others) used to talk of a demographic downturn in the employment market and used it as a hat rack upon which to hang a particular cause. My favourite cause at that time was the under-development of human resources.

On reflection, I have owned a number of hat racks, some more visible than others. The hat rack to which I currently refer is coloured red and blue and I call it my Tie Rack Hat Rack.

It is a rather apologetic piece of equipment because it does not match the rest of my furniture. It is too unsubtle and lacks sophistication. It really was brought in only to accommodate the more traditional traveller on this thesis journey. It was a paradigmatic 'faux pas'.

Let's think it through again.

I noticed that many of the people with whom I had in-depth discussions wore either red or blue ties. It was not important to me how many or how often (although it is recorded somewhere). It was an impression - a perfectly legitimate piece of sense-making - a phenomenological process.

Having been sensitised to red and blue, its occurrence in other contexts (security passes, computing floor and so on) became a focus for sense-making. A sort of signpost to the important issues. So why did I resort to looking for written evidence in order to justify what I already believed to be a legitimate idea?

I had a confidence crisis, that's what.

I let myself be confined - compromised by the sponsors. Why didn't I do something to stop the rot? Why didn't I tell them it was 'OK' to do things my way? Why didn't I tell them the story of red and blue?

I was scared, that's why.

Here I was, challenging the positivist way of life, championing the subjectivist cause and all I could do was conform.

They had won the battle. I bowed beneath the weight of their expectations and, in so doing, betrayed some of my deepest beliefs.

I remember now. I had a very uncomfortable conversation with a member of my group at the Collaborative Inquiry conference (see Thoughts on Writing Up). I was dreading then what I have now experienced. Realisation opened up a chasm between what I had wanted to do and what I had, in fact, done. On the one side my ideology and on the other their empiricism. I had thought it would be possible to bridge the two: to hold on to my value system whilst seeming to compromise my actions for the benefit of the sponsors' co-operation. So where's the bridge? How do I connect the two?

Right here. On these pages. How else can I make sense of what has happened? What is done is done. I cannot undo it but I can offer a re-interpretation.

In Thoughts of Writing Up, I talked about 'emptying cups' and said that my research approach would be flexible enough toaccommodate the new alongside the old paradigm. When I entered the two organisations, I had to empty my own cup. But I was not unknowing anything, just moving it aside to accommodate the positivist perspective alongside my own beliefs.

Having done this, there then had to be a reconciliation. I could only make sense of what I had experienced inside the organisations through my own belief system - and not through theirs. The post-positivist framework, therefore, had to re-assume centre stage in order for the sense-making act to begin.

And here was a problem.

When the curtain went up, there was still some scenery left over from the positivist scenario - hence, the Hat Rack - so that it punctured and punctuated the performance.

The script should have flowed easily and been grounded in a sense of its own being. Instead it rankled against the hardness of the positivist props. And they were props in every sense. Placed on stage to give the illusion of reality, stage posts on which to hang security. Without props the story would fail, disbelief would not be suspended and the play would be pronounced a failure. I was catering for the needs of others when I should have been attending to my own.

I was not a realist and I needed no props.

	ENERGY LEVEL	MANAGEMENT SKILLS	KEY QUESTIONS
VIOLET	Vision/Imagination	Leadership, Proactivity, Creative Imagination Balanced Learning Habits	What are the key purposes in your activities? How are you able to inspire people to follow them? Are your thoughts, feelings and actions consistent?
INDIGO	Intuition	Continuing Sensitivity to events	How does your part activity fit into the whole? What major trends do you foresee?
BLUE	Organisation/mind	Command of Relevant Facts Organisational Ability	Who's who in your organisation? What tasks need to be accomplished by whom?
GREEN	Emotional Commitment	Decision Making, Emotional Resilience Mental Agility	How do you make decisions? What drives you on?
YELLOW	Thought	Professional Knowledge Planning	What do you need to know in your job? What needs to be done in what order, with what results?
ORANGE	Social Aspects	Motivation, Communication Management Style Social Skills	What motivates yourself and other people? What social skills do you require to exercise with them, how?
RED	Physical Stamina	Executive Stress	How do you help keep yourself and your staff healthy? How do you make the most of executive stress?

BASED ON LESSEM, 1981

FIGURE 25: MANAGEMENT: VISION TO ACTION

SPONSOR B

(WITH METAPHOR)

The findings from the research conducted within Sponsor A were related in the previous section in two halves, the first half being the issues highlighted by staff, and the second the symbolic use of colour. This section will have a slightly different format. I have mentioned in previous chapters that I adopted a slightly more collaborative approach at Sponsor B than at Sponsor A. This was partly because the former were keen to know about my research methodology which gave me the confidence to share it with them (despite my fears of positivist rejection). As a result of this my presentation of ideas to the staff at Sponsor B took on the form of the interpretative method itself, and so this section will reflect that. I will also draw attention to similarities between the findings from the two sponsors. First of all, however, some background to the fieldwork will be given.

BACKGROUND

THE ROLE OF ANALYST PROGRAMMER

As related in the previous chapter, my fieldwork at Sponsor B focussed on a group of analyst programmers, known collectively as Project Y.

In the early 1970's, analysis and programming were (as for Sponsor A) two separate roles. The programmer worked in the machine room, translated English instructions into machine language, and carried out corrective action, whilst the analyst did everything else. A rivalry built up between these two and each thought they were better than the other. This rivalry was echoed in the findings from Sponsor A. The image of a programmer at this time was summed up by one person as "long-haired weirdo". This was partly a legacy of the mystique which then surrounded IT and the sole ownership of much technical knowledge on the part of programmers.

In about 1973 work was organised on a project basis, although the roles were still distinct. Then pools of analysts and programmers were formed in an attempt to introduce flexibility in resourcing the needs of these projects. At one stage analysts attempted to produce program suites but, this did not work (perhaps through lack of cross-training) and so it was left in the hands of the programmers. The idea was mooted of combining the roles but, there were fears that if this were done any errors might be carried right through the software development lifecycle.

The separation of roles provided lots of dangerous interfaces, nevertheless. For example, when programmers handed a program to analysts for testing it was often tested not to see if it worked but to see if it could be broken. This underlined the rivalry between the two groups.

In these early days the skills of programmers were regarded as speed, logic, and pattern recognition, whilst analysts were valued for their interpersonal skills. The latter point led to analysts being regarded as of a higher status. It also led to the formulation of separate career paths for each party, meeting up only at a very high

level in the management hierarchy. This situation also bore a resemblance to that in Sponsor A.

New grades were then introduced for programming. Programmers were put onto the lowest level of management, along with Operations Superintendants. At the next level up they moved into systems programming and into teams where they advised on systems trials. Progression was, thus, from programming to systems work.

The merging of analysis and programming took place around 1980. At this time, there were a lot of small projects in existence which could be handled by one manager. The advent of 'structured methods' such as LSDM and JSP (see Sponsor A) offered an opportunity to Quality Assure software development as it progressed, thus going some way to removing the fears concerning error rates. These managers also had the advantage of previous experience in the company and were in a position to consider the problems brought about by the historical split in roles. Since the projects were small-scale, it seemed feasible to combine them. It also offered the opportunity to create more flexible career paths. The emergence of the analyst programming role was not, therefore, the result of a conscious policy decision by Sponsor B.

Together with a high-level re-structure, Sponsor B was considering the setting up of separate pools again. It was easier to centralise resources where the stages of product development were clear-cut, as was the case with the new project management methods being introduced (see Method B below). In addition, pools of specialism were seen as one way to avoid the enormous learning curves involved when a change of technology was introduced. However, although re-introducing the split between analysis and programming may have been seen as an advantage in the short term it could be argued that the joint role was preferrable in the long term. In the short term a split meant the learning curves of individuals would be cut since they would only have to acquire skills in one specialism. In the long term, however, a joint role would produce more generalists and, hence, more flexibility in the workforce. Dependency upon one set of skills, or individuals, would be avoided. It was argued that the environment would be more stimulating and challenging because everyone would be involved in all the software development

stages. Staff on Project Y often remarked that there were no pure coders; everyone did some analysis. This also highlighted that a split between analysis and programming would have been considered an unpopular move.

CHANGE AND METAPHOR

Sponsor B were, thus, in the process of implementing structural change. Like Sponsor A, the main objective was to improve the organisation's efficiency, responsiveness to customer need, and competitive edge in an increasingly aggressive market. Although I have indicated that Sponsor B had a more open approach than Sponsor A (see previous chapter), they still had characteristics typical of a Civil Service institution. Many people at middle management level were being made redundant in an effort to shorten the bureaucratic chain of authority. An article in one of the major newspapers reported that:

> *"... the core of its problem is that it must change the culture of its middle management. ...it must push into new areas, and that demands a complete change of management culture, from a producer-led operation to a consumer-led one. The customer must become king."*
>
> *(The Independent, 1990)*

Thus, change was being applied in cultural as well as structural terms. The concept of Total Quality Management (TQM) was believed by top management to be the way in which this change could be achieved (more detail on TQM is given later).

A TQM programme had been introduced and 'rolled out' over a period of three years. A major strategy which Sponsor B adopted in order to apply TQM within IT concerned detailed methodologies of project management (Methods A and B). Two other strategies which resembled those of Sponsor A were the setting up of quality 'teams' and the application of formal methods to the software development lifecycle (LSDM and JSP). Interestingly, the comments received from staff concerning these were common to the two organisations.

It was whilst reading the company's documentation on TQM and project management that the idea came to me of using metaphor as a means of making sense of the information which I had gathered. This occurred approximately half way through the fieldwork, as was the case with Sponsor A. The trigger was the use of terminology which was reminiscent of the theatre. Examples included 'stage', 'stage manager', 'prompt', 'sponsor', 'designer', 'doorkeeper', and 'roles'. I decided to see what would happen if I viewed Project Y and its organisational context in terms of a play. This process began with a brainstorming session where I wrote down as many words and concepts as I could think of which were associated with the theatre. I then examined the list to see how these concepts resembled what I had experienced during the fieldwork. A surprisingly large number of parallels resulted.

One of the members of Project Y was a professional actor (Eddie Osei). This may have been a subconscious influence on my choice of metaphor, of course. However, I invited him to consider my ideas and give me his feedback. He did so with enthusiasm. He said he had found the metaphor useful in clarifying some of the problems encountered in the workplace. He also made some additions to the construction of the theatrical scenario by virtue of his knowledge of the area. As a result of our discussions, I produced a theatrical backdrop and used this format to present my findings.

Appendix 11 contains a list of all the findings which were included in the full report to the sponsor. However, there is not the room to discuss all of these within the confines of this thesis. As already explained, the methodological application of metaphor was triggered in the context of the organisation's literature on quality methods. Since this was the case, I have chosen to make quality methods the focus of the rest of this chapter. Before I do, however, I would like to record the valuable input and assistance I received from Eddie during the analysis stage of my research.

Thanks Eddie.

APPLYING THE METAPHOR

THE NEW STREET THEATRE COMPANY

I incorporated everybody who was connected with the work of Project Y into my theatrical metaphor by giving them a theatre company name. The name "The New Street Theatre Company" reflected the location of the building where this work took place but I have changed it here in order to preserve anonymity.

Appendix 13 contains the documents which were circulated before the presentation to staff. It shows that the work and the roles associated with Project Y were recast into the work and roles associated with the production of a stage play. As is explained in the Appendix, the play was the software development lifecycle, and the acts of the play were the stages involved in the TQM project management methodology (Method B). The act (stage) in which Project Y were involved was Act Two, the Building Stage (see Figure 26). Before viewing Act Two it is necessary to outline the main theatrical roles which were applied in the interpretation. They were: treatment writer, sponsor, scriptwriter, and audience.

In theatrical terms, a treatment writer is someone commissioned to write an outline for a play. However, considerable creative license is given to the scriptwriters in writing in the details. In this case, the Requirements Specification (the outline of what is required by the user) was equated with the treatment. The treatment writer was the Finance Department who represented the users for whom Project Y were providing software (the Accountants). However, Finance Department were also the sponsors of the project; that is, it was their budget which paid for the work to be done.

The scriptwriters were Project Y themselves, and the lines of the play were equated with the lines of computer code. The members of Project Y were also actors and were cast into their roles by the senior members of the project (referred to as "Levels 2 and 3" in the career structure). The audience were the users; i.e. the Accountants who were employed within the organisation. All these roles are summarised in Appendix 13.

It was noted that software development projects within Sponsor B were brought together on a dynamic basis to perform a particular task, as was the case with members of a theatrical production.

QUALITY AND ROLES

Figure 26 illustrates the Building Stages, according to Method B. Although Method B was the more current standard, it had not yet been rolled out across the organisation. Project Y were, consequently, still also making use of the older Method A. This gave rise to a certain amount of ambiguity and inconsistency. The problems could be interpreted as proof of the need to move towards a consistent Method B approach. However, the use of metaphor indicated that the Method had several weaknesses in regard to the relationship between roles and areas of responsibility. It is these weaknesses which will be the focus for much of the following discussion.

According to confidential organisational literature, the Building Stages of Method B:

> *"...contain the mainline set of technical acitivities required to engineer the operational system to meet the business and detailed end-user requirement."*

Figure 26 illustrates that the only part of the Building Stages where the Stage Manager (Project Y manager) was not in control was the Requirements Specification and its feed into the Systems Specification. Yet it was this very element which quite literally set the operational and technical stage for the Building Stages. As mentioned earlier, Finance Department were both the sponsor and the treatment writer for this play. They were referred to as 'the user' since they represented the Accountants on a sort of go-between basis. The actual users were located in District offices, outside the IT Headquarters.

Finance Department liaised with the users, more or less to the exclusion of Project Y, and tended to mould the Requirements to suit their own perception of the business need. However, this resulted in the production of solutions rather than user requirements. Staff referred to this as "over-specification". This meant that very little

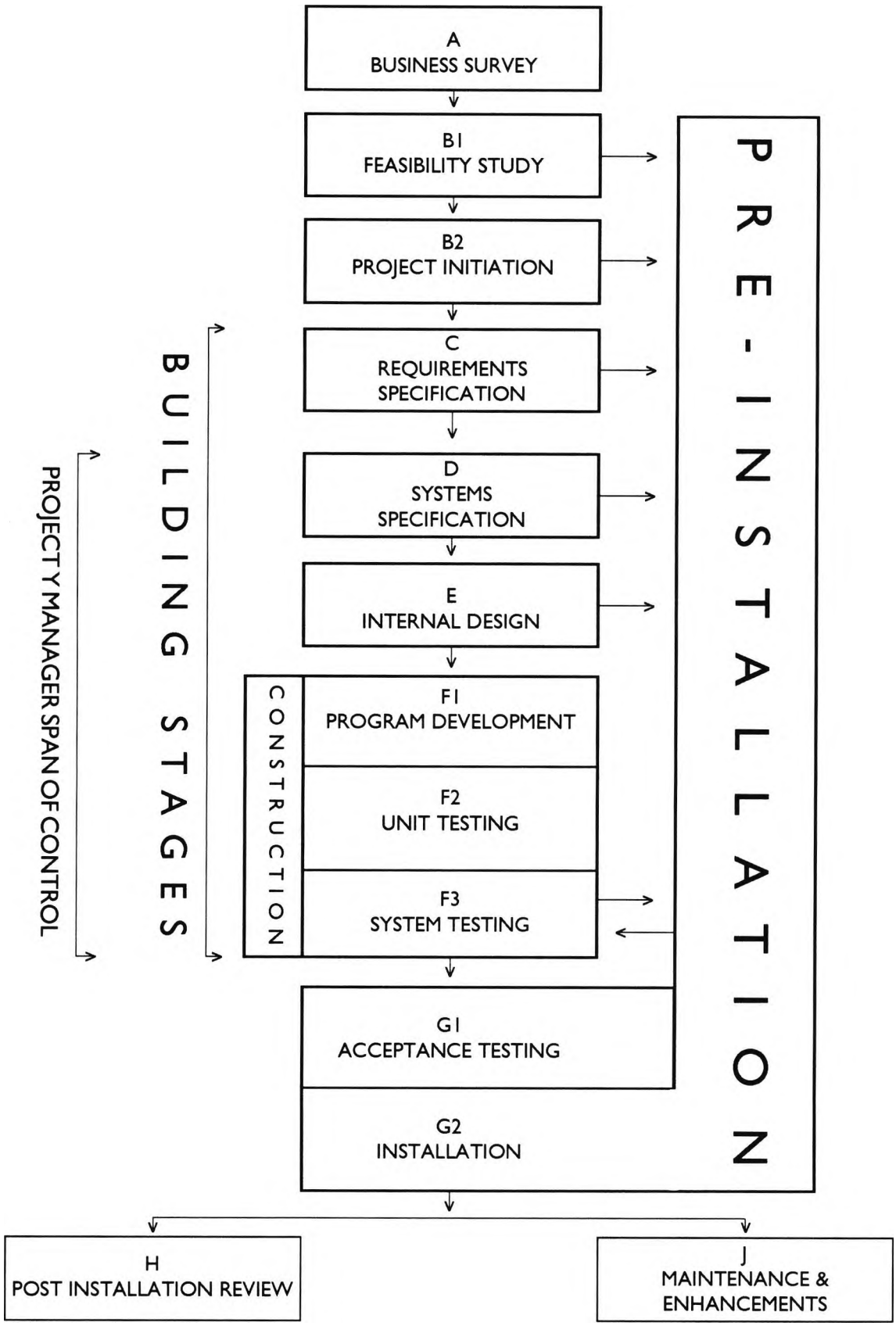


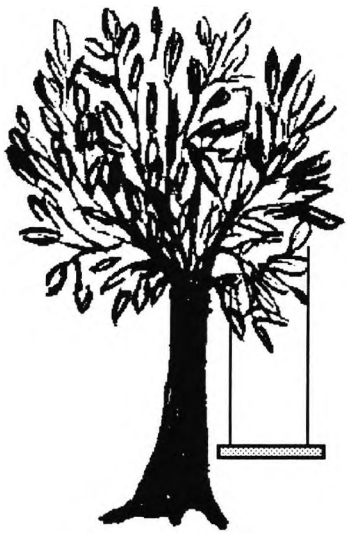
FIGURE 26: SPONSOR B: SYSTEM DEVELOPMENT LIFECYCLE

room was left for the analyst programmers to modify the specifications in the light of technical and logical imperatives. Areas which might usefully have been tackled jointly by the real user and Project Y were given as including: screen design, logical structuring of information, and the range of user functions.

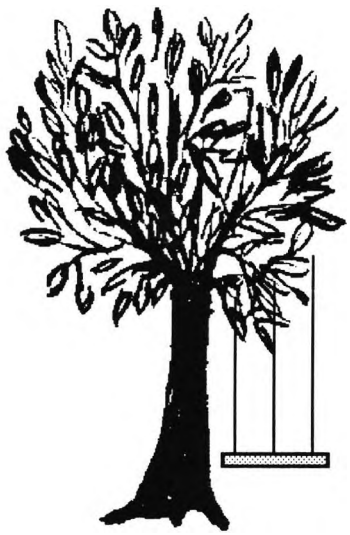
It was suggested that Finance Department could have been given some more training in analysis techniques, for example, with a 1/2-day seminar. This was felt to be particularly important in view of the fact that they were skilled more in the use of PCs than the mainframes employed on the Project.

With Finance Department operating as an interpreter, it also meant that there was much more room for mis-interpretation. Figure 27 was popular with staff because it depicted the problems which can arise when so many different parties were involved in the systems building process. Ironically, this diagram had been used by management within the organisation as an example of what not to do in a quality culture.

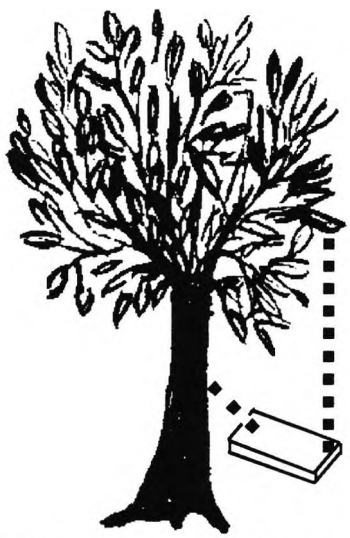
In Sponsor B's early days software developers were never allowed to consult the end-users, with the result that programs were frequently found to be 'unfit for the purpose'. It was intended that this scenario should disappear with the quality culture changes that were being implemented. However, nominating user representatives did not appear to be the best solution.



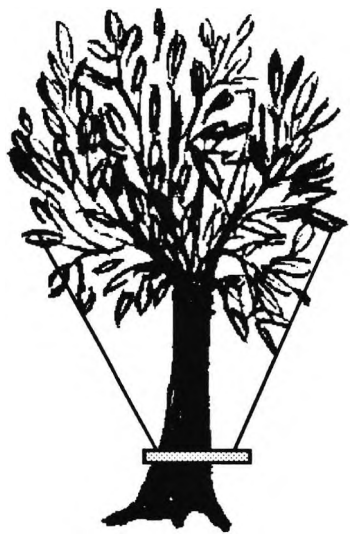
WHAT THE CLIENT ASKED FOR



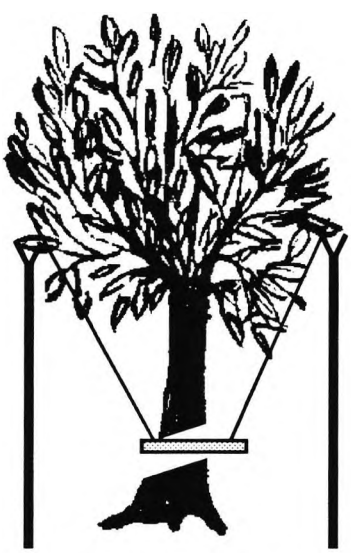
HOW THE PROJECT LEADER DESCRIBED IT



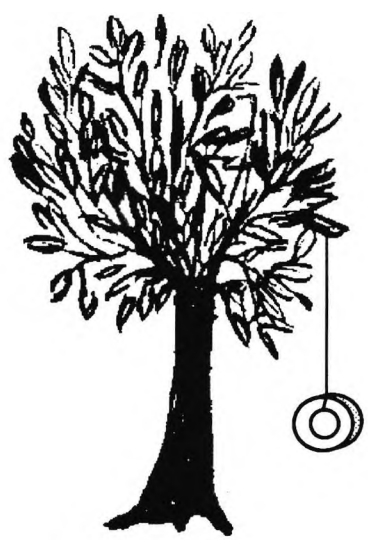
WHAT THE SYSTEMS DESIGNER SPECIFIED



WHAT THE PROGRAMMER WROTE



HOW IT WAS INSTALLED



WHAT THE CLIENT REALLY NEEDED

FIGURE 27: INTERPRETING USER REQUIREMENTS

Kaiser and Bostrom (1982) discussed the issue of communications between user representatives and software developers in a study of the personalities of project teams. The following quote summarises their conclusions:

> *"The results, however, indicate that user representatives on project teams are very similar to their systems counterparts on the Jungian personality dimensions. Even more surprising was that these user representatives are closer to popular descriptions of systems staff than the analysts are. The data indicate a plausible explanation. It appears that these user representatives are not the actual end users of the systems and are different in personality characteristics from these end users. These findings imply that organisations are shifting the communications gap from the user representative and system person to the user representative and end user. This strategy leads to a more harmonious design process but a high probability of implementation problems."*
>
> *(op. cit. p56)*

This resonated with the problems experienced by Project Y with Finance: the need for more analytical training, the tendency to over-specify, and the feeling of isolation from the real end user (the Accountants). The way in which the roles were cast within the Building Stages only served to re-inforce these points.

The problems associated with the role of Finance were interpreted by applying the theatrical metaphor. In the theatre the sponsor and the treatment writer would not normally be the same person; vested interests would be too strong. Also, the scriptwriters would be given much more room for input with respect to what the users (audience) would find most satisfactory, especially where an idea did not work in practice, or a better one was formulated. This contradiction in the context of Project Y meant that skills and expertise were constrained. The possible effects of this ranged from frustration, through de-motivation, to a product which did not satisfy the audience.

On the other hand, Finance Department reported that they received a good service from Project Y, adding that they found the team to be of a high calibre.

Method B accorded a dual role to the manager of Project Y - Stage Manager and Project Manager. As a Stage Manager, he was responsible for the smooth running of all processes of the Building Stages (according to Method B). However, he was hindered in exercising any critical decision-making because the party providing the Treatment was also the sponsor with which he had a reporting relationship. Hence, there was a conflict of role-playing. This was to be a recurrent theme.

As a Project Manager, his role was much the same as a theatre Director's: responsible for how things looked, getting the best from the actors, taking responsibility if the project collapsed, exercising vision, and ensuring compliance to that vision. The Project Manager was hindered in this role, too, because the vision was pre-supplied (by Finance Department). This was compounded where a project was driven primarily by its end date (a trait which contradicted the quality ethic) and where the initial plans had been presented as a *fait accompli* (by Finance Department). It was, therefore, a credit to the manager of Project Y that he managed to motivate his actors so well.

Team work is very important in the theatre. The quality of each line of the script (code) and of each performance contributes to the success of the whole play. Yet, as Project Y said, "one good performance does not make a good play". The real test of the software was whether it would retain its integrity in the long run, and be amenable to any necessary upgrades. The project felt very confident about their ability to work together as a team. The team felt that there were no lead roles and that their Director brought out the best in them. The theme of team spirit and team skills resembled Sponsor A.

Interestingly, the contractors on Project Y were not excluded from this team in the way that can happen in some organisations. This may have been because they were members of a subsidiary organisation. Their role was seen as more of a 'guest starring' one.

The combined roles of Stage Manager and Director were confusing. Project Y had tried to address this issue (partly sub-consciously) by appointing a member of staff

to take on the role of assistant (Assistant Stage Manager). Many people failed to recognise the importance of this. It was suggested that the potential of this arrangement be explored when considering how to avoid the pitfalls of dual role-playing in other areas, too. It was interesting to note that, after the research had concluded, Sponsor B announced that it would be exploring the possibilities of splitting project managers' jobs into two. One manager would then be responsible for the technical direction of a project, and the other manager would be responsible for issues relating to human resource management. Brooks, too, highlighted the different skill sets required for these two roles (coincidentally, he also used terms for these which could be linked to the theatre, referring to them as 'technical director' and 'producer', respectively (Brooks, 1978).

The subject of dual role-playing had particular relevance for the future of the organisation. There was a trend in business towards 'user friendly' technology with sophisticated software support tools, which would enable people to play more than one role (for example, combining the role of software developer with that of user). This would call for the core skills of flexibility and adaptability but the conflicts in roles suggested that multiple role-playing might bring with it a new set of drawbacks.

QUALITY ASSURANCE

It was noted that Sponsor B had set up its own software Integrity Centre about one year before my fieldwork commenced. This was part of the move towards TQM and 'getting it right first time' for the customer. This triggered me into considering how customer satisfaction was assessed on Project Y.

The ultimate critics of theatre are the audience, although theatre critics themselves provide a public service in this respect (they would argue). I asked myself who the critics were in the context of Project Y's work. There was a formal body called the Project Review Board, but they did not see the actual end product. In fact, the critics were a mixture of Project Y and Finance Department. (Auditors only got involved in special circumstances.) Staff agreed that this situation appeared to be a rather incestuous one. In the theatre, the role of critic is much more clear cut.

For Project Y, it was not, and the feedback which resulted was described by them as "jumbled". Again, Project Y had attempted to address this issue by coding eachother's program specifications rather than just their own, thus introducing a measure of control. This seemed to be a rather haphazard approach in terms of the quality ethic. This was one area in which more direction could have been supplied at local level by the quality methods.

If a theatre production is not successful, the sponsor may make a loss at the box office but, inevitably, the greatest disappointment will lie with the audience and, in the extreme case, to the detriment of the actors' reputations. I wondered who would get the blame for this in the context of Project Y: the scriptwriters for a poor script or the actors for a bad performance? Where did the treatment writers enter into the scenario? In the theatre, the script would usually have been so far removed from the treatment writers in terms of form and time that the impact on them would have been reduced. In Sponsor B, it was the whole organisation as well as the users who suffered if a product did not meet expectations. Who got the blame for this: the scriptwriters? Surely, they had had their hands tied (by the over-specified treatment). The actors (at the testing stages)? Yet, had they not just been performing their lines (of instruction)? A treatment writer would have given enough creative leeway to the scriptwriters to be able to disclaim responsibility for a failure. In the context of Sponsor B, though, this had not applied.

The question remained. To what extent could Finance Department (as the treatment writer) be held responsible for the final form of the product? For Sponsor B this situation was a difficult one to resolve. They were reluctant to consider Finance Department as responsible for the outcome because they had also provided the budget.

Figure 28 depicts the blame-laying process in a tongue-in-cheek way. The illustration was circulated as part of the quality culture change and was intended to demonstrate how things should not be done. Again, it was with irony that the staff found their experiences to be very similar to this picture.

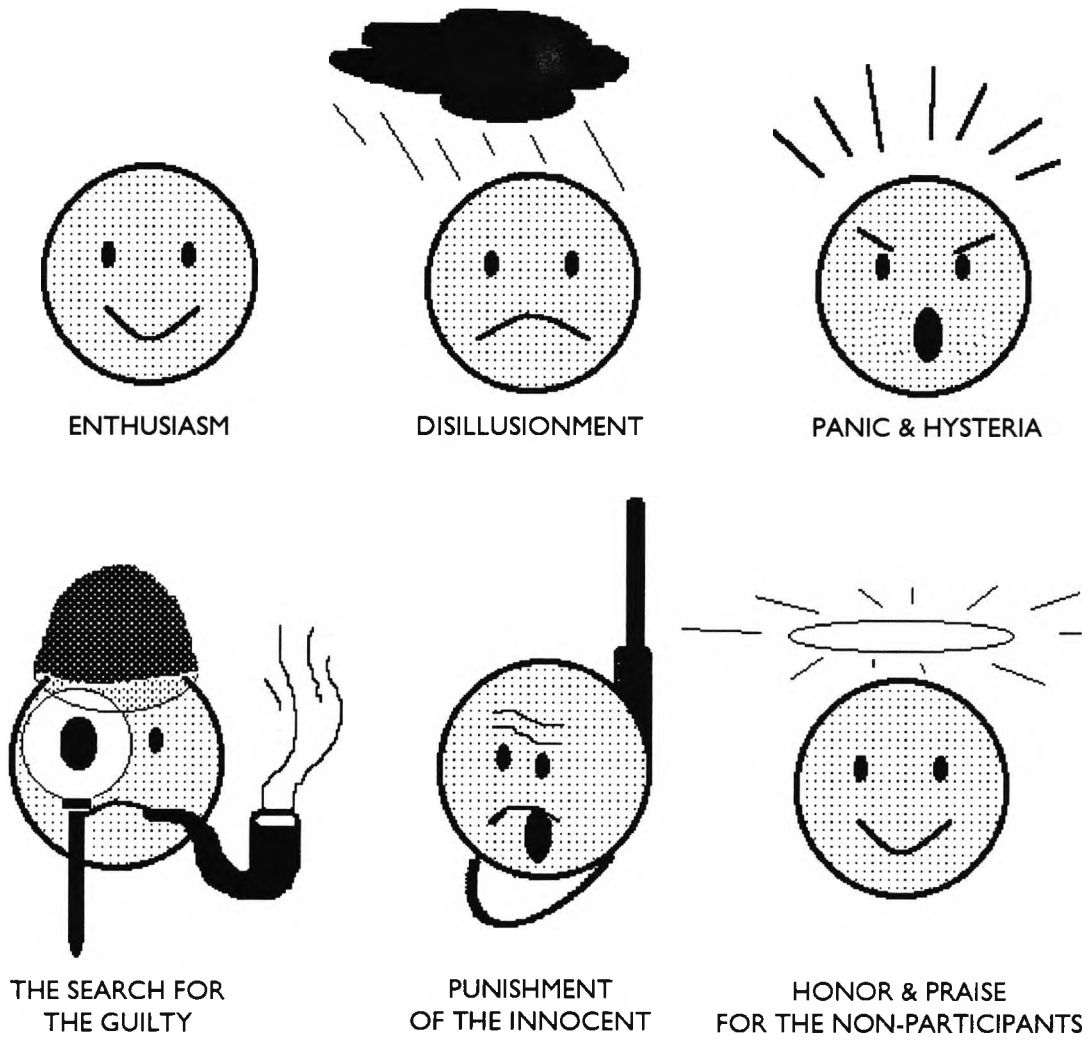


FIGURE 28: THE BLAME-LAYING PROCESS

Using the metaphor of theatre had helped to clarify problems which staff had encountered on Project Y. It seemed that the way in which work processes were conducted, and the nature of the relationships which were involved, were in contradiction to the explicit aims and objectives of the organisation in introducing a quality culture. Hence, as was the case within Sponsor A, there appeared to be a cultural gap between what the top levels of the organisation envisioned and what was actually happening at the lower levels. The new culture had been

implemented in a top-down way through the application of various types of quality method. A closer look at these, together with staff experiences, served to re-inforce the impression of a cultural mis-match.

QUALITY AND METHODS

One of the problems recognised within Sponsor B was the potential for the new quality culture to become absorbed into the older, more Civil Service-like culture, and to become process-oriented instead of customer-oriented. As with Sponsor A, comments from staff suggested that the new quality methods were being introduced in an over-specified, rigid way. One individual observed that the focus seemed to be on the 'what' (the content) rather than the 'how' (the process). He added that, to the extent that the new methods did not even differentiate between these two, they could be a disaster.

The quality methods applied within Sponsor B included LSDM and JSP, Methods A and B (project management techniques), and quality improvement efforts. Using the theatrical metaphor, LSDM and JSP were applied to the script of software development, Methods A and B to the quality of the staging, and quality improvement efforts to raising and maintaining general professionalism. Each of these three levels of quality method will be addressed below.

LSDM AND JSP

Overall the feedback concerning LSDM and JSP was positive but it was stressed that they should be used only as guidelines. The biggest advantage of these approaches was that they facilitated post-implementation software maintenance. One comment was that the standards had not been in place sufficiently in advance for them to be used effectively, the final details on their application only appearing once coding of the programs had begun.

LSDM (see the section on Sponsor A) gave the treatment writers input into writing the script. The problem according to staff was that the treatment writers were not

trained to write systems (scripts) themselves. Several other problems were highlighted. There was a tendency to expect projects to follow the methods too literally, and this was especially frustrating for experienced staff. The LSDM/JSP interface was also rather vague. These were all comments which echoed the experiences of Sponsor A.

As far as the technology was concerned, the methods as implemented were not found to be suitable for re-entrant code, databases, or tables, all things with which Project Y were working. It was difficult to generate structured diagrams for on-line systems and common sense and restraint had to be exercised in deciding how many levels of detail to go down. Structured approaches, therefore, appeared to be better suited to batch processing rather than the real-time systems which were being created for the Accountants. Since the creators of LSDM (LBMS) had intended their method to be applied to real-time systems, it was thought possible to address this problem at the training level. One suggestion was that brainstorming techniques could be applied at the LSDM/JSP interfaces to help with diagrams and to facilitate the coding processes.

METHODS A AND B

Method A was Sponsor B's old project management methodology (also devised by LBMS) and was introduced in the late 1970's. Method B was more recent, encompassed points from Method A and should have superceded it. It was a multi-layered detailed methodology for conducting the software development lifecycle and was created in-house. It also used LSDM for some of the stages. Its main advantage was seen as avoiding dependency upon one individual's skills - everyone became an understudy - thus spreading the skills base across a project.

Again, staff comments concerning the TQM methods were favourable. However, the Software Development Support (SDS) team which assisted Project Y did not appear to have the necessary skills and experience in order to advise on their proper use. Also, Method B was felt to be too cumbersome and to address the business needs insufficiently. Partly because of this, and partly because manuals for

both methods were still in circulation, Method A was still being applied to some extent.

As with LSDM and JSP, there was too much detail and formality which hindered performance. The quality literature and documentation were equated with 'How To Act' manuals. The danger was that so much time was spent worrying about following the rules that the individual forgot the art of how to act. Good documentation did not guarantee a good performance and many felt it to be constraining. If the standards did not work, they ought to have been flexible enough to modify - but they were not.

The role of a prompt in the theatre is to jog an actor's memory. It was suggested that the new methods should be used as a similar sort of guideline and that this would result in increased productivity.

Both Methods A and B introduced considerable delays into the lifecycle, again, because of all the detailed documentation which was specified. Although helpful for analysis (the focus was on getting the initial stages right), they were not found to be so useful for coding purposes. Again, experienced staff tended to get very frustrated. One suggestion was that automated production of the necessary documentation could be introduced.

Overall, staff felt that there were too many 'How To Act' manuals and expressed the need for one clear standard. The question of how old projects could be incorporated into the newly standardised environment was also posed.

As a result of all the comments I received, I drew a picture for Project Y which expressed their lack of confidence in Method B and this is reproduced in Figure 29.

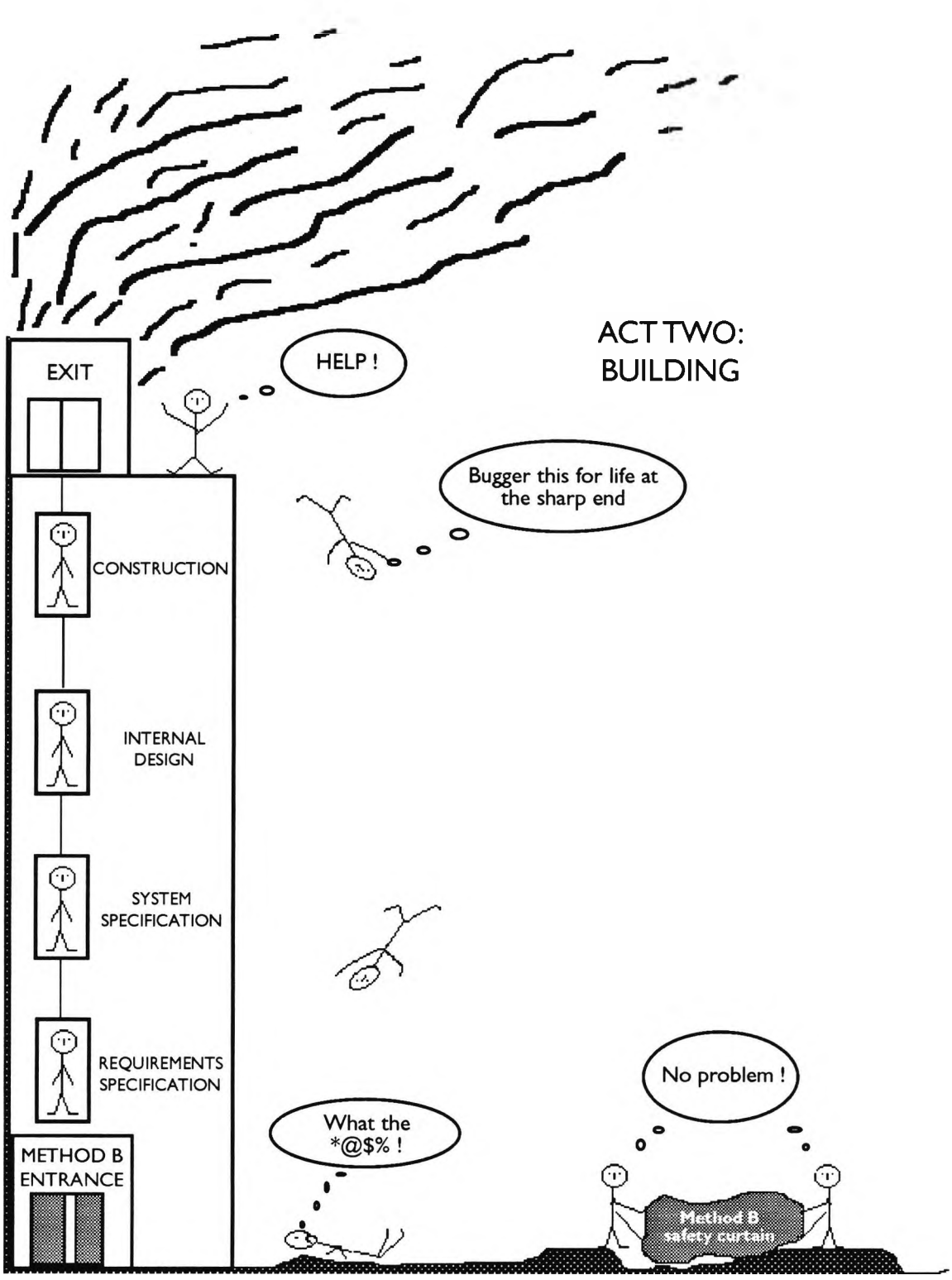


FIGURE 29: PROJECT Y: CONFIDENCE IN METHOD B

QUALITY IMPROVEMENT EFFORTS

Quality improvement efforts were being introduced in various ways. One involved the setting up of projects to investigate ways of improving quality. Another was very similar to the QSATs at Sponsor A and centred on the setting up of teams within existing projects (like Project Y) to discuss ways in which quality could be enhanced at local level. One of the biggest criticisms was that it was taking too long to implement these two efforts across the organisation. Nevertheless, they were seen as a good way to motivate and involve staff. It was, therefore, recommended that senior management nurture these initiatives and view them as valuable human resource strategies. It was also considered important that communication channels between senior management and the quality improvement groups be kept wide open in both directions, and that their contributions be recognised across the whole range of personalities and skills that made up a team, whether technical or otherwise. This emphasis on the range and importance of team skills also parallelled findings at Sponsor A.

The following observations concerning the functioning of quality improvement efforts were noted:

- schemes were dependent upon the positive response of management
- visible take-up of recommendations motivated staff
- formal and informal recognition of effort was important
- the range of issues raised needed serious consideration as representing the priority concerns of staff
- voluntary membership was vital if the interest and spirit of participation was to be maintained, and if an insight into 'unfettered' grass roots opinion was to be achieved.

Doubts about the successful take-up of quality improvement efforts were raised. Firstly, the promoters were regarded as members of the 'old guard' (Civil Service culture). This perception invited a lack of confidence in top management's commitment to TQM. Secondly, the low visibility of both initiatives, but most evidently the teams, was a contradiction in terms, especially since Sponsor B's suppliers were expected to tow the quality line. It was noted that the chairperson of the Project Y quality team had already resigned from the company before completion of the fieldwork. Another de-motivating factor related to the quality drive was the project priority ratings scheme. The idea of this was that it identified which projects were the most urgent, thereby highlighting how resources should be allocated and contributing to improved quality. In theory, this seemed like a sensible idea. However, Project Y had a low priority rating and their perspective underlined the negative effects of such a policy. A low rating was very bad for staff morale, and considered to be equivalent to the threat of a 'show closing' in the theatre. As was reported in the earlier chapter on applied method, this was variously expressed as:

"We might limp on to next year ...it is so bad for morale."

and

"It's the not knowing that is so awful."

As the staff said, if the rating dropped during the run of a project, it had a similar effect on the actors as a play being moved from the main theatre to the back studio. It also made obtaining resources from the centralised support functions very difficult. Thus, a self-fulfilling prophecy could ensue.

Ratings appeared to be biased towards projects which could generate a high income in the short term. This was compared to short-termist investment on the stock market, and was regarded as a symptom of British management culture. It was thought that this sort of attitude was inappropriate within a quality culture setting.

CENTRALISATION VERSUS DE-CENTRALISATION

Another issue which was of importance to staff related to the way in which the software support services provided to development projects had been centralised as part of the organisational re-alignment. This centralisation had been effected in order to make more economic use of resources, especially scarce IT skills. The Software Development Support (SDS) team which assisted Project Y in their development work were, therefore, not a dedicated team but a centralised resource which also serviced many other development projects. The fact that Project Y was of a low priority rating, as mentioned above, meant that their share of the resources was not sufficient. The problem of the relationship between the project and the support team was posed within the theatrical framework and this served to crystallise many of the complaints.

It was thought that the technical support role of SDS was similar to that of the technical team in the theatre, whose responsibility it was to provide skills relating to the production of scenery, lighting, sound, etc. In the theatre, the technical team is assigned to work on one play (project) at a time, and to support it throughout its run. In fact, they are in this sense part of the production itself (as evidenced by their appearing in the credits on the programmes). This situation did not apply to the relationship between Project Y and SDS. Siting the support role remotely from Project Y meant that SDS had become divorced from the project's time constraints. This "buying out of timescales", as the staff expressed it, had a detrimental effect on morale. In addition, it served to emphasise the advisory role of SDS. Project Y felt that a more active 'doing' role was required from them.

Another issue which the theatrical metaphor helped to put into perspective was that of status. There was a distinct separation between applications development roles (like those of Project Y) and development support roles (like those of SDS). The latter were seen as forming an IT 'elite', with higher gradings and better accommodation. Since the centralisation had taken place, staff were regularly recruited into the support function on a higher pay scale than applications development teams. In addition, employees with good technical skills were often removed from projects

and put into SDS to fill support roles like Database Administrator. This was seen as having a skills draining effect on donor projects. It was also cited as evidence of a weakness in the career structure, whereby development work was not regarded as providing enough scope for individuals to develop their technical abilities.

The respective roles were, therefore, not perceived to be equally valued. To apply the metaphor again, this was equated with a theatrical technical team being accorded higher status than the actors or the scriptwriters. A common explanation given for this scenario was that whilst analyst programmers in development areas were seen as generalists, support staff were seen as specialists. It was noted, though, that future developments in technology might shift this balance, increasing the demand for generalists in relation to specialists.

REFLECTIONS ON TOTAL QUALITY MANAGEMENT

In summary, then, it appeared that the changes required to implement a quality culture effectively had not taken place. Judging from the comments made by staff, this was not the result of a lack of willingness or motivation on their part. Rather, it could be argued that it was a consequence of how the changes had been introduced (Brooke, 1991b). The reasons for the failure became more apparent when the philosophy of Total Quality Management (TQM) itself was examined. The simplistic definition of quality in business had always been 'to get it right first time, on time, and to budget'. Yet this definition had centred on bald and ambiguous objectives relating to the 'what' of the mission statement. TQM implied much more than this and emphasised the 'how' of business. It signalled a move away from quality control as the responsibility of quality inspectors or quality control managers, to being the responsibility of evervone in an organisation (Collard and Sivyer, 1990). The customer then became anyone for whom a service was provided. In other words, not just those external to the organisation but internal, too. This meant that quality became a people issue and that it would only be through the commitment of all employees that an organisation would achieve true TQM.

So what did the findings suggest were the reasons for Sponsor B's failure to attain full TQM? The two main factors which I identified were the top-down approach to implementation which lacked lower level consultation, and the focus on detailed methodologies. The fieldwork suggested that there was a mis-match between the cultural traits required to implement full TQM and the traits of Sponsor B; as had been the case for Sponsor A. It was with irony that I noted the following Chinese proverb quoted in one of Sponsor B's confidential handbooks on TQM:

> *"Tell me and I will forget;*
> *Show me and I may remember;*
> *Involve me and I will understand."*
>
> *(Taken from a confidential handbook on Total Quality Management within Sponsor B.)*

An emphasis on commitment by the top management was compatible with TQM to the extent that it was a first step to ensuring commitment at every level of the business. However, the way in which this had been carried out (the lack of participation in setting goals) failed to give proper recognition to the fact that TQM was about people (Brooke, 1991b). It was also clear that the staff had been unconvinced of commitment at the top levels, anyway, and the protracted three-year roll-out programme had served to accentuate the reservations.

In view of the fact that Sponsor B's traditional culture had been similar to the Civil Service (as had been Sponsor A's), it was perhaps unsurprising to find that the mechanisms employed smacked of change by control (processes, manuals, documentation) rather than change by commitment (customers, guidelines, discussion) at the individual level. At staff level the most evident changes manifested themselves through altered work procedures, i.e. detailed methodologies, of which there was both a proliferation and ambiguity (Method A, Method B, LSDM, JSP). Their process-oriented nature detracted from the quality vision. Not only this, but there was an unclear relationship between the project management methodologies and the application of LSDM and JSP, which gave the impression of a fragmented rather than an integrated strategy. With hindsight Sponsor B were willing to admit that:

"Slavish application of TQM procedures does not necessarily increase the quality of the end product."

(Senior Manager, 1991.)

Professor Oakland (1989) described this situation when he said:

"Clearly, the challenge for many quality professionals is not so much making changes in their organisations as recognising the changes which are required in themselves."

The focus for TQM should, therefore, have been on culture at the individual level. The findings showed that this had not been the case. Staff admitted that they were not always practicing what they had learnt about TQM, and there was a lack of appreciation of the long term benefits arising from TQM as evidenced by their comments concerning extended project timescales.

A major contributing factor to this scenario was inadequate training. Training for staff in the philosophy of TQM had been limited to a one-off workshop session, provided by managers at each level for their direct reports, and cascaded down the organisation. This was, arguably, insufficient to ensure understanding and commitment. As Ullah (1991) said:

"By understanding how individuals differ in their reactions to increased responsibility for quality, problem-solving, and decision-making, managers can make informed judgements about the likely success of the changes and their effects on the motivation, morale and job performance of their employees."

Such attention to detail had not been taken into account at Sponsor B.

The TQM programme was due for a re-launch in the forthcoming year and this was seen as an opportunity to address many of the issues. I received positive feedback on my report to senior management, together with a list of "Reflections" which indicated how the company intended to change their approach in future. The following points were included in that list:

- It is better to look for a multitude of small quality improvements which have an immediate effect rather than going for the 'ocean boilers' which may take considerably longer and, therefore, dilute their impact.

- Sheep-dip' type training like that of the one-off TQM sessions does not promote understanding. The objectives of all levels of management need to be appreciated and overall there must be intelligent application rather than rule-book following. This means retaining an amount of flexibility.

- All formal training should be followed up by opportunities to exploit what has been learnt; and as quickly as possible.

- Visibility and publicity of quality activities is vital along with recognition and sometimes reward at the individual level.

- It helps considerably if quality improvements can be measured in some way.

- Continual and consistent repetition of the TQM message is essential (hence, the re-launch).

- As soon as possible TQM should become Business As Usual rather than a separate activity.

These points resonated with my interpretation of the findings. It was how the changes had been introduced that had been the main problem. Most of the reflections also indicated (sometimes implicitly) the need for an approach which addressed issues at the individual level. Thus, although the overall tone of the list was still potentially authoritative and controlling, it contained within it acceptance of a more individualised perspective. The need for this shift in focus was not only identified within Sponsor B (or, indeed, Sponsor A). The literature suggested that the implementation of TQM in business was posing significant problems for many organisations in the UK. Since TQM was essentially a cultural concept, it followed that the major issues which needed to be addressed related to the culture of UK businesses.

TQM emphasised self-control, autonomy and creativity among employees. Yet its application within the UK had been criticised for failing to explicitly deal with areas relating to employer/employee co-operation as requiring sensitive human resource management (Wilkinson et al, 1990). The quality improvement efforts taking place within Sponsor B provided an appropriate mechanism with which to address this. However, in a similar way to Sponsor A, their effectiveness was dependent upon high visibility, voluntary membership, and the recognition and uptake of recommendations on the part of senior management. This presented many companies with a significant challenge. The Civil Service style culture of Sponsors A and B was by no means unusual. Indeed, the traditional image of UK business included cultural traits like bureaucracy, risk averseness, short termism, and reactivity (Rajan and Fryatt, 1988, Nelson, 1989, and see Literature Reviews in Two Journeys Intertwined). Both the sponsors were being subjected to strong pressure to change in the light of increased competition in the marketplace, and the need to become more proactive. This was also the case for many located in the service sector. Organisations willing to respond to this pressure had been searching for an aide to cultural change and TQM had been heralded as one of the most valuable routes to success in this respect. But if organisations had thought TQM would provide a purely procedural solution which would change them overnight, they were wrong. The change literally had to come from the heart, as was demonstrated above.

Poor quality communications could be said to have characterised my experiences in Sponsor B in at least two ways. The communication between top and bottom layers of the organisation had not been of a quantity or quality sufficient to ensure achievement of TQM. Also, the staff of Project Y had pointed out the lack of communication between the analyst programmers and the Accountancy Department for whom they were producing the software system. The reliance on Finance Department as a 'go-between' increased chances of mis-interpretation and customer dis-satisfaction. In both respects, the findings demonstrated that quality of communications was essential to TQM. (This topic is expanded later).

A British Institute of Management report contained within it a message which, for me, summed up the most important lesson arising from TQM; and probably the most difficult one to learn in the context of British organisational culture:

> *"Reason is no longer enough. Managers must understand feelings, emotions and values."*
>
> *(Coulson-Thomas and Brown, 1990)*

The implications of this were fundamental in enabling both individual organisations, and the UK in general, to maintain a competitive edge. As a result of my fieldwork within Sponsors A and B, I constructed scenarios of how UK culture would have to change in order to successfully implement TQM, in contrast to how I thought it generally looked. These are discussed in the final chapter on Conclusions and Recommendations.

SPONSOR B AND THE USE OF METAPHOR

My use of metaphor was intended to be an interpretative tool, an aid to making sense of the information I had gathered. It emerged from the data and from my perception of the data. It was not an academic decision in that sense. I did not recognise it as an established methodology and seek to apply it according to the instructions in the literature. It was a grounded thing. I had no problem justifying this to myself (or to the staff). It was an idea which may or may not have worked in the application. Ibelieve it did work. The staff and the management seemed to think it worked, too. What did this mean: it worked? Simply that it fulfilled its role by helping to clarify where and why problems were encountered by staff. The theatrical metaphor was something with which they could easily relate. It did not get in the way of the work context and discussions were not locked within the theatrical framework. This was important because:

"If the metaphor is difficult to recognize... the associations may not come. If the metaphor is marginal... it may divert the discussion to indifferent queries. If the metaphor is too complex... it may gain life of its own, and end up being the object of discussion instead of a vehicle for understanding."

(Molin and Strandgaard, 1990.)

When I was preparing the report for senior management, I found myself in a dilemma. I did not know whether I should present my findings within the same metaphorical framework that I had done for the staff in the presentation. My doubts stemmed from my realisation that it would be considered an unusual approach for a business report. I decided that, in order to represent what had taken place in the presentations as honestly as possible I should follow suit. I, therefore, risked the possibility of its rejection. However, it was in retrospect that I realised I had ignored the alternative. I could have taken a collaborative approach and consulted with the senior management on this point. This was another example of how I had not been collaborative in my work. In other respects I had been more collaborative in this piece of fieldwork than within Sponsor A. I had been more open with the staff concerning my research methodology and I had refined it with the help of a member of Project Y. Of course, a truly collaborative effort would have gone a great deal further than this by involving the staff in every stage of the research and by giving them much more input into the direction of it.

Why did I avoid doing this? It was the Paradigm Yaks again. I assumed that I was surrounded by positivists and that their response to my approach would be negative. Even though the staff encouraged me to share the academic foundation and theoretical details of the research methodology with them, I still did not have the courage to employ a collaborative technique. I backed down from the challenge. In this way I, again, compromised my work. I persuaded myself that I had adopted a collaborative approach with the staff when, in fact, it was merely a veneer. If I had been collaborative many of the doubts I had about the reaction to the research would have been reduced. For example, my concern about presenting a report to senior management in metaphoric format. In a collaborative scenario the senior management would have been fully aware of the format which the

presentation took. Any reservations they might have had would have been discussed at that point.

As it transpired, the format of the report did not appear to createany problems. I specifically asked the senior manager receiving it about this. I was surprised that he seemed perfectly comfortable with the style. At the time I was very pleased about this, it was only later on that I realised how I had deluded myself. All the way through the research I had made assumptions concerning the nature of the 'enemy'; for that was what the situation amounted to! In my mind I had taken the role of subversive, someone who did not subscribe to the 'system norm'. When I entered the organisation I took with me all my academic baggage. The literature reviews I had conducted led me to believe that I would be waging a virtual war against concepts like technological determinism and positivist, scientific approaches to management. These were my biases. I decided beforehand that I would encounter conflict hence my lack of courage and collaboration. 'Don't tell the enemy your strategy'. I had set up another structural opposition - them versus me. I manufactured the division, therefore, it was my responsibility to breach it. I had created my own dilemma; another self-sacrifice.