SPEAKING DIFFERENT LANGUAGES: METAPHOR, DISCOURSE AND DISCIPLINARY CONFLICT IN PRODUCT DEVELOPMENT

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ABSTRACT

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Successful product development often requires the co-operative efforts of members of multi-disciplinary teams. Improving the effectiveness of these efforts has primarily been approached through structural features of organisations and disciplinary representation on project teams. More recently, interpersonal communication across disciplinary boundaries has been recognised as problematic. Tacit familiarisation and co-location are often assumed to address communicative difficulties.

Studies of collaborative work have identified the ability to effectively adopt the perspectives of others as essential to successful outcomes. This work reviews literature challenging traditional assumptions about communication and meaning, to show that difficulties may be deeply rooted in divergent beliefs and experiences that remain unaddressed in the course of normal work. Insights from cognitive linguistics are discussed, which reveal metaphor to be a central process in thought and understanding. The use of different metaphors can be seen to frame perception so that participants in situations may develop incompatible and incommensurable views.

This study has focused on the development of a method for identifying aspects of divergent and unshared metaphorical structuring in the ways disciplinary professionals conceptualise about their work. The study has involved open interviews centring on disciplinary stereotypes, and informants' beliefs about essential aspects of their work. Texts generated were subsequently subjected to discourse analysis involving thematic content, elements of interpretative repertoires, and the use of narratives in discerning metaphorical themes. The work was exploratory in nature, involving a small number of informants. Significantly different themes were identified in informants' discourses which shed light on areas of disciplinary friction related by them. These themes are consistent with Dougherty's (1992) findings of differences in disciplinary 'thought worlds', but convey a richer understanding through their metaphorical nature. It is believed that exploration and discussion of metaphorical themes may be employed in future work to facilitate collaboration in multidisciplinary product development.

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AUTHOR DECLARATIONS

1. During the period of registered study in which this dissertation was prepared, the author has not been registered for any other academic award or qualification.

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CHAPTER 1.

CONTEXT: MULTIDISCIPLINARY TEAMS AND COLLABORATIVE WORK

Introduction

Recently, there has been much interest in concurrent development, multidisciplinary teams and collaborative work in product development. Working as a team in a concurrent or multidisciplinary manner is thought to yield a number of benefits over a traditional, linear process where different disciplines carry out their work sequentially. The body of literature supporting, detailing, and espousing this point of view is by now large and generally well-accepted. (cf. Takeuchi & Nonaka, 1986; Katzenbach & Smith, 1993; Ulrich & Eppinger, 1995) However, tensions and conflicts arise during the course of this work, owing in part to interpretive differences between individuals attempting to co-operate in product development situations. The purpose of this study will be to explore the basis of these difficulties in the realms of taken-for-granted beliefs and tacit assumptions, through attention to metaphorical features of language and discourse. It is believed that this will result in a deeper and more meaningful understanding of the tensions arising between members of different disciplinary groups, and provide a more useful way of surfacing differences for constructive negotiation, than approaches that ignore individual interpretive differences.

This chapter describes the context within which the current project has been conducted. The first portion of the chapter will identify certain works within the literature on interdisciplinary product development which will serve as reference points to locate the current work's emphasis on communication and personal interaction. The second portion of the chapter explains the work's position on thinking styles and personality typing -- approaches which will not be employed.

Areas of Emphasis in the Study of Multidisciplinary Product Development

Frequently cited advantages of a multidisciplinary, concurrent, or collaborative approach to product development include shorter development times, smoother transitions from development to manufacturing, lower manufacturing cost, improved product reliability, and increased likelihood of market acceptance. These benefits stem from early and meaningful involvement of specialist professionals from important functional areas, which may include research and development, manufacturing, industrial design, marketing, quality assurance, material procurement, service, and sales. However, success in a multidisciplinary team effort is by no means assured. As Katzenbach and Smith (1993) indicate, highly successful teams are rare and many stubborn personal and organisational factors can frustrate efforts to foster them; 'teams do not become teams just because we call them teams or send them to team-building workshops.' (p. 4) Ulrich and Eppinger (1995) similarly list negative aspects of organisational environments that can reduce or nullify the effectiveness of product development team efforts, including: lack of team empowerment by general management; allegiance to functional (disciplinary) hierarchies rather than project goals; inadequate resources; and lack of adequate representation of the necessary range of functions on a project team. (p. 9) Areas of focus for research in multidisciplinary product development are aimed at overcoming these and other problems in complex and diverse organisational situations.

Incentives and Organisational Structures

Much research focuses on structural aspects of organisations and their effects on team success. Clark and Fujimoto (1991) identified four types of project organisation[1] in a study of the automotive industry. Important factors included the size of the project,

[1]The four types of organisation are: 'functional', 'lightweight', 'heavyweight', and 'dedicated autonomous' teams. The functional and dedicated autonomous forms represent the poles of organisation purely by discipline and by project/business unit, respectively. 'Lightweight' and 'heavyweight' are mixed, or matrix forms. Essentially the same typology is graphically presented by Ulrich and Eppinger (1995), adapted from Hayes, Wheelwright and Clark (1988) *Dynamic Manufacturing: Creating the Learning Organisation*, (New York: The Free Press).

novelty of the product for the organisation, and importantly whether the primary allegiance of team members was to a functional management structure or a project or business structure. This typology has subsequently been used by Bowen, Clark, Holloway, and Wheelwright (1994) in case studies of successful and unsuccessful development projects. Though they indicate that all four types have appropriate applications, the project-focused types -- 'heavyweight project team' and 'dedicated autonomous team' -- seem to be best suited to the business and economic conditions prevailing today. It is believed that the welfare of the organisation is ultimately better served when the activities of diverse specialists are focused on the commercial success of their joint effort, rather than on more narrow interests of a particular disciplinary group within the organisation. This is accomplished through organisational and project management structures which emphasise project and team loyalty over functional loyalty.

Besides organisational structures which bring goals and motivations of team members into accord, these researchers cite the importance of organisational learning in the form of project leadership experience and process (design and manufacturing) capability. Bowen et al. (1994) emphasise the importance of unified visions of products, projects, and business opportunities, promoted throughout the team by experienced and talented project leadership. Leonard-Barton, Bowen, Clark, Holloway and Wheelwright (1994) emphasise successful companies' use of projects to develop longer-term, strategic capabilities that speed the development of follow-on products. In both cases, beneficial organisational learning has been brought about as a result of a project-based organisation structure, and supportive actions of upper management.

The dynamics of interpersonal communication in these project-based organisational structures are often not explicitly treated as problematic. There is an assumption that communication and understanding between individuals with different backgrounds on teams will be accomplished tacitly through co-location -- the placement of different disciplinary specialists in close physical proximity to one another. Casual, day-to-day contact will undoubtedly improve understanding between disciplines and promote

familiarisation with each other's work. However, relying on co-location as a sole strategy for facilitating communication may entail certain problems. Expertise and excellence *within* a discipline are developed significantly through the working interactions of a strong community of its practitioners (Boland & Tenkasi, 1995; Brown & Duguid, 1991; Lave & Wenger, 1990). As Leonard-Barton et al. (1994) acknowledge, companies may have difficulty balancing the desire to integrate multidisciplinary project teams with the need to maintain a 'critical mass' within each discipline to develop expertise. Additional barriers to physical co-location arise due to the distributed or even global nature of many companies' research and development efforts, and reliance on outsourcing or consultant services. (Rafii & Perkins, 1995) [2]

Interaction and Communication

Interaction and communication between members of cross-functional product development teams has been recognised as an important subject in itself. An increasing number of interdisciplinary educational programs at colleges and universities seek to establish an understanding of other disciplines, and provide skills in working with them as part of preparation for professional practice. Bruce and Davies-Cooper (1994) survey approaches taken to the introduction of design management content in the curricula of UK business and design schools. The Corporate Design Foundation (1994) reported on the results of a survey and a symposium involving fourteen (largely US-based) interdisciplinary design / management / engineering programs. In both cases, a range of approaches is identified -- depending on the type of institution within which each programme is based -- and various pros and cons are discussed. Recurring important issues include managing team and interpersonal dynamics, and the difficulty of locating staff with adequately broad and in-depth training.

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[2]Research has also shown that the level of casual working contact between individuals is strongly dependent on physical distance, such that separation by more than twenty metres, or a flight of stairs, can reduce interaction to the point that physical distance becomes immaterial. Ulrich & Eppinger (1995, p. 275) and Rafii & Perkins (1995) cite Thomas J. Allen, (1977) *Managing the Flow of Technology*, (Cambridge, MA: MIT Press).

Distinctions between different types of interactions are also made. Buchanan and Vogel (1994) describe four 'modes' of work they explore in teaching design and interdisciplinary product development courses. Besides traditional areas of individual and group disciplinary practice, Buchanan and Vogel distinguish between 'multidisciplinary' and 'interdisciplinary' ways of interacting. The former occurs when individuals each retain ownership of their particular areas of disciplinary expertise, while co-operating with others on a shared task. Interdisciplinary work involves a 'deeper collaboration', in which

> .. each member of the group possesses a discipline and that they are prepared to look beyond that discipline to achieve group understanding of the project or problem at hand. This rarely happens by accident. There must be careful cultivation of interdisciplinary skills -- arts of communication and dialogue that are often alluded to (and seldom well articulated) in management theory of the knowledge-based or learning organisation. (p. 42)

Schrage (1995), in a popular book defiantly titled *No More Teams!* , makes a distinction that is similar in many ways. He argues that words like 'team' and 'communication' actually obscure an essential aspect of true collaboration. He feels that these words suggest a situation in which individuals co-operate in performing their pre-defined and independent functions by exchanging information. Based on his study of collaboration in the sciences and arts, as well as in product development, Schrage asserts that collaboration involves a sharing and joint exploration of ideas:

> (a process of) shared creation: two or more individuals with complementary skills interacting to create a shared understanding that none had previously possessed or could have come to on their own. (p. 33)

Schrage, like Buchanan and Vogel, does not argue that collaboration (or *inter*disciplinary vs. multidisciplinary work) is always 'better' or appropriate in every situation. However, both argue for the importance of recognising essential differences between these modes of work, so that their strengths can be properly utilised. Further, both identify more meaningful collaboration with the development of a new, joint understanding, which goes beyond simple co-operation.

Survey Methods Addressing Interaction and Conflict

Interactions between functional groups in professional practice have been studied across a variety of industrial situations by various survey methods. Survey methods are useful in looking for patterns in the general nature of interaction and conflict with respect to industrial sectors, project phases, and characteristics of project or organisational structure. For example, Ruekert (1995) has found that increased interaction generally increases *effectiveness* of product development (in terms of ultimate product quality and market acceptance), though for areas in which the organisation has substantial prior experience it may reduce the *efficiency* of the project effort (in terms of time and development expenditure).[3] Olson (1994) has reported survey results looking at conflict and conflict resolution between functional groups over the course of product development projects. Besides noting changes in levels of conflict over the course of project cycles, Olson has concluded that the greatest conflict occurs between groups which do not perceive a strong inter-dependence in achieving their respective goals. (Olson's work will be described in somewhat more detail below.)

Survey methods are also used to correlate characteristics of functional interactions with judgements of the success of product outcomes, in order to construct a general picture of 'best practices'. Davies-Cooper and Jones (1995) have developed such a survey-based diagnostic tool with particular attention to inter-departmental interfaces. They identify a number of areas of common weakness across the companies studied. These results also tend to refine the general understanding of what constitutes best practice, which Davies-Cooper and Jones find is based on inter-functional understanding, awareness, communication, and an overall commitment to the project. Fisher, Press, Chapman and Rust (1996) have undertaken a survey approach to assess the effectiveness of government efforts to promote best practices in design management, as well as the effects on 'creativity' perceived by managers and designers. Their findings indicate that

[3]The distinction of efficiency versus effectiveness begs the question of under what circumstances it might be advantageous to be efficient rather than effective. Ruekert does not address this question in his paper.

multidisciplinary teams are generally accepted as a regular feature of work. Designers reported that, though team working had broadened their awareness of other areas in product development, it had not changed their own professional identities or their perceptions of those of their team mates.

Survey methods involve responses to standardised questions. They allow comparisons between the responses of large numbers of individuals, enabling conclusions to be drawn about the distribution of beliefs, perceptions, and practices across companies and industry sectors. As described above, they can facilitate the identification of best practices, and the diagnosis of ways in which particular situations deviate from them. An essential trade-off that is made in adopting a survey method, however, is the loss of a certain amount of information about the specifics of each particular situation, in exchange for the ability to generalise or make quantitative statements. I would like to return to the work of Olson (1994) to explore the benefits, as well some of the drawbacks I see in his method.

An Example Survey-Based Study

Olson's (1994) work posits a connection between the perceived level of interdependence between two functional groups (in terms of each group seeing the co-operation of the other as important to its own ability to reach its goals), and the perceived level of conflict between the two groups. The study was a substantial undertaking, encompassing forty-five new product development projects in twelve firms operating in a variety of industries, observed over two years. It relied on self-reporting of attitudes via survey questionnaires returned from one-hundred and eleven individuals spread across four functional groups (Design, R&D, Manufacturing, and Marketing).[4] The study asked respondents to estimate the frequency of disputes, and to distinguish between conflicts over goal priorities and over ways in which specific work should be carried out.

[4]Olson points out that, given the number of respondents, projects, and companies involved, anything other than self-reporting with a survey-based approach would have been impractical.

Enquiries were specifically made as to the degree and nature of conflict at different stages in a project, as well as the conflict resolution mechanism that was employed.

Olson found a negative correlation between perceived interdependence and levels of conflict, which he interpreted in terms of to the idea that, 'those upon whom we are most dependent are those we are least likely to risk alienating.' (p. 62) Olson's study found moderately high levels of perceived interdependence between design and both R&D and marketing, while the lowest levels of interdependence were perceived between design and manufacturing; further, while design perceived a small increase in dependence on manufacturing in later project stages, manufacturing continued to see its dependence on design as relatively low.

With regard to the frequency and nature of conflict, disagreements over goal priorities were described on all sides as moderately low. However, greater disagreement was reported over specific ways in which work was carried out, with designers consistently perceiving higher levels of conflict with other departments than the other departments perceived with design. Design tended to see itself involved in more disputes with marketing in the early phases of a project, which tended to be resolved by later phases. There was agreement between personnel from both manufacturing and design that significantly higher levels of conflict over the way work was carried out occurred in later project stages between their departments, than were experienced with the other departments.[5]

Olson recommends steps to increase the groups' familiarity with each other, through earlier involvement on projects, and through consciously-undertaken cross-training

[5]The four conflict resolution mechanisms for respondents to chose were: 'avoiding or smoothing over issues'; 'bringing issues out into the open for general discussion'; 'resorting to the authority of a higher-ranking manager'; and 'bringing in a third party to serve as an arbitrator'. The most commonly cited mechanism was bringing issues up for general discussion; interestingly though, designers consistently saw conflicts between their department and others as more often settled by higher ranking managers or persons external to the conflict, than was perceived by other departments in their conflicts with design.

(such as having manufacturing people take design courses). He also recommends that perceptions of interdependence should be strengthened through the institution of a cross-functional reward system based on teamwork and the product's commercial success. Though Olson addresses his recommendations to management regarding all four groups, he particularly focuses on what is perceived to be the weakest relationship, that between manufacturing and design.

Olson's work provides insights into the widespread nature of interdisciplinary conflict, and the way it may vary with project cycles. His proposal of a link between conflict and interdependence seems believable. However, I find his recommendations to be unsatisfyingly vague and not particularly insightful; I believe the reason for this is that, rather than achieving its stated objective of identifying perceptual differences between designers and their counterparts, the study has documented the existence of different perceptions. Because specific and contextual information for each case was not gathered, Olson is not able to speculate about why the different perceptions may arise or how they result in conflict -- he has simply documented that conflict exists.

To elaborate, I think it is possible that the lower perceived involvement and higher perceived conflict between Design and Manufacturing, rather than having a cause and effect relationship, may both be, to an extent, effects. In my experience, Manufacturing and Design have significantly different objectives at the heart of their activities, reflected in different value systems, and established through different processes of enculturation.[6] Greater levels of conflict and perceived independence may both be related to differences in the way designers and manufacturing people regard their work. Non-specific involvement and cross-training would have a tendency to blunt these differences over time, but considering that the enculturation involved took place over many years, it is possible that short periods might not have a dramatic effect. In any case, it seems that the lack of

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[6]As an example, the word 'quality' in manufacturing terminology is associated with process predictability, stability, and product uniformity. Stable processes allow optimisation and cost reduction. On the other hand, industrial designers are expected to be innovators or 'seeds for change', as suggested by the cover of *ID (International Design)*, Jan-Feb 1996

specific information on instances of conflict -- which is a consequence of the research approach -- makes it difficult to suggest more specific remedial action.

Approaches to Facilitating Communication

Some researchers have addressed ways in which communication between disciplinary groups might be improved, particularly in light of mutually unintelligible specialist vocabularies. Leonard-Barton (1991) has called attention to the communicative functions of models and prototypes, which can prove more effective than words in focusing opinions and integrating efforts. Leonard-Barton points out that models focus and make explicit what is known, or thought to be known in a project, and what questions remain. Models embody these statements and questions in a way which appeals to all senses, thereby increasing the number of avenues by which information can be obtained. Leonard-Barton offers a counter-example, of a lopsided product[7] resulting from a biased process in which , 'from the beginning, the product (was) described in the language of a single dominant discipline.' (p. 64)

Schrage (1996) states an equally strong view of the communicative role of physical prototypes. He is extremely critical of the notion that teams which produce innovative products were first assembled and given (paper) product plans with aggressive deadlines. He cites examples from case studies in several major corporations in which an innovative prototype, produced by an individual or a handful of initiators, led to the assembly of an effective and motivated team. Schrage argues that an essential ingredient in this process is a culture which encourages a sort of internal marketplace, exposing new ideas to those who can potentially help bring them to fruition. This culture relies on disciplinary specialists having some exposure to working outside their disciplines, since people are less likely to become excited about prototypes coming from an area of which they have no appreciation.

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[7]The product in question was a piece of technically sophisticated computer hardware which was unsuccessfully introduced to market owing to a lack of applications software.

Cooper and Press (1995) detail aspects of the interfaces between design and other functions within organisations; they similarly suggest the usefulness of visual and other sensory information -- particularly with regard to the interface between design and marketing or market research (p. 151). In contrast to the quantitative emphasis of market research information, Cooper and Press emphasise an intuitive aspect to design thinking, and cite Woodhuysen that cognitive and emotional factors are more likely to be of interest to designers. To facilitate communication across this interface, Cooper and Press suggest that market research be jointly carried out, and/or that mood boards, metaphors and analogies, and scenarios may all aid in 'providing usable market intelligence to the designer.' (p. 153)

Finally, Dumas (1994) and McWilliam and Dumas (1995) have described approaches to facilitating communication within product development teams, and in the development of new brands, using a combination of visual and verbal metaphor. According to these researchers, the usefulness of metaphor lies in its ability to unlock and make accessible detailed and relevant tacit knowledge possessed by members of teams, which they may not be able to adequately express verbally.

Personality Types and Thinking Styles

The second portion of this chapter, establishing the context within which the current research will be conducted, addresses my position regarding approaches based on personality types and thinking styles. Such concepts have provided the basis for research into work interactions, and figure in many people's folk theories about the differences between engineers and designers, for example. As will be described below, these concepts figured in my initial thoughts about this project. However, I became convinced that they did not represent productive approaches to achieving the goals of this project for a number of reasons.

Personality typing schemes are attempts to structure the myriad differences in people's behaviours according to principles or along lines which reduce the apparent complexity. They also may construct oppositions between types based on compatibility, or make suggestions about the nature of friction to be expected between types when they interact. There are many such systems which can be applied in work situations, of which the Myers-Briggs typology is an example.[8] The Myers-Briggs system identifies sixteen personality types arising from combinations of four independent, bipolar temperaments. Each type is described in terms of characteristic behaviours, with various typical results in social interactions (including work groups).

A typing system developed for work interaction, specifically for management teams, is that of Belbin (1981). The Belbin system identifies eight personality types which correspond to 'team roles' these types naturally tend to perform. Various characteristic behaviours, strengths and weaknesses are attributed to each type/role (p. 78), and Belbin describes the importance of placing appropriate types in leadership positions, and of an overall balance of roles on teams if they are to be successful. Using the results of various psychometric tests, Belbin indicates that successful teams can be designed -- assembled from a group of individuals with various characteristics -- according to these principles of leadership and balance; potential problems with teams of known composition may also be predicted.

Other popular theories make a simpler distinction between two fundamental thinking styles, particularly with regard to choices of occupation. References are made to 'convergent' and 'divergent' thinking -- terms used by Hudson (1968) to describe the two basic thinking styles he had found among highly-performing English schoolboys. Though each style has a number of related attributes, a strong differentiation was based on an apparent preference for situations of singularity and certainty, versus situations of multiplicity and shifting possibility. Hudson strongly correlated these types with positive

[8]A popular explication of the Myers-Briggs personality typing scheme, including a self-assessment and a brief account of its basis in Jung's notions of temperament, is contained in Keirsey & Bates (1978).

and negative perceptions about careers in the arts and sciences. The currency of a popular perception of a fundamental difference between practitioners in the arts and the sciences was reflected in a recent BBC television documentary, discussing a 'chasm' between the arts and sciences.[9] The program, however, emphasised that no distinction in the fundamental nature of work in either field was supported by recent work in social science.

In general, this project will not utilise personality typing schemes because their approach emphasises the assessment of individuals and their behaviour, and their placement in pre-existing categories, rather than attention to the actual nature of belief in any specific instance. While these systems may be useful in raising awareness of the existence of other perspectives, to say simply that someone's opinion represents 'convergent' thinking, or that they are clearly of an 'intuitive temperament', without examining the belief and the context within which it is set, is in a way to deny its validity. Further, the application of such a label to a person's thinking tends to exclude the possibility of constructive change, particularly when the labelled behaviours are regarded as somehow intrinsic and immutable.

The Dual Knowledge Thesis

Coyne and Snodgrass (1991) discuss and critique a general epistemological position which recognises two modes of thought in polar opposition. They see this 'dual knowledge thesis' as underlying both the traditional distinctions between the rational and the romantic, and the more modern notion of distinct left-brain/analytical and right-brain/intuitive thinking styles. Coyne and Snodgrass are writing in the context of design education. They assert that a belief in two fundamental, oppositional modes of thought -- one rational and analytical, the other subjective and irrational, hinders effective dialogue and teaching. They particularly attack notions that there is something uniquely mysterious, intuitive, and inexplicable about design thinking, but are critical of the

[9]BBC, *Equinox*, 'The Culture Clash'. The program began with C. P. Snow's 'Two Cultures' address in 1959, and explored various aspects of education in the sciences compared to the arts and humanities in social and political context.

opposing position, that rationality and logical processes are exclusively valid. Coyne and Snodgrass effectively articulate the dilemma I experienced in my own education, which involved an unreconciled split between an engineering approach to design[10], and other approaches which seemed irreconcilable:

> The dual knowledge thesis in all its guises throws the student into a morass of difficulties that range from an unnecessary and suddenly induced fear of the unknown to attempting to reconcile notions of 'subjective judgement' with 'absolute truth.' (p. 130)

Coyne and Snodgrass trace the philosophical roots of the dual knowledge thesis through the Enlightenment, to Cartesian subject-object dualism. They show that the hermeneutical view of understanding formulated by Heidegger and Gadamer is less problematic, achieves greater accord with everyday experience, and renders a dual knowledge thesis unnecessary. They propose design to be an essentially hermeneutical activity, 'best described in terms of play or dialogue,' involving an interplay of expectation, historical consciousness, and immediate experience.

> If all human thought and action has this hermeneutical characteristic then the dual knowledge distinction is unnecessary. The hermeneutical nature of understanding is shared by both the 'divergent' activity of designing and the 'convergent' activity of solving a mathematical problem. Creating a work of art and applying a rule to predict the motion of a billiard ball are both hermeneutical, even though the media, subject matter and corpus of experiences will be different between areas of expertise, as will aptitudes. (p. 126)

To conclude, I do not question that there are differences in the ways people think, and that their thinking may fall into habitual patterns which inevitably contribute to their having different experiences of the same situation. I am not, however, choosing to approach the subject by applying a pre-existing framework of categorisation for personality types or thinking styles, because I do not think it will prove as useful for my purposes. It may be the case that there are correlations between 'thinking styles' and

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[10]This approach seems in retrospect to have been strongly influenced by the design methods movement; it emphasised activities such as 'need finding' and problem solving, through relatively structured methods.

disciplines, but I am more interested in seeing these behaviours as results of discipline-specific enculturation than of traits somehow inhering in the person.

Summary

Despite the generally accepted benefits of multidisciplinary team work in product development, successful outcomes are not guaranteed. While considerable attention has been paid to structural aspects of projects and organisations, the interactions between individuals with different disciplinary backgrounds have also been recognised as problematic. The practice of co-location is based on a well-founded belief that familiarisation and understanding will be improved tacitly, through casual day-to-day contact. However, co-location presents its own difficulties, and is probably not adequate as a sole strategy for facilitating communication within multidisciplinary teams.

In my experience, members of different professional disciplines may view the others with some degree of frustration or mistrust, draw negative inferences from words and actions based on professional stereotypes, and on some level have an awareness that the others are "speaking a different language." Humour which relies on professional or occupational stereotypes indicates that these beliefs are persistent and durable.[11] I believe opportunities exist to take a less passive approach to improving communication between members of different disciplinary traditions. I believe this opportunity lies in attention to semantics -- in the nature of meanings that are attributed to words and actions. The intention of this project is to focus on language as central to the processes by which people work together and share ideas, and to make a contribution by bringing to bear a richer view of the nature of meaning.

[11]See Appendix VI for samples of humour based on occupational stereotypes of engineers, circulated within professional communities on the Internet.

CHAPTER 2.

LITERATURE REVIEW

Introduction

The focus for this work will be on semantics and meaning with respect to the language used by members of different disciplines engaged in collaborative work in product development. This is a broad subject which could be approached from many different directions, with substantial overlap in different fields. Significant, potentially relevant work exists in a number of fields whose hyphenated names attest to this overlap, including sociolinguistics, psycholinguistics, cognitive linguistics, cognitive sociology, anthropological linguistics, and the ethnography of communication. Because this project was undertaken within a design institution, and because my background and future interests are primarily in design practice, the literature review was not restricted to any particular field. The review was guided primarily by an interest in how the various work might inform actual multidisciplinary design practice, based both on the researchers' avowed intent and on my own sense as a practitioner.

The following discussion is divided largely into two parts. The first explores a body of literature, identified through the writing of Coyne and Snodgrass, that I found to have a significant impact on my own thinking, both through its resonance with my experience in education and practice, and its usefulness in making discordant views more understandable. Much of this literature deals with meaning in relation to individual cognitive processes, and subsequent chapters will describe how it was used to inform the project work carried out. The second part of the literature review focuses more on meaning in the context of interaction, particularly how important areas of belief may remain unexplored during the course of normal work. Because others might chose to approach this subject in a different way, or with different priorities than I have applied, this second section will include brief references to areas with potential relevance that

were not explored in detail. First, however, the two sections of literature review will be prefaced by a brief discussion clarifying the sorts of semantic issues to be addressed.

Problems of Meaning

> Most organisations genuinely believe that their people all speak the same language when, in reality, the enterprise is a tower of Babel where marketing can't talk to accounting can't talk to research can't talk to manufacturing without a translator. This sad state shades into pathos as manager after manager, employee after employee, professional after professional starts whining that 'people don't understand what I'm saying ... They just don't get it.' (Schrage, 1995, p. 72)

When people perceive they are 'speaking different languages', they are experiencing problems of meaning. Though in a crude sense participants are speaking the same language -- in this case, English -- the awareness of a problem at some level indicates a realisation that some differences in meaning are being encountered.

There are of course, a range of specialist vocabularies in the various disciplinary fields which certainly exist and may be only partially intelligible -- or perhaps effectively unintelligible -- to members of other disciplines. It is well recognised that different occupational subgroups develop their own argot, lingo, or jargon, and that specialist vocabularies are important markers for differences in professional culture. (Hammersley & Atkinson, 1983) Indeed, these jargons develop ostensibly to facilitate the greater precision of expression and differentiation between concepts that is necessary in specialist discourse, but they also function to maintain boundaries between professional disciplines which are both passively and actively maintained. (Saville-Troike, 1982; Freidson, 1986) When considering issues of meaning in interpersonal communication between members of different disciplines, it would be possible to focus only on these explicit differences in vocabulary. Problems of communication may be believed to be a matter of learning essential items of the specialised jargon of another group -- which may be undertaken in a genuine attempt to find common ground, or as a more superficial

(or even cynical) appropriation intended to make one's arguments more 'palatable' to a particular group of 'others'. From the point of view of this paper, however, a somewhat different phenomenon is actually more interesting. There are cases in which the same word may exist in the vocabularies of different disciplines, but may be naturally and habitually used with substantially different meanings. Such an event in my personal experience played an important role in the genesis of this project.

A Personal Experience

This event was a conflict, or a state of tension occurring within a group of individuals with different backgrounds undertaking a common project -- the redesign of the interior of a new workspace we were to share. The individuals involved were employees of the same consulting company, but were members of groups that were distinct in terms of their professional roles (predominantly engineering versus industrial design), as well as their educational backgrounds. They had also, until this time, been located in separate buildings across the street from one another, though many had some familiarity with each other through previous project work. Even though the task was not normal client project work, each of our professional identities inevitably came with us into the interaction.

The dispute hinged on the use of the word 'compromise'; a situation was reached in which a proposal from one of the industrial designers seemed incompatible with constraints envisioned by some of the engineers. When it was suggested that 'a compromise' was necessary, this individual responded emphatically that he 'would not compromise'. My initial reaction was incredulity, since to me, compromise was a natural, inevitable, and essential aspect of everyday work. It soon became clear that the other individual was using the word with a sense of almost moralistic integrity, which had to be protected against degradation. His use of the word in this way seemed as natural and habitual for him, as my use in the sense of a mutually-satisfactory, negotiated outcome, was for me. It would have been easy for me to interpret this individual's behaviour according to several stereotypes -- particularly that of his being a 'prima-donna'

designer. However, it was the unquestioning naturalness of our divergent usages that suggested to me that fundamental, and more interesting, differences were involved.

Meaning - Myth, Metaphor, and Experience

This section will introduce ideas from several fields which provide a useful perspective on the kinds of problems of meaning described above. As a first step, it is necessary to direct attention to certain traditionally unquestioned assumptions about communication and the nature of meaning.

Traditional Views of Communication

Fiske (1990), in his overview of major approaches to the study of communications, discusses how the tendency to see differences in meanings as *problems*, rather than as arising naturally and inevitably from social and cultural differences, is characteristic of the view of a 'process school'. (pp. 6-8) The process school-view of communications is frequently traced to Shannon and Weaver's (1949) *Mathematical Theory of Communications*. This model was developed primarily with regard to the encoding and transmission of signals from a transmitter, via a channel and subject to noise, to a receiver for subsequent decoding. Though the model was developed to understand problems at a technical level in signal transmission, it was believed to be applicable to other aspects of communication, including semantics and effectiveness. Other, less linear models of communication were subsequently developed, though they continued to emphasise process and an essential view of communication as the transfer of a message from A to B. (Fiske, 1990, p. 39)

Reddy (1979) has undertaken a study of the resources available in the English language allowing speakers to discuss communication itself. From this study, Reddy finds that a large majority of linguistic expressions available metaphorically embody a very similar view of communication to that which is explicitly the basis of the Shannon and

Weaver model. Essentially, Reddy finds that the majority of expressions used to refer to communication metaphorically suggest that thoughts and ideas, as meaning, are *placed into* words, as in the placing of something inside a container. The words are then sent along a conduit, as in the passing of a physical object, to a recipient who unpacks the meaning at the other end. Reddy dubs this the 'conduit' metaphor, and points out that it encourages a way of thinking that emphasises the speaker's 'packing' of meaning *into* words as the real work of communication -- since removing the meaning at the other end should be relatively obvious and unproblematic. (Reddy, 1979, p. 175) Reddy constructs a series of thought experiments to illustrate how individuals in different and mutually unfamiliar contexts, employing a 'conduit' view of communication, can easily come to question the constructive intent -- and even the rationality -- of each others' communication. According to Reddy, this is one of several counter-productive influences of the conduit metaphor on our understanding of communication; he suggests that an awareness of the joint, essentially interpretative nature of both the sender's and the receiver's activities is important for successful communication. (pp. 185-187) Reddy's argument, and the extensive catalogue of expressions he identifies as embodying the conduit metaphor (p. 189-201) suggest that our tacit understanding of communication has similarities to that of the 'process school', independently of Shannon and Weaver's, and subsequent explicit models.

Categorisation and Meaning

Recognising the assumptions tacitly embodied in the conduit metaphor, by what process do the words exchanged through the conduit come to have meaning? Lakoff (1987) outlines a widely-held view of this process, based on a classical view of the nature of categories. Lakoff then presents a case based on his linguistic studies and the results of a number of other workers showing this classical view to be seriously incomplete and misleading. An updated understanding of categorisation is central to what Lakoff presents as a more useful, general theory of meaning.

As Lakoff points out, categorisation is central to human activities:

> Categorisation is not a matter to be taken lightly. there is nothing more basic than categorisation to our thought, perception, action, and speech. Every time we see something as a *kind* of thing, for example, a tree, we are categorising. Whenever we reason about *kinds* of things -- chairs, nations, illnesses, emotions, any kind of thing at all -- we are employing categories. ... Without the ability to categorise, we could not function at all, either in the physical world or in our social and intellectual lives. An understanding of how we categorise is central to any understanding of how we think and how we function, and therefore central to an understanding of what makes us human. (pp. 6-7)

Lakoff continues to point out that, because a classical view of categories and categorisation has been taken for granted for centuries, it has only recently been recognised to be an empirical hypothesis, rather than something unquestionably true. As such, it is pervasive, and built into the foundations of many academic disciplines as well as many of the folk theories we use to conceptualise about everyday activities such as communication.

In the classical view, according to Lakoff, categories of things are defined by a set of specific, shared characteristics. Because these shared characteristics are thought to be objectively evident to any capable and appropriately situated observer, the categories themselves are seen to have an objective existence in the world. Words are then attached to the categories, and derive their meanings through simple and direct correspondence to the real world and categorisable properties. (pp. 8-9; p. 167) Because of the objective nature of properties, categories, and the nature of meaning through correspondence, truth or falsity can also be uniquely determined from a single, detached, 'God's eye' point of view.[12] In assessing truth, the elucidation of categories and properties becomes critical; resolving truth from falsity requires recognising ever more elusive properties and making finer or more subtle observations of sameness or difference. Truth can be uniquely determined, and its apprehension is facilitated by a detached objectiveness. Mistakes, or disagreements, can only result from someone's inability to perceive clearly,

[12]Lakoff (1987) anticipates mathematics and biological species as counter-examples to his assertions against the existence of objective truth and categories-in-the-world. He discusses and refutes these positions using arguments from within biology (pp. 118-121; 185-195), and mathematics (pp. 353-369).

whether due to individual limitations or a failure to achieve an accurate or 'objective' perspective.

Lakoff presents and philosophically grounds an alternative theory of meaning, which is based significantly on an overturning of the classical theory of categorisation. He relates this overturning, beginning with the later writing of Wittgenstein on family resemblances, and culminating with empirical results gathered by Rosch, co-workers, and others over the last twenty years.[13] Many of these works involve cross-cultural studies; important early works focused on colour perception and naming, while subsequent work has dealt with other linguistic categories, such as those for objects, plants and animals, persons and relations, and abstract concepts. These results form the basis of what is known as prototype theory. They indicate that human categorisation is flexible and highly context-dependent; items may be satisfactory members of categories such as 'chair', 'bachelor', or 'lie' in some situations and not in others. Many categories show prototype effects, in that membership is graded and some items are considered more central (better representatives) than others; a pigeon is more centrally 'a bird' than is a duck, a penguin, or an ostrich. Central members show various other perceptual effects; they are recognised more quickly, learned and remembered more easily. Very many categories cannot be described in terms of a set of necessary and sufficient conditions; rather, membership may be based on a sort of family resemblance, or on patterns of bodily or social experience.[14] The important conclusion for Lakoff is that categories cannot be considered to be objective or to exist independently of human perception and cognition.

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[13]Lakoff's (1987) second chapter traces the development of this process and identifies key figures. He cites Wittgenstein, *Philosophical Investigations*, (1953) 1:66-71. He cites a large number of works by Eleanor Rosch (Eleanor Heider) from 1973 to 1981, and indicates that this work more than any other revolutionised the study of categorisation in experimental psychology, which spearheaded the challenge to the classical view of categorisation.

[14]The title of Lakoff's book illustrates this point. 'Women', 'fire', and 'dangerous things', along with water and crickets, are included in the same grammatical category in the Australian aboriginal language, Dyirbal. Lakoff cites Dixon's work demonstrating that, rather than being arbitrary, this association is completely sensible and natural in the context of the social and ritual life of the people (pp. 92-95).

Lakoff clarifies that his rejection of any ultimate, objective viewpoint attainable by human perception does not imply a rejection of the existence of a 'real world', or recourse to an attitude of total relativism and, 'anything goes.' Lakoff cites Putnam's critique[15] of metaphysical, 'God's eye' realism, and his proposal of an 'internal' realism which recognises important constraint through experience of the real world, but allows for the possibility of more than one internally valid conceptual system within these constraints. Within this new view of realism, Lakoff offers a revision of what it means to be 'objective':

> Objectivity cannot be a matter of conforming to a god's eye point of view, since the very existence of such a point of view is impossible on logical grounds. But that does not mean that there is no objectivity. Objectivity involves rising above prejudices, and that begins by being aware that we have those prejudices. the primal prejudice is our own conceptual system. To be objective, we must be aware that we have a particular conceptual system, we must know what it is like, and we must be able to entertain alternatives. Practical standards of objectivity are possible in a great many domains of human endeavour. Acknowledging alternative conceptual schemes does not abandon objectivity; on the contrary, it makes objectivity possible. (Lakoff, 1987, p. 264)[16]

The purpose of this discussion has been to draw attention to traditional assumptions about meaning and communication that influence our perception of problematic situations like those described at the outset of the chapter. Beliefs that communication is primarily the transmission of meaning in words, and that words label objectively definable entities, are seriously misleading -- though they are often tacitly held. Rather, communication must be seen to be a highly interpretive process for all parties involved, depending greatly on what Lakoff (above) describes as the 'primal prejudice' of 'our own conceptual system'. The ideas to be discussed in the remainder of this section all deal with how our conceptual systems may be understood through our language, in ways that are relevant for multidisciplinary work.

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[15]Putnam, Hillary. (1981). *Reason, Truth and History*. (Cambridge: Cambridge University Press.) was not consulted for this work.

[16]Lakoff also presents a summary of his views on what constitutes objectivity within experiential realism on pp. 301-302.

Myths and Discourse

Lakoff describes the coherent system of beliefs underpinning traditional theories of meaning as 'the objectivist myth'. In this case, the term 'myth' is not used in the sense of a story, fable or legend. It is used to denote a system of pervasive, unquestioned background belief against which other beliefs appear natural and unquestionably true. Barthes employs a similar usage of 'myth' with a key role in meaning within a semiotic model of communication. Here, myths also have the essential characteristic of erasing or obscuring the fact of their own historical or cultural origin, so that the beliefs they entail come to appear inevitable and natural.[17] Discourses are the conversations, discussions, and arguments that take place against a backdrop of taken for granted beliefs -- of which myths are the most pervasive and deeply submerged.

Coyne and Snodgrass (1995) apply the work of Lakoff and others to an analysis and critique of three prominent modes of discourse in design: the oppositional poles of rationalism and romanticism, and the dual or mediating position described as pluralism. For Coyne and Snodgrass, the main goal of this critique is to demonstrate that all three positions are artefacts of a Cartesian subject-object dualism, which is unnecessary and counter-productive in light of more recent philosophical thinking.[18] Aside from this broad goal, the literature Coyne and Snodgrass draw upon to support their case appears to be useful for understanding incompatibilities between discourses in general. Specifically, they justify paying particular attention to metaphor: 'An analysis of prevalent metaphors therefore is important in accounting for the difficulty of communication and understanding across domains of discourse.' Finally, Coyne and Snodgrass assert that, 'new metaphors open up different problem definitions, and new and creative means of generating action.' (p. 32)

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[17]For a concise discussion of Barthes' ideas of myth relative to connotation and signification, see Fiske (1990) p. 89.

[18]These include the hermeneutic philosophies of Heidegger and Gadamer. See also discussion of Coyne & Snodgrass' earlier (1991) article on the 'dual knowledge thesis', Chapter One above.

Metaphor and Problem Setting

Coyne and Snodgrass cite Schon's (1979) work in asserting that discourse within a discipline tends to be cast in terms of certain metaphors which become 'entrenched'. These metaphors often result in a problem regime -- the range of things identified as 'problems' and consequently the implied solutions -- becoming natural and self-evident, to the exclusion of other possibilities. This phenomenon is described by Schon as 'problem setting'.

Rather than emphasising problem solving, Schon (1979) advocates the need to consider problem setting as more fundamental to effective action. (p. 138) He describes problem setting as an operation involving complementary processes of 'naming' and 'framing', in which entities are identified and relationships between them are established. Problems do not exist independently of human experience and perception -- 'together, the two process [naming and framing] construct a problem out of the vague and indeterminate reality which John Dewey called the "problematic situation."' (p. 146) When naming and framing are subsumed within a metaphor that includes a strong positive/negative opposition (a 'normative dualism'), directions for action become obvious. This obviousness is central to Schon's identification of something as a 'generative' metaphor. (p. 148)

Generative metaphors play important roles in the way individuals 'frame' a situation, and it is possible for different individuals to employ different metaphors. This results in a situation Schon describes as 'frame conflict'. Frame conflicts are recurring disputes which remain stubbornly unsettled. They are not disputes over specific facts; they are disputes over *which* facts are attended to, and what those facts *mean*. (p. 139) Frame conflicts resemble dilemmas more than problems; they are not adequately solved by 'instrumental' problem solving activities, trade-off analysis, or voting. (pp. 150-151) The central example Schon explores is from the realm of housing policy, in which problems of crime and poor inner-city conditions became widely understood by policy

makers in terms of a metaphor of health, versus blight and decay, making drastic actions of excision the obvious responses. Schon observes that, in retrospect, these approaches may have caused more problems than they have solved, compared to approaches taken in other countries which seem to have employed different metaphors. (pp. 144-147)

Schon makes several observations about the operation of generative metaphors in these cases. First, he points out that the characteristic obviousness of action depends on the metaphor remaining tacit; when it is raised to explicit awareness, that which was obvious becomes open to debate. (p. 138) Second, generative metaphors are not necessarily explicit in the 'surface' language employed -- they may be 'deep', requiring reconstruction from problem-setting stories:

> The deep metaphor, in this sense, is the metaphor which accounts for centrally important features of the story -- which makes it understandable that certain elements of the situation are included in the story while others are omitted; that certain assumptions are taken as true although there is evidence that would appear to disconfirm them; and, especially, that the normative conclusions are found to follow so obviously from the facts. (Schon, 1979, p. 149)

Generative metaphors also play a powerful creative role, according to Schon. He describes a product development team which makes an important breakthrough in the development of a synthetic bristle brush when they begin to see it instead as, 'a sort of pump.' (pp. 139-142) Adoption of a new generative metaphor can 'generate new perceptions, explanations, and inventions.' (p. 142) New problem setting stories and new metaphors are more likely to arise when individuals are immersed in information-rich situations where experience overwhelms their existing category schemes. (p. 152; 156) This is described as the basis of 'frame restructuring', which is the most effective way of addressing situations of frame conflict. In frame restructuring, individuals are jointly involved in a social context which motivates them to decompose their respective frames, rename and reorder their observations. The new frame that is developed is neither a compromise nor a simple fusion of their previous views, but a new way of looking at the situation. Schon describes an example in housing policy of such a process carried out

between government, landowners, and residents of squatter settlements in Peru. (pp. 152-156)

Metaphor and Understanding

Schon's argument gives linguistic metaphor a significant role in shaping our understanding of problematic situations. How is it that metaphor can have such a powerful effect? Lakoff and other researchers (Lakoff, 1987, 1993; Lakoff & Johnson, 1980; Gibbs, 1993) see metaphor as far more than a decorative aspect of language, as it has been regarded in traditional theories of literal meaning.[19] Rather, they see metaphorical expressions in language as reflecting a more fundamental cognitive process which is central to our understanding of many concepts, including emotions, time, life, death, and other abstract concepts we employ in life and work. This process is essentially one of mapping between two conceptual domains, such that the more abstract domain is understood and grounded in terms of the more concrete one.[20]

Lakoff and Johnson (1980) make their arguments by showing that a variety of ordinary linguistic expressions consistently reflect a metaphorical mapping between two domains, referred to as the 'source' and 'target'. Many examples are offered in Lakoff and Johnson (1980, cf. pp. 46-51) and Lakoff and Turner (1989), including KNOWING IS SEEING, LOVE IS A JOURNEY and RATIONAL ARGUMENT IS WAR.[21] An extensive case study is contained in Lakoff (1987) showing how anger is understood through a large number of metaphors, many of which are variations of ANGER IS HEAT or ANGER IS INTERNAL PRESSURE. (pp. 380-415) Consistent mapping is seen when multiple linguistic

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[19]Lakoff makes this point in all the works by him consulted. Gibbs (1993) provides a historical discussion and evidence supporting this view. See Ortony (1993) for a survey of this and alternative views.

[20]Lakoff (1993) indicates that the term 'metaphor' is now used, in contemporary metaphor theory, to refer exclusively to the cognitive *mapping*, while the phrase 'metaphorical expression' refers to the linguistic manifestation.

[21]Lakoff and others adopt the convention of using small capital letters to indicate that it is the metaphorical mapping relationship that is being referred to, rather than the concepts identified by the individual words.

expressions map elements of the target domain back onto the source domain in a way which preserves relationships within the two domains. For example, in the case of RATIONAL ARGUMENT IS WAR, aspects such as winning, losing, prevailing, challenging a position, defeating, retreating, abandoning, and conceding are meaningful in both domains[22], and their relationship to each other remains the same before and after the mapping. However, the mapping is clearly from source to target and not vice versa -- that is, terms from the domain of war are used to understand rational arguments, and not vice versa.

Structuring, Entailments, Coherence, and Grounding

Terms used to describe important concepts about metaphor in this literature include 'structuring', 'entailments', 'coherence', and 'grounding'. Referring to the example above, the consistent, directional mapping evident in RATIONAL ARGUMENT IS WAR, the concept of 'rational argument' is said to be *structured* by the concept of 'war'. The *entailments* of a metaphor are peripheral concepts which are 'brought along' with it and also have meaning; in the case of RATIONAL ARGUMENT IS WAR, entailments could include feeling elation and garnering rewards for victory, dread of defeat, wounds suffered in battle, or lasting scars from those wounds. However, the mapping between domains is always partial, so that there is a limit to what is entailed by a metaphor; for example, concepts of military rank do not seem to carry over from the domain of war into the domain of rational argument. Similarly, many aspects of rational argument are not structured by the concept of war. In fact, the concept of rational arguments is also structured significantly by the domain of buildings: arguments may be carefully constructed and have solid foundations, or they may be precarious or wobbly.

Coherence *within* a metaphor is essentially related to the consistency described above. However, coherence also occurs *between* metaphors when there is a consistency between their entailments. An example would be in the realm of the concept of anger, where a

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[22]Lakoff & Johnson, 1980 (pp. 3-6) use ARGUMENT IS WAR in their introduction, asserting the metaphor's role in understanding, and not just as 'a matter of words'.

metaphorical expression such as, 'she simmered in the back until her anger finally boiled over,' is *coherent* with both ANGER IS HEAT and ANGER IS INTERNAL PRESSURE -- since the imagery is of a heated fluid escaping from a container.

Another aspect of coherence occurs with respect to culture. Because of the inevitably partial nature of metaphorical mapping, a metaphor highlights some aspects of the thing being understood, and downplays or obscures others. (Lakoff & Johnson, 1980, pp. 10-13) The perception of a metaphor as being apt is related to values of the culture. Metaphors become natural when what they highlight is consistent with important values of the culture, and what they obscure is relatively unimportant. (pp. 22-24) A final observation on coherence with respect to perception: understanding something only by way of a single or a highly coherent set of metaphors will provide only a partial understanding, which systematically overlooks some aspects of the thing in question. (pp. 218-222)

Grounding, as a concept, plays a central role in Lakoff's philosophical position known as experiential realism (Lakoff, 1987). As described above, the mapping between domains is directional, with more abstract concepts mapped onto -- and hence understood in terms of -- more concrete ones. At the base of this system, according to Lakoff and Johnson (1980), and Johnson (1987)[23], the conceptual system is *grounded* in directly perceived bodily experience. In the examples of ANGER IS HEAT and ANGER IS INTERNAL PRESSURE, both families of metaphors are experientially grounded in bodily perception of the physiological responses of rising body temperature and blood pressure. In this way, metaphorical expressions of anger, like, 'his temperature's rising,' or 'she's a bit hot under the collar,' are quite directly grounded in bodily experience. More abstract, intense metaphorical expressions, such as, 'he's burning with rage,' or, 'she's positively incandescent,' are linked by the metaphorical entailments of fire and extreme heat back to the same basis of grounding in bodily experience, but their meaning is now said to be

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[23]Johnson, Mark. (1987). *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. (Chicago: University of Chicago Press). This work was not consulted for this paper; it was cited extensively by Lakoff (1987) in connection with basic-level experience and kinaesthetic image schemas (cf. pp. 269-271).

'indirect'. An even more abstract metaphorical expression, 'she was consumed by her anger,' is still linked through an entailment of fire -- namely, that the fuel is consumed -- back to an ultimate bodily understanding of anger in terms of heat.

Novel versus Conventional Metaphors

Lakoff makes clear his belief that imaginative processes -- particularly metaphor and metonymy -- play central roles in making concepts meaningful.[24] He does not accept the distinction between literal and metaphorical language in the way that others, including other metaphor theorists, have. As a result, Lakoff and colleagues see metaphorical processes involved in much more of our everyday language than other theorists, including Searle and Black.[25] A key distinction therefore is between novel, original, or poetic metaphors -- acknowledged by most theorists -- and 'conventional' or everyday language which Lakoff and colleagues argue is also metaphorical. Common, everyday expressions, such as, 'I'm falling in love,' or, 'I see your point,' along with many of the expressions for anger described in Lakoff (1987, pp. 380-415), would be regarded as 'dead' metaphors by traditional metaphor theorists. In this view, dead metaphors are used reflexively, and do not involve the conscious, associative processes that novel, poetic, or 'vital' metaphors do. Lakoff and co-workers, however, believe that everyday expressions such as these *are* metaphorical, and that the difference between them and novel or poetic metaphor is one of degree.[26] They argue that uses of these 'conventionalised' metaphors are in fact, 'the most alive and most deeply entrenched, efficient, and powerful,' with regard to our thinking *because* they are used naturally and effortlessly. (Lakoff & Turner, 1989, p. 129) The

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[24]See Lakoff, 1987 (pp. 301-303) for a summary of the relationship between directly and indirectly meaningful concepts; see also Lakoff & Johnson, 1980 (pp. 115-125). See Lakoff, 1987 (pp. 153-154) for a summary of the role of imaginative processes in idealised cognitive models.

[25]See Lakoff, 1993 (p. 205) for a concise statement of 'what is not metaphorical'; see Ortony, 1993 (pp. 1-14) for discussion of various views on a literal/metaphorical distinction. See Lakoff & Turner, 1989 (pp. 110-136; 217-218) for a review of their position relative to traditional 'literal' meaning as well as the positions of other prominent metaphor theorists.

[26]See Black's (1979) chapter in Ortony (1993). Lakoff & Turner (1989) specifically address the 'interaction' and 'dead metaphor' positions on pp. 128-133.

unique effects and power of novel, poetic metaphor derive from the same properties of the conceptual system as used by conventionalised metaphor; this is the subject of Lakoff and Turner's work, but is also concisely expressed by Lakoff and Johnson:

> What we experience with such a metaphor is a kind of reverberation down through the network of entailments that awakens and connects our memories of past .. experiences and serves as a possible guide for future ones. (p. 140)

> We see this as a clear case of the power of metaphor to create a reality rather than simply to give us a way of conceptualising a pre-existing reality. (p. 144)[27]

Meaning and Experience

The non-classical views of meaning presented so far are subsumed by the umbrella term, 'constructivism'. Ortony (1993, pp. 1-4) describes the general character of constructivist theories which, in contrast to logical positivism, see cognition in terms of 'mental construction':

> Knowledge of reality, whether occasioned by perception, language, or memory, necessitates going beyond the information given. It arises through the interaction of that information with the context in which it is presented and with the knower's pre-existing knowledge. (p. 1)

Though Resnick (1991) describes constructivism as a 'pervasive' assumption in modern cognitive psychology, Ortony indicates that views within a number of fields -- sociology, psychology, linguistics, philosophy, and literary theory -- can be seen in terms of a constructivist/non-constructivist distinction and a 'more fundamental and pervasive difference of opinion about the relationship between language and the world.' (p. 2)[28]

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[27]A brief example in Lakoff & Johnson (p. 5) imagines the differences in our understanding that would result if ARGUMENT IS WAR were to be replaced by ARGUMENT IS DANCING. The example referred to in this quote was one of Lakoff's non English-speaking students misunderstanding the phrase, 'the solution of my problems,' as a *chemical* metaphor rather than a sort of puzzle metaphor, with interesting possibilities for interpretation.

[28]Ortony acknowledges that few modern researchers would subscribe to extreme forms of *either* the constructivist (Whorf and linguistic determinism) or non-constructivist (logical positivist) views.

Experience plays a central role in the view of meaning developed by Lakoff (et al.); the entire conceptual system and all abstract concepts are ultimately grounded in direct experience. Though Lakoff includes in this *social* experience, and knowledge gained through human interaction (Lakoff & Johnson, p. 230), the emphasis is on the bodily perception by an entity in an environment. Winograd and Flores (1986) also take a cognitive approach to meaning, but from a different philosophical basis than Lakoff, and one in which interaction plays a greater role. The character of their conclusions is consistent with those of Lakoff and of Schon. However, they provide a different perspective on reality as *created* through interaction, and on the nature of distinct modes of awareness in work.

Winograd and Flores ground their recommendations for human-computer interface design in a synthesis of three independent threads of thought: the philosophical works of Heidegger and Gadamer, speech act theory as developed by Austin and Searle, and Maturana and Varela's ideas of autopoiesis as an organising principle applied to living systems and cognition. Winograd and Flores find a convergence between the views of Heidegger and Gadamer, and Maturana and Varela -- whose work began with a completely different basis in biology.[29] The result is a view in which meaning and cognition are *coupled* to an external reality, but not uniquely or objectively determined by it. They elaborate on the essential relationship between meaning and experience in a way highly consistent with Ortony's description of constructivism.

> ... our openness to experience is grounded in a pre-understanding without which understanding itself would not be possible. An individual's pre-understanding is a result of experience within a tradition. Everything we say is said against the background of that experience and tradition, and makes sense only with respect to it. Language (as well as other meaningful actions) need express only what is not obvious, and can occur only between individuals who share to a large degree the same background. Knowledge is *always* the result of interpretation, which depends on the entire previous experience of the interpreter and on situatedness in a tradition. It is neither 'subjective'

[29]Maturana and Varela studied the visual functioning of the frog's retina, and later colour perception in humans. From their findings of significant image 'processing' in the retina, they concluded that cognition could not consist of symbol manipulation and an internal representation of external reality. Winograd and Flores point out that this is an essential conclusion of Heidegger's as well (pp. 10, 33, 71).

(particular to the individual) nor 'objective' (independent of the individual). (pp. 74-75)

In this view, 'pre-understanding', or pre-orientation within a background of cumulative prior experience is the basis upon which all interpretation is made. (pp. 149; 171) A judgement of what is 'obvious' determines what must be said, and, 'what is unspoken is as much a part of the meaning as what is spoken.' (p. 58) Winograd and Flores go on to say that the articulation of this background can never be complete, because any description must itself be made against the very same background. However, this does not negate the importance or usefulness of developing awareness of the backgrounds of others and ourselves -- it means an objective or complete understanding is not possible. (pp. 32; 75)

Winograd and Flores emphasise the social and communicative grounding of reality, consistent with their recognition of speech act theory. (pp. 68-69) They assert that language effectively, 'creates the world about which it speaks,' and point out that systematic domains (such as financial markets) exist only through language, 'based on expressions of commitment from one individual to another.' (p. 174) The appearance of objectivity in such cases is really just a condition of great regularity in the conversations that take place and the conditions of satisfaction, established either legally or by convention. (p. 172) They propose that, if what is frequently objectified as 'organisational structure' is seen instead as a network or fabric of commitments, different uses for computers in supporting communication will become apparent.

Winograd and Flores discuss a conception of 'blindness' (from Heidegger) which has the effect of limiting perception and awareness -- a similar effect to Schon's 'problem setting' and Lakoff's 'highlighting and obscuring'. An important distinction is made between states of unreflective involvement and reflective analysis, with blindness being an inevitable result of the latter. Winograd and Flores discuss Heidegger's assertion that much of our being-in-the-world is in a state of unreflective 'thrownness'; the tendency to

see cognition solely in terms of reflection and abstract reasoning is a consequence of the rationalist tradition. In the state of thrownness, we do not experience things as objects with properties -- they are simply 'ready-to-hand'. It is only in the event of 'breakdowns' that things become 'present-at-hand', and we become aware of them as objects with properties. (p. 36) It is this state which is exclusively seen as 'cognition' in the rationalist view, and this state which inevitably produces a blindness.

> Whenever we treat a situation as present-at-hand, analysing it in terms of objects and their properties, we thereby create a blindness. Our view is limited to what can be expressed in the terms we have adopted. This is not a flaw to be avoided in thinking -- on the contrary, it is necessary and inescapable. Reflective thought is impossible without the kind of abstraction that produces blindness. Nevertheless we must be aware of the limitations that are imposed. (p. 97)

This position is similar to Schon's in proposing that the recognition of something as a problem requires doing so in some terms which inevitably shape or guide the directions explored as solutions, thereby excluding others from even entering into consideration. 'A problem is created by the linguistic acts in which it is identified and categorised.' (Winograd & Flores, p. 147) Winograd and Flores interpret this conclusion in the context of organisations and procedures; regarding rational approaches to problem solving, they caution, 'rational search within a problem space is not possible until the space itself has been created, and is useful only to the extent that the formal structure corresponds effectively to the situation.' (p. 98) They propose looking at organisational procedures as pre-planned responses to recurrent situations of breakdown which are both an essential aspect of the functioning of an organisation and inevitably a source of blindness and rigidity. In this way, our expertise allows us to act with increasing effectiveness within a systematic domain, but simultaneously narrows the 'field of possibilities' and blinds us to the existence of other possibilities. (p. 150)

In this description, an interesting correspondence occurs between the unreflective state of thrownness -- jolted into reflection and analysis by the occurrence of a breakdown -- and the state of information-richness described by Schon, which facilitates

observations that catalyse frame restructuring. Winograd and Flores point out that breakdowns are not problems until they are so described. They are also opportunities to change our interpretation of situations, which can be constructive if they are regarded as such.

> By this we mean the interrupted moment of our habitual, standard, comfortable 'being-in-the-world.' Breakdowns serve an extremely important cognitive function, revealing to us the nature of our practices and equipment, making them 'present-at-hand' to us, perhaps for the first time. In this sense they function in a positive rather than a negative way. (p. 77)

Narrative and Understanding

Several of the positions described above have included reference to an important role played by narratives or storytelling in facilitating understanding. This is an appropriate subject with which to transition from the first section of the literature review -- primarily focused on individual cognition -- to the second which will focus more on meaning in interaction. Narratives and storytelling span both sides of this possibly arbitrary distinction, since they appear to have both individual and social cognitive significance.

Returning to Schon, storytelling was emphasised as important, both in revealing possibly deep, generative metaphors, and as central in facilitating the process of constructing new metaphors. The telling of stories provides a way to structure experience before the fully coherent metaphor has emerged, and continues to reflect that metaphor once it is established. This occurs in the complementary naming of features or aspects of a situation identified as important, and the framing of relationships between them. Storytelling was seen to have similar functions in frame restructuring, in which it facilitated the synthesis of a new understanding from experience in an information-rich environment.[30]

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[30]Schon, 1979, pp. 146, 149, 158-160.

Stories are often told to provide examples, when a person wishes to illustrate a general case with a specific instance. In general, the use of a part to represent or 'stand for' a larger whole is known as metonymy. Lakoff identifies a variety of cognitive models which function in what is described as 'reference point reasoning'. These models are metonymic in nature, and operate in the sort of reasoning by which we gain an understanding of an entire category on the basis of a subpart or a representative of that category. Types of metonymic models include: social stereotypes which shape expectations for interaction, typical examples which serve as a basis for generalisation, ideals used in judgements of quality or planning, paragons which we seek to emulate, and salient or memorable examples used in making probability judgements.[31] Though Lakoff does not specifically discuss this, it seems plausible that the 'naming' function of stories might help establish certain entities as prominent, for use in these sorts of reasoning.[32]

Brown and Duguid (1991) are concerned more with organisational learning than individual cognition. However, their focus is on identifying social processes that support learning within communities of practitioners, and ways organisations can foster (rather than thwart) these processes. They discuss ethnographic studies of workplace learning, primarily citing the work of Orr studying the actual practices of photocopier field service personnel in comparison to the canonical practices set out by the corporation in its training documents. [33] Orr found that stories and story-telling played important roles, both as repositories of knowledge that could be circulated within the community, and in facilitating the process of diagnosis and repair of particularly troublesome machines. Challenging situations were frequently handled communally (despite the corporation's

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[31]Lakoff, 1987; types of metonymic models are described on pp. 84-90; Lakoff cites Rosch with regard to reference point reasoning on pp. 145, 152, 367. Lakoff and Johnson, 1980; metonymy and metonymic concepts are discussed in Chapter 8, see pp. 39-40.

[32]Lakoff distinguishes between social stereotypes, which he says are consciously discussed and often recognised as inaccurate, and typical examples which tend to be employed unconsciously and automatically. This observation was empirically confirmed, as described in Chapter 4.

[33]The works of Orr cited by Brown and Duguid, including (1990) "Sharing Knowledge, Celebrating Identity: War Stories and Community Memory in a Service Culture", in D. S. Middleton and D. Edwards (Eds.), *Collective Remembering: Memory in Society* (Beverley Hills, CA: Sage Publications) were not consulted directly for this work.

emphasis on individual troubleshooting and flowcharts) by way of a 'long story-telling procedure', and that the reciprocal construction and emergence of a coherent story from context, separate experiences, and previous stories was central to determining courses of action.

> Story telling allows them [the service representatives] to keep track of the sequences of behaviour and of their theories, and thereby to work towards a coherent account of the current state of the machine. The reps try to impose coherence on an apparently random sequence of events in order that they can decide what to do next. (Brown & Duguid, p. 45)

Boland and Tenkasi (1995) are also focusing on knowledge within a community of practitioners; however, they discuss ways in which multiple such communities within an organisation, each with specialised expertise, can best collaborate. They identify two distinct activities involving these 'communities of knowing', both of which are necessary. First, excellence and continued development within a community depends on the co-operative refinement, not just of knowledge, but of a way of looking at the world. This process is described as 'perspective making'. Second, collaboration between communities requires that, 'the diverse knowledge held by individuals in the organisation must be represented in its uniqueness, and made available for others to incorporate in a perspective-taking process.' (pp. 356-358)

Boland and Tenkasi use the work of Bruner (1990) to support several assertions about the importance of narrative, both in the process of perspective making within a community, and in understanding taken-for-granted aspects of community belief. Bruner asserts an innate human, 'predisposition to organise experience into narrative form,' (p. 45) which constitutes a narrative mode of cognition, standing in contrast to the paradigmatic (information processing) mode emphasised in much cognitive science. Bruner identifies four characteristics of this narrative mode[34]; Boland and Tenkasi find

[34]Bruner (1990, p. 50) identifies these characteristics as: 1) sequentiality; 2) factual 'indifference' -- that is, a story can be good and cognitively 'true', even if facts it contains are false or fictional; 3) managing departures from canonical; 4) dramatic quality.

the most significant to be narrative's role in restoring canonicality to confusing or apparently inconsistent observations.

> An argument proves something about the world to be true, but a narrative shows how events or features in the world are sensible and fit within our shared cultural field. It is well recognised that surfacing and challenging the often implicit assumptions that underlie a paradigmatic argument is an important element for innovative knowledge work. Narrative serves an important role in this regard. By bringing the apparently noncanonical into relief alongside the canonical, the narrative mode of cognition provides access to the implicit assumptions and interpretive structures that characterise a community of knowing. (Boland & Tenkasi, p. 353)

Boland discusses a method by which implicit assumptions can be revealed through a structural analysis of stories. (p. 364)[35] An essential feature of this method is identification of 'kernel' events within the story -- points at which the story implies something else *might* have happened, but didn't. These are likely to be points at which a tension is developed between canonical and non-canonical aspects of the situation, which can then be resolved by the actor's choices. The way in which an actor carries this out is likely to reveal values of the community that, according to Boland, 'may be difficult to surface otherwise.' (p. 365)

Meaning and Interaction

This section will consider work which has addressed meaning primarily from a perspective of social groups and interaction, rather than as a matter of individual cognition. The first work to be discussed in detail will be drawn from fields of sociology, with subsequent work discussed from pragmatics within the philosophy of language. Finally, brief mention will be made of other directions which were left largely unexplored, for the reference of others who might wish to approach the subject with different priorities than I have chosen. These fields have provided useful and influential ideas which contribute to the context within which the subsequent fieldwork stages of this

[35]Boland describes this as a simplified version of the method presented by Chatman, S. (1978). *Story and Discourse in Fiction and Film*. (Ithaca, NY: Cornell University Press).

project may be considered. The emphasis of this review is more on establishing important background concepts than on surveying the most current work in the given fields.

Sociological Perspectives

Among the major theoretical divisions within sociology identified by Giddens (1993, pp. 710-717), the tradition of symbolic interactionism has concerned itself primarily with the way people construct social reality on the basis of interactions studied at a personal, rather than societal or 'structural', level. This tradition was strongly influenced by the pragmatic philosophical positions of Dewey and Mead, as well as by the ideas of Max Weber. (Hughes, Martin & Sharock, 1995) A symbolic interactionist approach is prominently identified with the Department of Sociology at the University of Chicago, which spawned a tradition referred to as the 'Chicago School'. This tradition focused on details of the everyday lives of people engaged in work in an urban context, and pioneered participant-observation and case study methods.

The Sociology of Occupations and Professions

A large body of work has been carried out making occupations and professions the objects of sociological study. This tradition was established and greatly furthered during the tenure of C. Everett Hughes at the University of Chicago, whose prominent students include Blanche Greer, Howard Becker, and Eliot Freidson. Major themes include the ways in which groups establish themselves as professions in order to improve control and enhance their social and economic positions. (Macdonald, 1995; Dingwall, 1983) This involves a negotiation in which the rest of society must be persuaded to sanction a degree of autonomy and control to the professional group, in exchange for perceived benefits. Central issues involved are those of 'license' and 'mandate' (Dingwall, 1983), or 'trust', 'autonomy', and 'collegial control'. (Freidson, 1983) Processes which make this possible include the creation and maintenance of boundaries, and mechanisms of inclusion and exclusion. Formally recognised professions, such as law, medicine, the clergy,

accountancy, and architecture have been the primary subjects of study. According to Freidson (1983), and Macdonald (1995), questions of whether or not a particular occupation is a 'profession', as matters of definition, have become less important in favour of a more flexible approach to studying both the formally-recognised professions and occupations. Macdonald identifies the use of knowledge as a means by which power can be wielded as a central concern behind a number of approaches. (pp. 157-186)[36]

It would be possible to engage in a study of the extent to which different disciplinary groups involved in product development have characteristics of recognised professions, occupational professions, or occupations. Though professional organisations within these disciplines do exist, and may impose some barriers to membership, these are not significant barriers to practice in the manner that exists for architects, or civil engineers. From the point of view of this project, it seems more interesting to consider to what extent an individual's identity derives from being a 'member' of a disciplinary group, versus an organisational or work group, or perhaps from experience at elite educational institutions. It would also be possible to study the ways language can be a means by which such groups achieve a degree of closure, and their reasons for doing so. Freidson (1986) has discussed ways in which formal knowledge within a profession is used by different sub-groups to further differing interests. While academics and researchers are primarily involved with the production of formal knowledge, it is selectively adopted and emphasised by administrators, and transformed by the practitioner in the face of the complexities of actual practice.

While many interesting questions present themselves, the primary interests of this project are directed more toward areas of incommensurable knowledge and experience, than to power relationships between groups. While various group power issues will be important aspects of the context in any organisation, this work will focus more on issues

[36]Macdonald discusses the work of Foucault in this connection (pp. 174-183), and also more generally (pp. 24-27). Foucault is also identified with a strand of discourse analysis to be discussed below, Ch. 4. Macdonald makes observations on Foucault's insights, weighed against the difficulty researchers in other traditions have had in utilising his work other than empirically.

of meaning occurring between individuals, since these appear to present more immediate opportunities for individual growth and change.

Micro-Interaction Perspectives

Among sociological studies which focus on the details of personal interaction in social settings, the work of Erving Goffman represents an important thread. A student at the University of Chicago in the 1940's, Goffman came into contact with Hughes, Blumer, and other influential figures mentioned above. Goffman's work called attention to the way that details of interaction are managed by parties involved in social interaction to control the nature of meaning each attributes to events. Goffman's 'dramaturgical' approach involved the application of metaphors of theatre and stage presentation. (cf. Goffman, 1969)

Within sociology, perhaps the most detail-oriented work addressing the construction of meaning in situations of interaction is described as ethnomethodology. As articulated by its founder, Harold Garfinkle, ethnomethodology focuses attention on discerning the actual methods employed by people in making sense of their daily interactions on an ongoing basis -- so called, 'practical everyday reasoning'. Garfinkle's work constituted (and was presented by him) as a substantial critique of the methods of other sociologists, since he argued that sociological observations were inevitably made with tacit and unacknowledged use of the same sort of practical everyday reasoning employed by the subjects of the observations (Garfinkle, 1986). As long as this practical everyday reasoning went unscrutinised, in Garfinkle's view, sociological theorising could make little claim to scientific 'objectivity'. This critical stance meant ethnomethodological approaches were greeted with a certain hostility by other sociologists, but according to Giddens, many of their insights have been incorporated in one form or another in more mainstream sociology. These include an awareness that,

> The words used in ordinary talk do not have precise meanings, and we 'fix' what we want to say, or our understanding of what is said, through the unstated assumptions that back it up. ... the stability and meaningfulness of our daily social life depend on the sharing of unstated cultural assumptions about what is

said and why. If we were not able to take these for granted, meaningful communication would be impossible. (Giddens, 1993, p. 95)

The work of Aaron Cicourel in this area, which he described as 'cognitive sociology', has particular relevance. (Cicourel, 1973) Cicourel described his undertaking as an attempt to redress what he saw as a lack of an actual cognitive theory of how interpretation works during interaction. Cicourel credited Goffman with drawing closer attention to, 'the kinds of events in everyday life from which social analysts make inferences about process and structure,' and felt Goffman succeeded in conveying a very convincing sense of what is actually involved when 'insiders' interpret social situations. However, he could not accept Goffman's work as providing the type of theoretical underpinning he felt was necessary to understand meaning in interaction, since so much of the descriptions' power relied on the unexplicated processes of, 'an ideally situated and perceptive "third party."' (Cicourel, 1973, pp. 23-24)

The deeper understanding Cicourel sought was not only for the benefit of the sociological researcher making observations, but to understand how individuals maintain an ongoing sense that they are talking about the 'same' thing. Cicourel sought to sketch the outlines of the cognitive theory he felt was necessary by synthesising the work of Alfred Schutz -- a student of Husserl's who attempted to apply a phenomenological approach to sociological subjects -- with aspects of Chomsky's generative-transformational linguistics.[37] Cicourel described the theory in terms of the processes it would set out to explain, namely the, 'interpretive procedures,' by which, 'a continual sense of social structure,' is maintained in interaction. He saw these interpretive procedures -- the basis of what Garfinkle described as practical reasoning -- as analogous to the deep structures in generative linguistics. Further, acquisition of these interpretive

[37]Cicourel, p. 33. Cicourel emphasises that he sees Shutz's writings to be more 'explicit', while discussing similar aspects of interaction as James, Mead, Baldwin, and others. For general discussions of Chomsky and his theories, see Greene, Judith (1972); *Psycholinguistics: Chomsky and Psychology* (Harmondsworth: Penguin); a more recent, popular account is contained in Pinker, Steven (1994); *The Language Instinct*. (London: Penguin).

procedures was as an essential aspect of socialisation, enabling the participant to function within their social environment. Cicourel quotes Goodenough's (1965) cognitive formulation of the concept of 'culture' -- that it consists of those things an individual has to know or believe in order to be accepted as a member. Cicourel asserts that interpretive procedures provide the means by which an individual gains that knowledge. (p. 65)

Cicourel drew from the writings of Schutz and Garfinkle to articulate some of the key features he thought interpretive procedures must necessarily possess. First, Cicourel quotes Schutz to establish the central importance in interaction of each participant's making an estimation of the motives of the other:

> I am interested above all not in the overt behaviour of others, not in their performance of gestures and bodily movements, but in their intentions, and that means the in-order-to motives, for the sake of which, and in the because motives based on which, they act as they do. (Cicourel, p. 34)[38]

Cicourel (pp. 51-53) elaborates on several assumptions individuals make when interacting. Articulation of the first assumption is attributed to Schutz, as one of a 'reciprocity of perspectives'; participants are to assume, in the absence of compelling evidence to the contrary, that the situation would appear the same if they were to exchange places. This entails that personal differences must be disregarded, 'so the scene can be attended to identically for the practical matter at hand.' (p. 52) This requires individuals to engage, either tacitly or implicitly, in determining a threshold below which differences are ignored. The second assumption is attributed to Garfinkle, as the 'et cetera' assumption; items in conversation are assumed to reference ('index') a larger set or network of categories in determining meaning. The listener presumes the speaker intended reference to the larger set, and the speaker assumes the listener 'fills in'. Considered together, these assumptions indicate that a great deal goes unsaid in normal conversation, and is filled in as a matter of course by the participants.

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[38]Cicourel, quoting Schutz, A. (1964), in A. Broderson (Ed.) Collected Papers II: Studies in Social Theory. (The Hague: Nijhoff). p. 11.

> When I ask a question I have intentions (a deep structure) or a more elaborated version in mind than what I actually ask you. My 'pruned' or 'deleted' surface question, therefore, presumes a more elaborated version which I assume you 'fill in', despite receiving only my surface message. Your answer, therefore, is based upon both the elaborated and surface elements of my question, and I in turn 'fill in' your answer so as to construct your elaborated intentions. Both participants, therefore, must presume that each will generate recognisable and intelligible utterances as a necessary condition for the interaction to even occur, and each must reconstruct the other's intentions (the deep structure) if there is to be co-ordinated social interaction. (Cicourel, p. 34)

This further requires a 'prospective and retrospective sense of occurrence', by which participants recognise they must, to a degree, tolerate utterances they find confusing or ambiguous, in hope that they will be clarified by later remarks (which may never come). Consequently, participants must provisionally accept utterances they find unclear, and must be prepared to reinterpret previous utterances in light of new ones, while maintaining the appearance of a smooth, ongoing interaction.

The basis upon which these assumptions are made, according to Cicourel, will be a stock of 'normal form typifications'. Cicourel quotes from Schutz:

> But as I confront my fellow-man, I bring into each concrete situation a stock of preconstituted knowledge which includes a network of typifications of human individuals in general, of typical human motivations, goals, and action patterns. It also includes knowledge of expressive and interpretive schemes, of objective sign-systems and, in particular, of the vernacular language.[39]

In addition to presumptions about motivations and behaviours, Cicourel recognised that vocabulary performed connotative referential functions beyond the 'literal' meanings of the words. First, the mere presence of talk is taken as indicative of how the other feels the interaction is progressing. Beyond this, distinct vocabularies indicate ('index') what *kind* of interaction is taking place -- contextual information which is critical in reconstructing meaning.

> The significance of descriptive vocabularies as indexical expressions lies in their providing both members and researchers with 'instructions' for recovering or retrieving the 'full' relevance of an utterance; suggesting what

[39]Cicourel (p. 35) quoting from Schutz (1964, pp. 29-30).

> anyone must presume or ‘fill in ‘ in order to capture the fidelity of a truncated or indexical expression whose sense requires a specification of common assumptions about context (the time or occasion of the expression, who the speaker was, where the utterance was made, and the like). (p. 56)

Taken together, these ethnomethodological observations call attention to the assumptions and concessions that must be made in order to maintain a mutual sense of smoothness and coherence in normal, everyday social interaction. This requires making estimations about the other's perspective, and filling in from 'surface' utterances to reconstruct what is really meant, and what the speakers motives and subsequent actions are likely to be. A threshold of what constitutes practical agreement 'for the matter at hand' is necessary, so that interaction can continue. However, Cicourel notes that this does not require actual consensus:

> But notice that neither the reciprocity of perspectives nor the et cetera assumption imply that consensus exists or is necessary; rather, they indicate that a presumed ‘agreement’ to begin, sustain, and terminate interaction will occur despite the lack of conventional notions about the existence of substantive consensus to explain concerted action. (p. 53)

> But even experiencing the same setting does not guarantee consensus or complete agreement, only a tacit arrangement to claim that the ‘same’ object or event was witnessed. The representation problem is basically a negotiated accomplishment which trades on idealised, context-free rules or norms for creating an important (but nevertheless ‘real’) illusion of ‘similarity’, ‘sameness’ or ‘consensus’. These ‘illusions’ are socially organised cognitive constructions. (pp. 158-9)

Grice and Pragmatics

H. P. Grice set out to address a problem in the philosophy of language -- namely, that the meaning of language in everyday use is frequently not derivable from a formal, logical analysis of what is actually spoken. As we have seen, Lakoff has argued that meaning is not a matter of formal logic at all. However, Grice's intention was not to jettison formal logic, but to broaden the framework to include conventional assumptions made by participants in

conversations. Consistent with the pragmatic theory of speech acts[40], Grice (1975) recognised that conversations were co-operative, directed undertakings:

> Our talk exchanges do not normally consist of a succession of disconnected remarks, and would not be rational if they did. They are characteristically, to some degree at least, co-operative efforts; and each participant recognises in them, to some extent, a common purpose or set of purposes, or at least a mutually accepted direction. (p. 45)

Grice proposed that successful participation in such conversations required that individuals tacitly recognised a 'co-operative principle', which instructed them to make their contributions appropriate to the mutually-accepted purpose of the conversation they were engaged in. This co-operative principle entailed a series of maxims for speakers; Grice elaborated on four, paraphrased below:

> Quantity: make your contribution as informative as is required, and no more so, for the current purposes of the exchange.
>
> Quality: try to make your contribution one that is true; do not say what you believe to be false; do not say that for which you lack adequate evidence.
>
> Relation: be relevant
>
> Manner: be perspicuous; avoid obscurity of expression; avoid ambiguity; be brief; be orderly.

For Grice's purposes, the real significance of these maxims was that speakers could choose to convey meaning by *flouting* one or all of these maxims, so long as the listener was aware this was happening, and otherwise had no reason to believe the speaker was not engaged in the conversation in good faith -- that is, accepting the co-operative principle. This situation prompts the hearer to calculate what would have to be *assumed* in order to preserve the co-operative principle in light of the speaker's utterance. The result is meaning conveyed by what Grice termed, 'conversational implicature'. (pp. 45; 56) Grice used the example of a letter of recommendation on behalf of a candidate for a

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[40]Speech act theory is primarily identified with J. L. Austin (*How to Do Things with Words*, 1962), and J. R. Searle (*Speech Acts*, 1970); within philosophy, 'pragmatics' is the body of theory of language use, distinct from semantics, concerned with theories of meaning.

philosophy teaching position, which conveyed damning criticism by containing nothing but glowing praise -- for non-central traits such as the candidate's handwriting and punctuality.

For the purposes of this paper, the important aspects of Grice's argument are not related to formal logic, they lie in the recognition that conversations involve an often tacitly-developed framework of mutual understanding about what is proper and relevant in the situation. More recently, Clark and Brennan (1991) have proposed that Grice's co-operative principle is grounded in a principle of least collaborative effort. What Cicourel recognised as the need to create the appearance of talking about the same thing -- for the purposes at hand -- could perhaps be paraphrased in terms of a Gricean maxim: 'do not start unnecessary debates or arguments.'

Meaning and Culture

The final portion of this chapter will briefly discuss several approaches to meaning which focus on an individual's non-specific interactions with others (in contrast to micro-interactionist approaches described above), in the context of a surrounding field of shared beliefs and practices -- something often characterised as a 'culture'.

The term 'culture' is described by Raymond Williams (1983, pp. 87-93) as 'one of the two or three most complicated words in the English language,' owing both to its intricate historical development, and its current usage to represent important concepts in diverse and sometimes incompatible fields. Though early usages were all in the sense of tending and husbandry, its general application now refers either to: (1) intellectual, spiritual, or aesthetic development -- as a general process, or the specific products, results or achievements of such a process; or (2) a particular way of life -- of a people, a group, a period, or humanity in general. (p. 90) It is the latter of these usages which has been adopted from anthropology, with varying interpretations, to apply to occupational and organisational groups. Morgan (1986) describes and explores various

metaphors, including 'culture', that have been employed as ways of understanding organisations, and has argued that such complex phenomena cannot be understood *without* employing metaphor of some sort. (Morgan, 1983)

Smircich (1983) has distinguished a family structure among various approaches to organisations which utilise different concepts of culture drawn from schools within anthropology. Two of the families describe culture in terms of social structure and function, rather than individual interpretive processes. A third family is subdivided into two primary modes based on different approaches to cultures as systems of knowledge or meaning: 'cognitive' anthropology, emphasising culture as shared knowledge, in the tradition of Goodenough; and 'symbolic' anthropology, emphasising culture as shared meaning, in the tradition of Geertz.[41] The former views organisations as, 'networks of subjective meanings or shared frames of reference [which can be seen] to function in a rule-like or grammar-like manner,' while the latter sees organisations as patterns of symbolic discourse, requiring interpretation or reading. (pp. 349-350) Smircich indicates that views also vary according to the extent to which cultures are considered as isolated entities, or acknowledge contextual influences. These distinctions are, of course, not hard and fast, and they will not be emphasised in mentioning the works below. Smircich's discussion is interesting, however, in that it conveys a sense of the range in which the term 'culture' can be applied.

Harris (1994) employs the cognitive science concept of 'schemas' -- structures that organise knowledge and memory, and shape new perception -- to view individual interpretation in a social context. He indicates that schemas are regarded to be the most generally useful concept for understanding organisations in terms of 'social cognition'.[42] He identifies several types of schemas individuals are likely to develop concerning their

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[41]Ward Goodenough (*Culture, Language, and Society*, 1971) and Clifford Geertz (*The Interpretation of Cultures*, 1973).

[42]Lakoff (1987, pp. 68; 116) discusses the relationship between the cognitive theory he proposes (Idealised Cognitive Models, or ICM's) and other theories in cognitive science including schemas, frames, and scripts.

organisational environments, including those for self and others, the organisation as an entity with values, verbal and physical cultural artefacts, and events. Harris indicates that processes of convergence and social confirmation will result in substantial commonality between individuals' schemas in these areas, and that such patterns will be one of the strongest indications of culture. (pp. 312-314) 'Other'-schemas will be the means by which an individual adopts the perspectives of other organisation members, and the strength and clarity of these schemas reflects the salience of a particular other-culture for that individual.

> An individual's ability to distil My Subgroup or They perspectives from their person-in-organisation schemas provides evidence of the existence of subcultures. If individuals can articulate different arguments they would expect to be posed by different groups, evidence for subcultural differences between those groups is provided. (p. 318)

A more anthropological approach is taken by Levine and Moreland (1991). They describe two approaches to work group culture, one in terms of shared thoughts, the other in terms of shared customs and symbols. The shared-thought approach is qualitatively similar to Harris', though without the overtly cognitive terminology. Levine and Moreland express this knowledge in terms of a series of questions workers are likely to have about their environments, about their group's history, about prototypical group members -- paragons or under-achievers -- and about the nature of work and motivation. Viewed as shared customs, culture is seen to consist of routines, stories and myths, jargon, rituals, and symbols -- material objects that possess special significance. Levine and Moreland also discuss how studying the process by which new members are incorporated and made part of the group is particularly revealing of group culture. They make reference to an important article by Van Maanen and Barley (1984) which discusses these aspects in detail regarding 'occupational communities'. Van Maanen and Barley deal with some of the issues described earlier with respect to the sociology of occupations and professions, including power, control, and the 'mystification' of practice, while retaining a cultural (rather than structural/functional) perspective.

The process of becoming a functioning member of a group, familiar with its culture, is often referred to as 'socialisation' or 'enculturation'. Kline (1995) writes, not about occupational or work cultures specifically, but about disciplines as bodies of formalised academic knowledge, developed and maintained by distinct cultures within academia and industry. He discusses the necessity of developing a sort of meta-discipline, which is concerned with multidisciplinarity as a subject in itself -- that is, recognising and addressing problems that arise from the compartmentalisation of knowledge in disciplines, and understanding how to negotiate the boundaries between them. A major problem identified by Kline is a powerful tendency toward 'fallacies of projection', which result when systems of understanding and validation developed within a discipline, are assumed to be applicable across the breadth of human knowledge and experience. Kline presents a comprehensive list, derived from anthropology, of disciplinary enculturation processes and how they operate to encourage such fallacies. (pp. 249-250)

Finally, two works which have proven methodologically relevant to this study, and will be discussed somewhat more in subsequent chapters, are those of Phillips (1994) and Dougherty (1992). Phillips' work explicitly uses the theme of culture and an ethnographic approach, in order to study meaning at an individual level. The purpose of the study is to try to distinguish between 'macro-organisational' or *industry* cultures, rather than occupational or organisational cultures. She compares two specialised California 'industries', those of wine-making and fine-art museums, according to categories of major cultural assumptions derived from anthropology. Phillips reports consistent differences in the ways informants in the two industries perceive fundamental aspects of themselves, their work, their organisations, their environment, human nature, time, and the nature of truth and reality.

Dougherty's (1992) study uses less explicitly cultural terms, though it focuses on systems of knowledge and belief described as 'thought worlds' and their effects on individual interpretive processes. Dougherty's work is specifically in the area of inter-departmental collaboration in industrial product development, and is therefore highly

relevant to the current project. Dougherty looks at patterns of success and failure in product development outcomes, relative to thought-world differences, and organisational routines which either enhance or mitigate them. Though she does not use metaphorical processes to develop her understanding of different thought worlds (as this project will), Dougherty's recommendations coincide with some of the choices of approach described for this project in Chapter One:

> .. the collaboration problem runs deeper than conflicts over personality types or goals. Indeed, to attempt to resolve the problem through negotiation over goals may only begin to touch on the divergent understandings which lay at the heart of the problem. Nor is the problem like the proverbial set of blind men touching a different part of an elephant. It is more like the tales of eye witnesses at an accident, or of individuals in a troubled relationship -- each tells a "complete" story, but tells a different one. (p. 191)

> .. correcting the innovation problems caused by these interpretive barriers requires cultural solutions, not only structural ones. (p. 179)

CHAPTER 3.

BELIEFS, KEY QUESTIONS AND STATEMENT OF HYPOTHESIS

Introduction

The purpose of this chapter will be to clearly establish the beliefs and assumptions within which this study and its goals are framed, and from this to develop the key questions and hypothesis the subsequent work will address. First, central points from the previous two chapters will be recapped, in order to make clear the theoretical position that is being adopted. Following that, the types of opportunities this position is believed to present will be discussed, along with the decision to propose approaching some of these opportunities through a subsequent PhD project. Finally, the nature of the contribution the current work will attempt to make, and the specific questions and hypothesis that the work will address will be presented.

Summary of Key Points from Literature Review

Context of Prior Work in Multidisciplinary Product Development

Much of the research addressing multidisciplinary work in product development has focused on the importance of structural characteristics of teams and organisations. Key issues have included achieving adequate disciplinary representation, early involvement of manufacturing, and structural incentives based on project success rather than disciplinary agendas. Difficulties in relations at an interpersonal level may not be explicitly addressed, or when they are considered, it is often assumed that they will be reduced as a result of tacit familiarisation through normal work. The most widely accepted means of achieving tacit familiarisation is through physical co-location, though this may be difficult for some companies to implement practically and effectively.

Other research which does explicitly address disciplinary interfaces and differences has emphasised the development of survey-based tools with general applicability across industry sectors. These tools enable the diagnosis of problems in specific organisational contexts by way of comparisons with generally accepted best practices, and can help to refine understanding of those practices. However, the methodological consequence of accommodating large samples in diverse situations -- surveys with standardised responses -- inevitably compresses and overlooks information on interpretive differences in individual cases. An awareness of beliefs and underlying assumptions involved in individual cases may be necessary to complement such generalised results, when undertaking action to reduce conflict.

Communication and Collaboration

Communication is a necessary ingredient in effective collaboration, but is not in itself sufficient. Collaboration requires the ability to share diverse ideas and develop them jointly in an atmosphere of mutual understanding and respect. Belief in the existence of a privileged or objectively correct way of knowing must be given up in favour of a willingness to negotiate and accept the usefulness of approaches from different disciplinary traditions. Commonly held assumptions about language must be overturned; it is not a conduit-like means for unproblematically transferring knowledge from one person to another. Rather, effort is required on the part of both sides in an exchange, with an awareness that what is meant by an utterance depends inextricably on a background of different assumptions and experience. This background may be left largely unspoken to the extent it is tacit or taken for granted.

Cognitive Aspects

Metaphorical and metonymic processes are seen to be fundamental to our understanding of abstract concepts, including many of those we use in everyday life, and those that are developed and used in specialised disciplinary practice. Thus, metaphorical

linguistic expressions -- particularly those which have become to some degree conventionalised in their use -- will reflect otherwise taken-for-granted aspects of the ways we conceptualise the nature of work and our contributions. Similarly, we use narratives to structure our experience and make it memorable; the entities and relations identified in such stories reflect and are determined by the overall interpretive framework we have adopted. These cognitive processes, expressed in language, not only give us ways to describe past experience, but actively shape expectations and our perception of new situations.

Aspects of Interaction

In interpersonal communication, much remains unsaid; meaning rests on assumptions by each participant that the other will fill in and reconstruct from what is said, to determine what is meant. Conversations are co-operative, purposeful undertakings in which both parties weigh their contributions according to co-operative principles and their perceptions of what is required for the purposes at hand. Inferences are made on the basis of characteristics and motives that are imputed from limited information about the other person. We generally tend to overestimate the degree to which our own experiences and beliefs will resemble those of another person, though stereotypes can furnish ready explanations for the behaviour of others when it is inconsistent with our own beliefs -- reinforcing the stereotypes in the process.

Opportunities Presented

I believe that barriers to a richer understanding of the skills and work processes of other disciplines are likely to exist and may not be addressed in the course of normal work. Effective and synergistic collaboration is unlikely to take place without a respect for, and a reasonable understanding of, the knowledge and work processes of others. I believe that some of these barriers involve divergences in taken-for-granted assumptions, which are related to enculturation in a particular disciplinary tradition.

These assumptions exert a powerful effect on our perception of situations and the actions of others. Though the shared nature of these assumptions enhances our ability to co-operate within a disciplinary tradition, they inevitably induce blindness to aspects of other traditions. Features of language, including conventionalised metaphorical expressions and narrative structures, can provide a way to bring taken-for-granted, framing assumptions to the surface. Once framing is made explicit, there is the possibility that traditions can begin to inform each other, and joint restructuring of frames can take place.

The work of Dougherty (1992), explicitly supports a connection between what she describes as 'interpretive barriers', and successful innovation in multidisciplinary product development. This work identified a connection between failures in new product introductions, and barriers to the successful linking of technology and market presented by incompatible departmental 'thought worlds'. These barriers operated in conjunction with behavioural routines within the organisation that prescribed relationships, and imposed pre-defined understandings of markets and product standards. Incompatible thought worlds *and* organisational routines conspired to inhibit the formation of a new 'social order' for collaboration and innovation, which was evident in the successful cases.[43]

> Departmental thought worlds partition the information and insights. Each also has a distinct system of meaning which colours its interpretation of the same information, selectively filters technology-market issues, and produces a qualitatively different understanding of product innovation. Organisational product routines reinforce thought world separation by providing for only limited interaction, and further inhibit the kind of collective action that is necessary to innovation. (p.195)

Dougherty identifies general differences in abstract conceptions of product and work-related issues between thought worlds in the groups she studied (p. 188), which will be discussed below in Chapter Seven. The roles that metaphor and other cognitive processes

[43]Dougherty, 1992, p. 192. Dougherty indicates that counterproductive routines are quite strong, and even in successful cases breaking out of them was 'an unusual and often temporary event.'

might play in structuring individual's incompatible thought worlds, or the possibility of using these processes to facilitate reconciliation, were not addressed by Dougherty.

The central assertion of this paper is that metaphorical language and narrative can be used to surface divergent, taken-for-granted, occupation-specific beliefs and assumptions which are unlikely to be addressed in the course of normal work. Demonstration that this can form a basis for interventions with working groups that help lower barriers (such as those of Dougherty's thought worlds) and improve collaboration, would be the most useful way of proving this assertion. This is a complex undertaking which has proven to be beyond the scope of what was achievable during the course of this MPhil project. On a practical level, the need to identify appropriate groups within organisations willing to co-operate with the research to generate case study material, proved difficult. Additional background research into techniques, and the development of practical skills in facilitating group work were also necessary. As a result, a proposal to carry out this work as a separate project for the PhD degree has been submitted and provisionally accepted by the Royal College of Art, pending successful completion of the current work. (See Appendix III for the text of this proposal.)

Key Questions to be Addressed by the Current Work

The decision was taken to focus the MPhil project on the development of a method of identifying significant metaphorical themes in the ways individuals conceptualised about their work, through analysis of individual interviews. The general purposes of this work will be to gain familiarity with the types of themes that could be involved in divergences between thought worlds, and to explore different ways of bringing them to light. Key questions that are raised address issues of authenticity, reliability, and validity.

First, what criteria will be used to determine 'significance'? Lakoff and co-workers (Lakoff, 1987, 1993; Lakoff and Turner, 1989; Lakoff and Johnson, 1980), establish criteria to support their assertions that all metaphorical expressions have cognitive

significance, albeit to varying degrees, since metaphor is seen as a cognitive process. They identify a range of metaphorical expressions, including novel or poetic metaphors which are consciously constructed, and unselfconsciously used or conventionalised metaphors. As discussed in Chapter Two, Lakoff and co-workers assert that conventionalised metaphors have the greatest power to influence our thinking, because their use is taken for granted as natural. Their general criteria for judging the cognitive significance of a particular metaphor is in terms of the number and variety of expressions it motivates (either directly or through its entailments), and the breadth of its application in different situations. According to Lakoff and Johnson (1980), multiple metaphors may be used to structure a complex concept, but there will be a coherent relationship discernible between the most prominent metaphors and important values of the culture.[44] Schon's (1979) work on generative metaphor and problem setting similarly describes the manner in which metaphor plays a powerful role in framing a person's thinking about a particular subject. He predicts a direct relationship between underlying metaphors and the process of naming and framing that is employed in narratives. The entities which are named and the relations that are framed between them are expected to be consistent with dominant metaphorical structurings that are involved.

Beyond individual cognitive significance, will it be possible to show that themes uncovered are significant relative to friction in multidisciplinary work? Since interviews will be employed with individuals who may not be working directly with each other, it will be impossible to show direct links between incompatible themes and specific instances of conflict. However, an approach will be used which compares the themes identified through the use of the method, with informants' stereotyped beliefs about sources of friction, to explore connections with disciplinary conflict.

Considering these questions, and predictions that can be made on the basis of the theoretical perspective, the field work carried out will be directed toward testing the

[44]Coherence is an important concept discussed in Chapter Two; see also Lakoff & Johnson (1980, pp. 7-9; 22-24) for discussion of coherence with culture; (pp. 89-96) on coherence within a single metaphor; and (pp. 97-105) on coherence between metaphors.

following hypothesis: if friction between members of professional disciplines is related to their use of unshared, specialised abstract concepts that are understood metaphorically, there will be significantly different organising features in their discourses which can be attributed to metaphorical structuring of ways of thinking about their work. At least some of these structurings will be incompatible or inconsistent. Further, it should be possible to understand aspects of the tension between them in terms of incompatibilities or inconsistencies between metaphors motivating a range of expressions they use when discussing central issues in their work.

Broader questions must also be asked: regarding reliability, will the method be able to produce potentially useful results in a variety of circumstances? What techniques will prove most effective in bringing themes reflecting tacit assumptions to the surface? These questions will be addressed by obtaining as broad a range as possible in the backgrounds of informants, and by considering a range of approaches for eliciting information from them. In terms of validity, how can confidence be established that themes and assumptions uncovered by the method have the meanings for informants that are purported by the analysis? And finally, does the technique appear to provide research insights that are different, more relevant, or more useful than those that might be obtained in another way? Chapters addressing these broader issues will follow those which describe the development of the methodology, the conduct of the field research, and the results generated.

CHAPTER 4.

METHODOLOGY

Introduction

Because this study was not undertaken from the outset within a particular research tradition, the process by which a particular approach and methodology came to be chosen over others seems equally a part of the research result. The first portion of this chapter will take a roughly chronological and somewhat narrative approach to describing how certain threads present at the start of the project were followed, developed and transformed over the course of the enquiry, paying particular attention to what was learned that enabled questions to be framed more clearly, and the reasons various choices were made in light of the broader goals of the project.

Starting Points

Words, Pairs, and Icons

As described earlier, an event which played an important role in the genesis of this project involved a dispute between an industrial designer and me which centred on the word 'compromise', after which I was struck by the way we had each presumed the use of different meanings of the word to be natural in the situation. Because this seemed to be an interesting phenomenon, and I had a sense that in some way it might be connected to a sort of 'cultural' difference between engineers and industrial designers, I began to informally collect other words which seemed to me to have a similar quality of occupying some sort of 'contested ground' between different disciplines.[45] At the formal start of the project, this list contained a dozen or so words, which quickly swelled after the first six months to approach one hundred and fifty. In keeping an eye out for 'loaded' words, I soon noticed that they frequently occurred in contrasting pairs. Because my initial project proposal

[45]A version of this list is provided for reference in Appendix IV.

was framed in terms of 'professional cultures', I had been directed to the work of the anthropologist, Levi-Strauss. Besides noting his distinction between the modes of action of the Engineer and the Bricoleur (Levi-Strauss, 1966, p.18), the structuralists' fascination with bipolar opposition heightened my sensitivity to words used in loaded pairs. I was also interested by Saussure's assertion that meaning is established through shades of difference between words, as well as through opposition -- ideas more recently developed by Derrida.[46] Finally, I decided to keep an informal record of personalities and objects that seemed to function in design conversations as icons, myths and legends. This seemed consistent with an anthropological or ethnographic approach, as well as the tradition of viewing design history in terms of great figures and iconic objects as described by Sparke (1986) and Walker (1989). As a result, the project has paid particular attention to words, words in opposition, icons, legends, and stories, from its very early stages.

Early Considerations of Interview and Analysis Methods

Early interest in approaching the project in terms of a concept of culture suggested reading on varieties of interview-based methods including ethnographic interview techniques (Thompson, 1988; Schwartzman, 1993; Hammersley & Atkinson, 1986; Saville-Troike, 1982). The decision was taken early on that open interviews would be a necessary approach since very little was known about the sorts of information I would be seeking. Also, as stated earlier, the intent of the project has always centred on exploring the nature of beliefs in individual cases, rather than documenting how wide-spread general occurrences are.

[46]See Fiske (1990) for a brief discussion of Saussure's ideas of signification. An introductory discussion of Derrida can be found in Sarup, Madan; *An Introductory Guide to Post-Structuralism and Postmodernism* (New York: Harvester Wheatsheaf, 1988).

Range of Topics Considered Relevant

Structuring the interviews around a framework or typology of subject areas seemed necessary, since it was assumed that a very broad range of beliefs could be involved in divergences. An early candidate for such a framework was that of Bonsiepe (1995) which identified five areas of difference between industrial practitioners in science, technology, and design as: (1) objective of work activity, (2) accepted mode of discourse, (3) accepted sets of standard practices, (4) institutional setting, and (5) conditions of satisfaction or completion. Even limited reading in the sociology of occupations and professions (Macdonald, 1995; Freidson, 1986; Dingwall & Lewis, 1983; Krause, 1971) indicated that Bonsiepe's category four could be expanded dramatically to include education and claims to knowledge, position in organisational hierarchies, and maintenance of boundaries and social closure. It also appeared that category five could be an amalgam of criteria for completion, systems of validation, and ideas about success. In personal communication, Bonsiepe indicated this typology had emerged from consideration of his experience and various unspecified sources. Other typologies of cultural assumptions more explicitly drawn from anthropology, including one adapted to organisational settings, are described by Phillips (1994); though they differ with each other in certain ways, and with Bonsiepe's typology described above, all are of comparable breadth. Clearly an interview which attempted to explicitly address all these areas in any detail would be impractically long, but it was unclear how to simplify the structure of an interview since little was known about what sorts of questions or approaches would be more productive.

Semantic and Textual Analysis Methods Considered

Several analysis methods were considered and rejected for various reasons, which will be briefly described. A long-established method used in the study of connotative or affective meaning of words and objects is the semantic differential of Osgood, Suci and Tannenbaum (1957). This technique requires respondents to rate a word or object on a series of bipolar affective scales, which can then be correlated and statistically analysed

to yield values along (typically) three dimensions of meaning: evaluation, potency, and activity. Though such a technique could in principle give some indication of different individuals' affective readings of same stimuli in the form of words or objects, it would yield little in terms of any systematic values and beliefs involved, and hence was never seriously considered for this study. A method of similar vintage, Ziff's (1960) semantic analysis is a technique for probing meaning using substitution frames -- sentences in which words and word order are altered, and respondents are asked to judge changes in meaning or aptness. Though the substitution frame technique could be very useful to address certain questions, it was rejected for this study on similar grounds as was the semantic differential.

Techniques which are better suited to the analysis of bodies of text, such as interview transcripts, include conversation analysis and content analysis. Conversation analysis is an ethnomethodological technique, the purpose of which is to scrutinise the minute detail of features of a conversation, including pauses timed to fractions of seconds, to make inferences about how the relationship between the individuals is constituted from one moment to the next. It is a micro-interactionist technique better suited to the study of power relationships than the concerns of this study. Content analysis embraces a variety of techniques, the simplest of which involves counting the number of occurrences of individual words in a body of text. More complex variations address problems of homonymy and recognition of grammatical variations of 'the same' word, as well as making inference of relatedness based on systematic co-occurrence. These processes are frequently computationally implemented, making it possible to analyse vast amounts of text.[47] The insensitivity to meaning of these techniques makes them poorly suited for this study; however, variations of manual content analysis are applied to interviews of the sort envisioned. These methods rely on judgements by the researcher as to subjects and

[47]An interesting example appeared in *Wired* magazine, January 1996, in which Steve Steinberg applied co-occurrence content analysis to project summaries of all (presumably unclassified) US Department of Defence, Advanced Research Projects Agency computing research projects to produce a concise map of active research areas, described as 'a peek at the future'.

themes, followed by coding of bodies of text into analytically defined categories. Studies by Phillips (1994) and particularly by Dougherty (1992) are of this type and are highly relevant to the current study.

Methods Involving the Creation of Representations

Other methods aim to produce an external representation of a respondent's inter-related concepts in a particular subject area. Two such methods are cognitive mapping (Axelrod, 1976; Eden, Jones and Sims, 1979), and variations of repertory grid technique stemming from the work of Kelly (1955).

Cognitive mapping is frequently used as part of a knowledge elicitation procedure in artificial intelligence research directed toward the construction of expert systems. The emphasis is on producing an organised representation of concepts and relevant factors employed by a person making a decision in a particular subject area, as well as their perception of the nature of causal relationships between factors. Decision analysis, prediction, and automation are not goals of this project, however, Boland and Tenkasi (1995) have incorporated cognitive mapping into their strategy for facilitating dialogue between different 'communities of knowing'. In this work, part of the essential collaborative processes of perspective making and perspective taking involves a dialogue facilitated by the use and construction of boundary objects (Star, 1993). Cognitive maps can serve as such boundary objects between communities of knowing, and also increase self-awareness within the community through the reflective process required for their creation. Boland indicates that this can help to surface previously tacit assumptions in cause and effect relationships (p.362), but indicates further efforts are necessary to explore the maps' relationships to unstated aspects of the perspective (p.364). Boland identifies the analysis of narratives as a means of accomplishing this. Regarding the use of cognitive mapping, it was not felt this would be an appropriate method given the aims of the current study. Their emphasis on rationality and cause and effect statements seemed at odds with this study's interest in the tacit and taken-for-granted, and seemed likely to

favour what Argyris (1994) has referred to as 'espoused theories-of-action' rather than 'theories in use'.[48]

Grid technique, and the theoretical framework of personal construct psychology (PCP) within which it is grounded, originated with Kelly's (1955) work, though it has been subsequently broadened and developed. Grid technique is used to create a representation of an individual's conceptualisation about a certain domain, consisting of a set of elements prominent within that domain, and a set of constructs which quantitatively express relationships between those elements. This first requires a process of elicitation, followed by a statistical analysis based on rankings given by the respondent which allows construction of a multi-dimensional spatial representation. In applications of grid technique, the representation itself may be of primary interest (such as in knowledge elicitation), but since its inception, it has also been used to aid constructive change facilitated by the analyst (Kelly, 1955), as a result of self-reflection by the respondent (Bannister and Fransella, 1974), and sharing systems of meaning among groups of respondents (Shaw, 1980; Mancuso and Shaw, 1988).

Grid technique is relevant to the aims of this project and has informed the project in certain ways. As summarised by Mancuso and Shaw (1988), the foundations of PCP are essentially constructivist in nature, and are underpinned by themes that have been prominently raised elsewhere in the literature review. Namely, these include: that the making of distinctions and categorisation is a central human activity; that perception is shaped and channelled by the accumulated system of these distinctions; and that the system is continually engaged in prediction and updated as new experiences are encountered. The use of grid technique as part of a metaphor-based programme of research with new product development teams has been used by Dumas and co-workers (forthcoming). Grid techniques are carried out with a respondent, regarding a particular domain of experience, and with a purpose or aspect of that experience in mind. (Shaw, 1980) In

[48]The original reference, to Argyris and Schon (1978), *Organisational Learning*, (Reading, MA: Addison-Wesley) was not consulted for this work.

conventional grid technique, a set of elements believed to span the domain in question is elicited -- if the domain is personal relationships these may be friends and family members; if the domain is product development, they may be own-company and competitors' products (Dumas, forthcoming). In any case, the elements must be specific and personally meaningful to the respondent. Constructs can then be elicited in several ways, but common techniques involve presenting the respondent with dyadic or triadic comparisons of elements, in which they must determine in what way (or ways) the elements are alike or different (in the context of the domain and purpose). These aspects of similarity or difference, paired in binary opposition, become the poles of constructs. Finally, each element is rated or placed relative to the others along each construct. This allows the use of statistical techniques, such as principle component analysis, to produce spatial and other representations of the system of elements and constructs.

Despite aspects of PCP being theoretically relevant to this project, and the use of grid technique -- albeit as an ancillary measure -- by Dumas, these techniques were not formally used in this project for a number of reasons. A repertory grid is not something constructed from interview data, rather, the interactive construction of the grid constitutes the interview. The necessity of the respondent's ranking of each element on each construct, which is essential to the statistical analysis that makes the representation possible, can be cumbersome and time-consuming unless the number of elements and constructs remains fairly small. Because of the relative broadness of the context ('working with members of other disciplines in product development') and the purpose ('exploring difficulties and disagreements'), difficulty was anticipated in limiting the number of constructs in what was expected to be a rather wide-ranging discussion, or, if an early limit was imposed, it seemed likely something 'more important' might come out during subsequent conversation that would require considerable effort to retroactively integrate into the grid. The mathematical precision of the representation was not considered to be sufficiently useful to justify either the effort required or the potentially lost information (due to limitations the method would impose on the interview),

especially since it was expected that the actual wording used to identify constructs, if not elements, would vary considerably from person to person and over time. It was decided not to pursue the use of a formalised grid technique, though aspects of the elicitation procedure did have an influence on the structure of the interviews conducted.

Development of Interview Technique

Faced with an overwhelmingly broad typology of potentially relevant subject areas, the decision was made not to try to systematically cover them in a structured interview, but instead to focus the interview on that aspect which in my practical experience had remained the most concrete issue at the core of the project: that members of specialist disciplines can acknowledge the need to work together, and do so in some way for a number of years, and still retain negative opinions about the methods or essential value of what the other groups contribute. Probing areas of negative opinions and stereotypes about other groups seemed like the best way to tap into the beliefs and feelings that were involved in friction between members of groups, rather than trying to apply a broad typology of constitutive characteristics. Thus, a loosely structured interview strategy was chosen, to elicit stereotyped beliefs about the other groups, with open responses and follow-up questions to focus on areas in which strong feelings appeared to be involved.

The first interview script was drafted with two distinct parts. After asking for the major occupational groups the informant worked with, the first part enquired about negative and positive stereotyped beliefs about those groups the informant was 'aware of'. This was asked first in a general way, then using some of the constitutive characteristics (such as 'goals', 'priorities', etc.) as prompts. The second part was intended to approach similar beliefs, but by way of elaboration of specific experiences. I had initially thought to ask for the names of individuals in each group with whom the informant had either 'gotten on well with', or 'not gotten on well with', as is done in grid technique. However, since I had decided to use strength of feeling as a guide, I formulated two lists of words

which I felt characterised somewhat stronger feelings one might experience with co-workers. The two lists are reproduced below:

Table 4.1 Feeling Words

Respect	Don't respect
Admire	Don't admire
Productive	Counter-productive
Helpful	Un-helpful
Beneficial	Detrimental
Constructive	Irritating / Make you angry
Enjoy working with	Frustrating
Easy to work with	Difficult to work with

The words chosen for these two lists were intended to be evocative of feelings in order to stimulate recall of specific personalities and instances; the list was not intended to be all-inclusive, and informants were encouraged to add any other words that seemed appropriate. Then, when two or three names had been elicited in response to positive and negative feeling prompts for each group, the informant was encouraged to describe the instances, and to consider ways in which the positive and negative instances were similar and ways they were different.

Changes Resulting from Trial Interviews

Two trial interviews were conducted with fellow students who both had work experience -- one with a first degree in engineering, the other in industrial design. A number of problems were observed during the first interview, so significant changes were made prior to the second. After the second interview, some instructions were added and the script was further simplified, but changes were much less substantial. I will briefly describe what was learned in the trial interviews, before describing the script that was used to guide the actual field interviews.[49]

[49]Samples of the interview scripts are contained in Appendix II.

The first trial interview required nearly six hours over two sessions. During this time, the planned script was not even completed, though some time was occupied with meta-discussions about interview questions. Clearly, a problem existed with time, but other problems were noticed as well, having to do with the flow, or 'naturalness' of questions and answers. The most marked instances occurred during the stereotype questions, in which the informant had great difficulty discussing stereotyped beliefs he was aware of, since he was unsure whether he was supposed to describe his own beliefs, or adopt imagined points of view of others. When describing his own views, he was reluctant to describe anything as a stereotype, or to classify it as either positive or negative (as the script and form required). He preferred to describe traits in relatively neutral terms, and then spin out positive or negative ramifications. Also, the terms 'positive' and 'negative' seemed to beg a number of questions of point of view, specifically whether I was asking him to speak as an industrial designer, or from an assumed 'objective' or 'societal' point of view. My perception was that many of his responses were stilted and very self-conscious; the informant confirmed during our meta-discussion that he had engaged in a great deal of self-editing. Even so, several articulate and expressive encapsulations resulted, which will be mentioned during the analysis. Unfortunately, due to poor quality and incomplete tape recordings, this material cannot be subjected to the analytical procedure, and cannot be formally included with the results. The evolution of the roles of note-taking, recording and transcription are informative and telling in themselves, and will be described later in this chapter.

The second trial interview was conducted four weeks later. Significant changes were made to reduce the time required; in general, where the first interview had included specific questions about each of several aspects for each group, the second simply asked for a general elaboration. A more directed strategy was chosen to elicit and then consolidate the number of groups the informant identified, since this was the dominant determining factor in interview length. The informant was asked to visualise a 'typical' meeting, and name the different groups that might be present. This list was consolidated

by asking the informant to group together those occupations or roles which, in their experience, tended to 'speak the same language'. This approach has, to date, not resulted in more than three or four consolidated groups being identified. I was also prepared to elaborate on what 'speaking the same language' meant -- that is, that the individuals or groups tended to present, understand and respect the same types of arguments and use similar words, whether or not they agreed in a specific instance. However, to date, none of the informants has been confused by the notion of 'speaking the same language'.

The second trial interview was completed in one hour and forty-five minutes, which was within the two-hour practical upper limit I had set myself. The range of material covered still seemed adequate, so I felt the changes to the interview had had the desired effect. However, this informant also seemed to have difficulty interpreting questions that were phrased in terms of 'stereotypes'; he stumbled significantly trying to interpret my instruction to 'describe stereotypes of each group he was aware of', and later reported having been unsure whether he was intended to speak from his own experience, or about beliefs he thought might be held by others. In this interview, however, a simple rephrasing of the question produced dramatically better results. I had begun to use the word 'typical' elsewhere in my instructions, and when I asked him instead to tell me about a 'typical' engineer or industrial designer, he unhesitatingly offered a number of detailed characterisations, from ways of working, to styles of dress and preference in cars[50]. Though he still qualified what he said ('of course, they're not *all* like that..'), the difference was nothing less than dramatic. As a result, I resolved to banish the word 'stereotype' from my script.[51]

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[50]In both trial interviews, respondents offered descriptions of stereotypical dress and choice of automobiles for members of different groups. This did not occur in any of the subsequent interviews. It is impossible to judge whether this is coincidence, or possibly due to a change in my conduct of the interview, since adequate recordings of the first interviews were not obtained. Since these descriptions emerged early in the interview, the only prominent change I am aware of was the elimination of the word 'stereotype'.

[51]Besides 'typical', I have noticed that the word 'classic' when applied to persons and behaviour seems to work similarly to cue stereotyped beliefs without raising defences and self-consciousness.

Another problem which occurred in both interviews was associated with the elaboration of specific experiences recalled in response to the feeling-word prompts. It seemed that some of the experiences, while strongly felt and consistent with the feeling words, were ultimately attributed by the informant to other aspects of individuals' personalities or situations -- that is, they were not ultimately described in terms of behaviour that was in some way 'typical' for that group.[52] Subsequently, instructions and reminders were given to choose instances for elaboration which were, 'related to characteristics that are in some way typical for that group.'

Finally, in reviewing the results of the two trial interviews, it was felt that the second lacked comparably interesting material in some areas. It seemed that some of the prompts from the first interview, which were removed to shorten the second one, had addressed fruitful areas. It was decided to reintroduce some elements from the constitutive characteristics typology, in the form of themes for follow-up questions. These questions would have to do with how various groups judged success, how the informant knew when they were doing a good job, what skills or attitudes were necessary to doing excellent work in their field, and what separated excellent from mediocre work.

Information Expected from Interview in Final Form

To summarise, the interview is intended to yield statements that will shed light on deeply-held beliefs and values that are in some way felt to be recurrently transgressed by the actions of members of other occupational groups. Rather than attempting a systematic survey of belief, the interview approach is to probe stereotypes, particularly negative ones, based on strong feeling and personal experience. The explicit structure of the interview embodies two different approaches to elicitation: first, construction of a

[52]It is natural enough, for example, that a situation which resulted in feelings of frustration and lack of respect, and which involved someone who was an engineer, could turn out to be due to idiosyncratic traits of that individual. In one case, a technical / research person at a client company was perceived to have been abnormally defensive and protective of their area of expertise due to being 'an insecure person'; in another case, the workshop supervisor was ultimately perceived to have been someone unable to speak normally, only to shout and yell.

typology according to generalised characteristics; second, description and comparison of specific individuals and experiences that have engendered strong positive or negative feelings. Areas for follow-up questions are informally structured, in terms of values about success, ways of working, and distinctions between mediocrity and excellence. The goal is to produce a text which is rich in terms of its content of explicit and value-laden distinctions, self-conscious and conventionalised metaphorical language, and examples, icons, and narratives, which can then be subjected to analysis.

Choice of Analysis Method

In research projects, at least as ideally described, an analytical method is fully determined before the bulk of the fieldwork is carried out. This was not the case in this project, and one of the reasons this chapter has adopted a more narrative style is to make the reasons for this, and more importantly the learning process that took place, more evident to the reader. Previous sections have described the development of a technique for data collection by interview, as well as early candidate analysis approaches which were rejected as inappropriate based on the goals or theoretical position chosen for the study. The choice of an analysis method will now be described in a similar way.

Note Taking and Levels of Transcription

The development of my sensitivity to issues which became central in the analysis method are tellingly mirrored by changes in my approach to note taking and the transcription of interview texts. Though tape recording was used from the first trial interview onward, my initial expectation had been that material written by the informant, and my own written notes would constitute the primary data; audio recordings were made as a sort of backup, and as standard practice in any social science interview.[53] By the

[53]Due to this view of the non-centrality of audio recordings, inadequate care was taken in recording the first trial interview, resulting in the tapes being substantially unintelligible; In the second trial interview, it was decided to go ahead despite the lack of a

time of the third interview -- which was the first field interview -- it was clear that substantially more was needed to adequately represent what was said than was written by the informants themselves, though it was felt that the taking of copious notes in a detached way should be avoided. As a solution, notes were taken on sheets of paper -- corresponding to the different subject areas in the interview script -- which were arranged loosely, face-up on the table, accessible to both the informant and the interviewer. In the event, the majority of notations were made by me, though the informant was encouraged to draw or 'put down what they meant', and the 'accurate' capturing of key points was presented as a joint responsibility.

In all cases, a summary document was generated from notes, augmented by memory, as soon after the interview as possible. In these summaries, there was a tension between making a chronological reconstruction, or a grouping of content according to related themes and subjects. However, it was following the first field interview that reconstruction of the chronological order from the scattered sheets proved too difficult, and the audio tapes were listened to while the notes on the sheets were reviewed. It was at this point that the first surprising discovery was made: besides the inevitably large amount said which had not been written down, there were instances in which what I had written down on the sheet was *not* what the informant had 'actually' said. These differences were very seldom in what might be described as the key subject words, or obviously metaphorical expressions (which I was already prepared to regard as important features), but were in the choice of seemingly ancillary words, aspects of construction, prepositions, etc. While a significant amount of paraphrasing of the 'unimportant' is an acquired and necessary skill in note taking, it appeared that during the few moments utterances were held in memory before they could be written down, I had subtly altered wording and construction without being aware of it in at least some instances. Because of a growing realisation that seemingly insignificant things might be significant after all, and the problem of chronological reconstruction, the decision was made to change the method to

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piece of the recording equipment, which meant that the second interview was not audio recorded at all.

emphasise tape recordings over written notes in constructing the summary documents. As a result, all interview summaries after the first two trials included a paraphrased transcript of the tape, in which the wording of what seemed to be important points was accurately represented, while intervening talk and my questions were paraphrased or summarised.

During this time, I was also making attempts to distil more condensed representations of the useful material gained from each interview. These documents summarised important utterances which were sorted according to which disciplinary group they applied to, and included explicit and obviously metaphorical characterisations. These condensations were disappointing and unsatisfying, though; they came across as somewhat sterile, reductive and unenlightening. It was as if the process of 'boiling down', that seemed to be a necessary first step toward analysis, was 'boiling off' something essential to what was of interest. The remaining interviews were conducted, therefore, guided by a tacit sense of what was interesting material, but without an analytical framework for interpreting just what made the material interesting, or how it would be used to support or refute the hypothesis.

Discourse Analysis

As described by Potter and Wetherell (1987), the term 'discourse analysis' is applied to a broad range of techniques and approaches -- so broad that two books with the phrase in their titles may have essentially no overlap in content. (p. 6)[54] They define discourse analysis with respect to social psychology as focusing on interaction and language by looking at, 'broader units than linguistics (phoneme, word, sentence) and conversation analysis (turn, adjacency pair, closing) to make sense of social life.' (p. 138) The theoretical roots of discourse analysis are traced to speech act theory, ethnomethodology, and semiotics. The essential insight from speech act theory is that very

[54]In particular, Potter & Wetherell mention the work of Foucault which is also referred to as 'discourse analysis', but bears no direct relationship to this technique.

few utterances encountered in daily life are neutral descriptions or declarations; rather, people say things in order to *do* things -- to impress, to persuade, to elicit action. (p. 17)

Potter and Wetherell see the construction of linguistic expressions and the variation between utterances as providing valuable information when related to the purposes a particular utterance may have had. They emphasise that social science interview techniques often regard this variation as a problem, relying on standardised responses or sorting into pre-defined categories to suppress and exclude what is actually useful information.

Potter and Wetherell cite examples which are methodologically relevant for this study, including the work of Gilbert and Mulkay on the discourse of scientists[55], which revealed the use of two distinct and inconsistent 'interpretative repertoires'.

> Interpretative repertoires are recurrently used systems of terms used for characterising and evaluating actions, events and other phenomena. A repertoire, like the empiricist and contingent repertoires [examples from the scientists' discourse work], is constituted through a limited range of terms used in particular stylistic and grammatical constructions. Often a repertoire will be organised around specific metaphors and figures of speech (tropes).. (Potter & Wetherell, p.149)

The two repertoires Gilbert and Mulkay identified in the scientists' discourse were systematically used for different purposes. The 'empiricist' repertoire gave logical and chronological priority to data; lab procedures were described neutrally, in terms of rules and procedures -- from which the data became apparent and conclusions naturally 'emerged'. The 'contingent' repertoire on the other hand emphasised speculation, scientists' prior commitments, social contexts and personal characteristics. In formal settings, Gilbert and Mulkay found that scientists used the empiricist repertoire in relating their own findings or those that were consistent with their positions, and tended to employ the contingent repertoire to explain any conflicting findings of others, at least implicitly attributing them to bias or experimental error. In informal settings,

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[55]e.g. Gilbert, G. N. and Mulkay, M.; (1984), *Opening Pandora's Box: A Sociological Analysis of Scientists' Discourse.* Cambridge UK: Cambridge University Press.

scientists would employ both repertoires in discussing their own work, but would use the contingent repertoire in terms of insight instead of bias; rather than conclusions emerging from pre-existing data, they were hunches or dramatic revelations later *confirmed* by data. (Potter & Wetherell, pp. 146-155) Another example revealed systematic differences in what was subsumed in the term 'community', by different factions seeking to lay blame for a race riot. (pp. 133-136). In both cases, the interpretative repertoires were structured by the use of particular metaphors.

Potter and Wetherell devote a chapter to a methodological discussion (pp. 158-176). They emphasise that the technique cannot be described as a single analytic method, but rather,

> .. there is a broad theoretical framework, which focuses attention on the constructive and functional dimensions of discourse, coupled with the reader's skill in identifying significant patterns of consistency and variation.' (p.169)

This theoretical framework can in principle be applied to all manner of spoken and written texts (p. 7), though certain methodological requirements are imposed in the case of interviews. One of these is the production of complete, verbatim transcriptions of questions as well as answers, since both must be considered in the context of the other. (pp. 165-166) Because I had not transcribed my interviews with this level of thoroughness, the time-consuming process of re-transcription was necessary.[56] However, I found that this facilitated an analysis of the texts which, for the first time, did not seem reductive. I now see this as a natural culmination of the learning process described in the preceding section, which is also expressed by Potter and Wetherell:

> Academic training teaches people to read for gist -- which is precisely the wrong spirit for discourse analysis. If you read an article or book the usual goal is to produce a simple, unitary summary, and to ignore the nuance, contradictions and areas of vagueness. However, the discourse analyst is concerned with the detail of passages of discourse, however fragmented and

[56]Potter and Wetherell describe increasing levels of transcription detail, culminating in the portrayal of overlaps in speech and the timing of pauses. My transcription conventions are described in Appendix I. Transcription, checking, and parsing of a two-hour tape required about twenty hours, which is consistent with Potter and Wetherell's estimates for standard transcriptions.

> contradictory, and with what is actually said or written, not some general idea that seems to be intended. In ethnomethodological terms, we are so used to 'repairing the indexicality' (Garfinkle, 1967) of talk, and reconstructing it in ways that make sense for us, that it is very difficult to throw off this habit. Thus, part of the process is inevitably a critical interrogation of our own presuppositions and our unexamined techniques of sense making (Ashmore, 1985; Potter, forthcoming). The analyst constantly asks: why am I reading this passage in this way? What features produce this reading? (p.168)

The Use of Discourse Analysis with Respect to Beliefs

Potter and Wetherell explicitly reject the use of discourse analysis as a route to things 'beyond' the text itself, such as attitudes and beliefs -- terms which I have used frequently in conjunction with the goals of this project. They draw the line at identifying interpretative repertoires and their use in particular contexts, and avoid speculation about cognitive processes 'going on under the skull' (pp. 14; 157; 160), though they acknowledge this as an area of contention. (p.177) I believe a number of Potter and Wetherell's points are well-founded, but that their criticism of notions of attitude and belief are directed at far more rigid and deterministic interpretations than those applied in this project.[57] In any case, I will assert that the cognitive significance of metaphors found at the heart of interpretative repertoires can be defended, on the strength of the arguments of Lakoff et al. and Schon, and other sources cited earlier in this paper.

Much of the evidence cited by Potter and Wetherell to attack the validity of unitary or rigid cognitive representations is the fluidity of social characterisations observed in their studies, both as used by the same individual over time, and between individuals observing 'the same' phenomenon.[58] On the basis of this, they explicitly challenge prototype theory categorisation, which figures prominently in Lakoff's argument. I believe their evidence supports an assertion that social categories (categories applied to other people) are used

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[57]Much of Potter & Wetherell's criticism is directed toward Moscovici's theory of social representations. (pp. 139; 142-146) They criticise this position as relying on cognitive 'speculation' and employing a circular argument that the representations are socially transmitted, while also serving as the basis for delineating a group.

[58]Potter & Wetherell's salient examples are drawn from fieldwork done around issues and situations involving racial tension and violence; it is difficult to imagine a context in which social characterisations would be more complex and highly charged.

in discourse in a far more complex way than categories of objects, plants and animals which are more often the subjects of the prototype research related by Lakoff. However, Lakoff emphasises the flexibility and context dependence of prototype categorisation in a way Potter and Wetherell do not acknowledge. Furthermore, he gives a detailed rebuttal to criticisms of prototype theory based on what he describes as a mistaken, overly rigid, 'effects equal structure' interpretation of the theory's claims. The work in which this appears (Lakoff, 1987) was contemporary with Potter and Wetherell's, and was not cited by them. Finally, Lakoff is using the results of prototype research to attack the classical theory of categorisation and theories of meaning based upon it. Far from weakening Lakoff's argument, the examples cited by Potter and Wetherell actually strengthen the case for the inadequacy of the classical theory of categorisation.

A Review of How the Initial Threads Have Developed

To conclude this chapter, I would like to return briefly to see what has become of the starting points identified in the first section. The initial observation was of the same word being used by two individuals with different meanings taken for granted, which lead to an ad-hoc collection of such seemingly contested words and bipolar oppositions. Later, the work of Lakoff and others introduced metaphor and experiential grounding as cognitively significant processes. These processes were implicated by Coyne and Snodgrass in reinforcing traditional, divisive views of rationality and creativity, and were shown by Schon to powerfully frame thinking and the perception of possibilities in problematic situations. Narrative was also given a central role by Schon in the framing process, through the selective identification of certain entities and relations at the expense of others, and Boland made a case for the surfacing of tacit assumptions, in part through the analysis of narratives. Finally, discourse analysis as an approach to interview texts may potentially encompass all these elements -- words, oppositions, metaphors, and narratives -- by placing them within the structure of coherent repertoires, purposively employed in an individual's discourse.

CHAPTER 5.

FIELD RESEARCH AS CONDUCTED

Introduction

This chapter will provide a more detailed description of the interviews and subsequent analysis stages as they were conducted. A summary of results of this analysis for each of the interviews will be presented in Chapter Six, while further interpretation and discussion of these results takes place in Chapter Seven.

As discussed above, the goal of the interview is to generate a text which will provide a rich source for analysis. The intention is to obtain a variety of characterisations of the informant's own group, of other groups and sources of friction, as well as various ideas about the nature of work, methods, goals, success and failure. The primary goals of the analysis are, first, to develop a picture of the informant's perception of areas of friction and their causes, and second, to reveal the systematic use of interpretative repertoires and metaphorical themes which shed light on the informant's understanding and conceptualisation in those areas. Evidence to support the significance of themes uncovered (and hence the validity of the analysis), will be based on how systematically they are used, how broadly they are applied to different areas of discourse, the variety of expressions they motivate, and their ability to supply a coherent explanation for aspects of the discourse and areas of friction.

Conduct of the Interviews

The evolution of the interview approach was described in some detail in the previous chapter. Following a discussion of the selection of informants, the essential features of the interview script will be briefly reviewed, along with variations in the way the interviews were conducted.

Selection of Informants

A method was chosen that was appropriate to the analysis of a relatively small number of in-depth interviews. This small sample size precluded the possibility of supporting generalised statements about the beliefs held by different groups. The emphasis was placed on developing a method that could be used to unpack the interview texts, and it was desirable to have a variety of individuals represented. Significantly different texts were generated, and I believe they provided a good range for the development of both interview and analysis methods.

Access to a pool of potential informants was limited, and all informants were obtained through personal contacts. As a result, there are certain links and commonalities in the backgrounds of the informants. Two of the informants, UC and AM[59], were employees of the same company, and had some limited experience working together. A third informant, EF, had worked on a two-month contract basis for the same company, and had worked with UC during that period. Both UC and EF were personal acquaintances of mine prior to the interview. The remaining informants, RK and BB, were unknown to each other and to the other informants, to the best of my knowledge, and were not acquaintances of mine prior to the interviews. Both UC and BB had previously attended the Royal College of Art, though in different departments and at different times.

Brief Summary of Interview Script

The interview was open in nature, but was loosely guided by a script which structured it according to the two different approaches to elicitation. This structure was consistently followed in the first three interviews, informally followed in the fourth, and minimally followed in the fifth interview. Prior to the interviews, all informants were aware that the subject of research was, 'the communication between different disciplinary groups working together in product development,' and that the subject of the interview

[59]Informants' initials and their company names have been disguised. Similarly, the names of client companies in their descriptions are also disguised.

would be their feelings about the various groups they had worked with. An outline of the structural areas of the script is as follows:

I. Elicitation of a group typology, according to a 'meeting table' visualisation; consolidation of typology according to groups 'speaking the same language'.

II. 'Typical' descriptions; distinctions, general characteristics of each consolidated group.

III. Elaboration of specific experiences, prompted in response to 'feeling words' list.

The script also set out areas to be addressed through follow-up questions, as appropriate. These questions were extremely important, since they were intended to clarify or make explicit the assumptions and beliefs the informant's initial answers may have been based upon. Areas for thematic follow-up questions were:

- Characterisations of success and how it is recognised; how it feels to be doing good work; the nature of unsuccessful work.
- Essential characteristics, skills, attributes required to achieve excellence in the field; excellence vs. mediocrity.
- Characterisation of a range or spectrum, and the nature of its poles, when the informant was unsatisfied with offering a single 'typical' description for a group.
- Requesting descriptive words or expressions in response to specific incidents or examples; requesting examples of opposites, and construction of oppositions.
- How others judge success and what their goals are.

Variation in Thematic Elements

The interviews were not conducted identically. Though the script was consistently followed in the first three interviews, there were variations in specific details and in the emphasis on different thematic follow-up areas in each. The last two informants, BB and RK, had to be interviewed under less ideal circumstances than the first three, since their schedules would only allow sixty-minute sessions, and RK could only be interviewed over lunch. In both these cases, the decision was made not to try to follow the interview script;

rather, questions were asked in similar areas, but not in as systematic a manner. Overall, the result was somewhat less structured and more of the informant's talk was narrative in nature. Analysis of these interviews will allow a comparison of the effectiveness of the two interview approaches, though the reduced time must also be taken into consideration. Though this degree of variation would not be desirable in future work, it may be of use in gaining a sense of what approaches are more fruitful.

Mechanics and Administration

With the exception of the last informant (RK), all interviews were conducted in private or semi-private rooms, with interviewer and informant seated at a table. All interviews were tape recorded. In all but the last case, a number of sheets of blank paper were available, upon which the informant was encouraged to make lists or diagrams -- starting with the meeting table prompt described in the development of the methodology. These sheets were also annotated by the interviewer and retained for reference. Besides the meeting table diagram, several informants drew a spectrum to explain characteristics of one or more groups. These diagrams were useful during tape transcription to clarify ambiguous verbal references like 'this one..', or 'on the other side..'.

The AM interview drew attention to privacy as a factor in the interview setting. This interview was conducted in a conference room at the consultancy at which AM was employed. The walls of this room did not extend fully to the ceiling, and it was situated in an open-plan office, so that voices of nearby administrative workers and occasional passers-by could sometimes be heard. Though the informant seemed relaxed and open during the interview, instances were noted during review of the recording when he seemed to lower his voice noticeably (these instances are indicated in the transcript), even though he indicated he was not referring to people he currently worked with. Because the interview script involves discussing negative feelings experienced in working with others, a fully private setting is probably necessary for future work.

In all cases, notes were made as soon as possible following the interview, while reviewing the recording and the retained sheets from the session. As described above, these notes increasingly took the form of an abbreviated transcription of the tape, though other observations and thoughts were included. It was later, when the requirements of the analytical procedure became clear, that each interview was fully re-transcribed in a manner that will described below.

Description of Informants

The interview script in its original form contained a sheet for biographical information, including educational and employment history. In the actual events however, it was decided to collect a CV from the informant, rather than taking time out of the interview. In every case, biographical information was related during the interview itself. Background descriptions of the informants are summarised in Table 5.1.

(insert Table II, Informant Backgrounds, here)

Table 5.1 Informant Backgrounds

Post-Interview Analytical Procedure

Transcription

The production of a stable text which reflected the language used by the informants was essential. A number of sources discuss the difficulty of constructing a written representation of an oral conversation, which involves far more than simply 'capturing the words on paper'. (Potter and Wetherell, 1987; Reissman, 1993; Pack, 1986) The production of a transcript involves continual interpretation and reconstruction, not just of what was said, but also of the non-lexical, non-verbal, and contextual features that support inferring what was meant. The goal is to generate a text which adequately represents the discourse to the researcher, and subsequent readers, for the purposes of analysis. This requires making judgements about what will be attended to and what will be ignored. It is also necessary to develop ways of representing everything that is considered relevant, on the page, so that it can be reviewed repeatedly and worked with conveniently. The transcription conventions employed are summarised at the beginning of Appendix I, which also contains the transcriptions and analysis documents. In general, non-grammatical construction is preserved, though stumbling and non-lexical utterances are not reflected in detail. Marked inflection and emphasis is represented, as are false starts of more than a word or two. While pauses are not timed, an indication of relative length (long or short), and distinction between hesitation and pauses is made.

Transcriptions were made in two passes: a first pass during which the bulk of the text was generated, followed by a second pass to check the accuracy of word identification, as well as representation of intonation, hesitation, and pauses. A portable cassette recorder with special features including pause, on-the-fly rewind and fast-forward, variable playback speed, and a numerical tape counter proved helpful. Readings from the counter were periodically recorded in the transcript, and proved invaluable in rapidly locating portions of the tape for subsequent review. Texts were created as computer files using an

outlining and word-processing program which automatically numbered turns (and updated numbering during the parsing process described below). The program also allowed the use of different type styles and line spacing to aid readability, and facilitated text searching and gathering for subsequent analysis.

Parsing

Producing a checked transcript of an interview, broken down and numbered by conversational turns, required fifteen to twenty hours, depending on the length of the interview and the quality of the recording. A conversational turn, however, can be quite lengthy and often very complex, as the speaker shifts between themes and subjects, and incorporates examples and narratives. It was necessary to break the text of most conversational turns down into shorter segments to make subsequent analysis manageable; this process is known as 'parsing'. Parsing does not involve removal of any text, and parsed segments are numbered to allow their quick re-location in the original transcript.[60]

The choice of points at which a stream of text was parsed was a matter of subjective judgement based on several factors. Parsed segments were chosen to be long enough to convey some meaning when standing alone, but generally short enough that they expressed a single thought or consistent concept. This generally yielded segments equivalent to one to three sentences of written text, though longer cohesive segments are not uncommon. It should be noted that parsing was not based on features of punctuation and capitalisation in the written text, since these are attributes introduced during transcription not present in the original talk. However, extended pauses which seemed to mark a change in direction or a new thought were chosen as natural points to break the text.

[60]The numbering system is decimal, sometimes referred to as 'legal'. Turns in the original transcript were numbered sequentially. Turn 2 in the original transcript, for example, might have been parsed into five segments: 2., 2.1, 2.2, etc. for analysis.

The first points established for parsing were determined by looking for examples and narratives. Because these are generally offered to illustrate or support a point which has just been made, they tend to elaborate or recapitulate themes that have been recently introduced -- particularly those that the speaker wishes to reinforce. They are also frequently flagged by the speaker in some way at their outset -- such as by saying, 'I remember an example.. ' -- and provide relatively unambiguous break points in the text. Because they highlight important points the speaker made, a summary listing of examples and narratives provides a fairly compact 'road map' of the structure or course of the interview.

Further parsing was accomplished through attention to evaluative tone (positive, neutral, or negative) and strength (weak or strong) of portions of the text. As Potter and Wetherell point out, evaluative tone is linked to the use of different themes and repertoires, so significant changes in tone frequently helped locate transitions between themes that were natural points to parse the text. The following example shows how a single turn was parsed into three segments (Appendix I contains a description of the notation used for evaluative strength and tone; in the samples below, [p] and [n] indicate 'weakly positive' and 'weakly negative', respectively.):

21. EF: Then -- should we go to marketing? (I: sure) The typical marketing people, I am involved with, seem to understand that a well-engineered product and also a well-designed product go together to make a product that is easy to market, to sell. But the people I'm involved with seem to be very, very cost-driven. That one of their customers will come to them and say we need a product that has this specification and costs x. If it costs x plus 1 cent we won't buy it, it must cost x. That translates back to engineering and industrial design as, 'make this product cheaper, and we don't care how it performs or how it looks.' 'Make it as cheap as possible.'

21. EF: Then -- should we go to marketing? (I: sure) The typical marketing people, I am involved with, seem to understand that a well-engineered product and also a well-designed product go together to make a product that is easy to market, to sell. [p]

21.1. But the people I'm involved with seem to be very, very cost-driven. That one of their customers will come to them and say we need a product that has this specification and costs x. If it costs x plus 1 cent we won't buy it, it must cost x. [n]

21.2. That translates back to engineering and industrial design as, 'make this product cheaper, and we don't care how it performs or how it looks.' 'Make it as cheap as possible.' [n]

However, there were often instances in which strong shifts in tone accompanied oppositional pairings which were explicitly constructed by the speaker. Such constructed oppositions were not split, because the two terms of the opposition were clearly intended to be dependent upon each other for their meanings, as in the example below ([P/N] indicates an explicitly constructed, strongly positive/negative opposition):

80. EF: It.. Often if you show an engineer what you want to achieve, they will say that can't be done, because their experience has told them in the past, if they do a certain thing in a certain way it won't work. And that precludes that solution, instead of saying, 'this is what we need to achieve, how can it be done,' and opening up several routes as opposed to closing down the only one they know. And that's, that's quite a standard situation. .. That, it's been tried once before and it failed, and not trying to, particularly, or wanting to analyse why it failed and whether that's relevant now.

80. EF: It.. Often if you show an engineer what you want to achieve, they will say that can't be done, because their experience has told them in the past, if they do a certain thing in a certain way it won't work. [n]

80.1. And that precludes that solution, instead of saying, 'this is what we need to achieve, how can it be done,' and opening up several routes as opposed to closing down the only one they know. [P/N]

80.2. And that's, that's quite a standard situation. .. That, it's been tried once before and it failed, and not trying to, particularly, or wanting to analyse why it failed and whether that's relevant now. [n]

The parsing process generally required another two passes through the interview text. Though the tape recordings were not replayed start to finish during this process, they were referred to frequently at points where parsing seemed ambiguous. In these cases, attention was paid to intonation and the lengths of pauses, to make a judgement about which utterances were more closely or intimately linked in the informant's speech. At the conclusion of this process, the written texts became the primary representations for further analysis.

Successive Readings and 'Lenses'

In the analysis of the interviews, both the explicitly conveyed details of perceived conflict, and the nature of the language with which these details were conveyed, are considered important. However, the array of intertwined and interwoven themes, observations, hypotheses and assertions presented by each interview seemed overwhelmingly complex at first. An approach was adopted which relied on successive readings, each focusing on a particular attribute or way of looking at the text. Understanding the text sequentially through several different 'lenses' helped make the complexity manageable and made patterns more discernible. Paper copies of the parsed interview texts were printed out in landscape format, with extra wide margins and generous line spacing between segments, to allow ample room for annotation. The first reading through such a lens was the one described above as part of the parsing process, in which attention was paid to the informant's evaluative tone at different points in the text, and the points at which they employed narratives and examples. Viewed generally as speech acts, strongly evaluative portions of the texts are not neutral descriptions of reality, but represent the informant's attempts to persuade the listener of the particular value and insight of their point of view. The patterns of positive and negative evaluation and explicitly constructed oppositions can be used to mark the entities and relations (naming and framing) the informant has employed to accomplish this. Neutrally evaluated

portions of text are also of interest, since they present concepts and observations the informant takes as obvious and non-controversial.

Reading for Explicit Content

As Potter and Wetherell point out, reading a text for gist is a strongly ingrained habit. It was decided to make one pass through the text in this way, with the intent of highlighting or emphasising what appeared to be the important points. For this first, 'explicit content' pass, words and phrases were underlined so that the gist of each segment was apparent. This served two functions: first, it made these aspects of the content available with a fairly quick scan down the page, and secondly, it made it much easier to approach the text on subsequent readings in a very different way, without reverting reflexively to trying to capture what the text was 'about'.[61]

Reading for Figurative Language

A second reading was then made, concentrating on selecting and highlighting metaphorical expressions. A broad highlighting pen was used for this pass, so that there was a clear visual differentiation between the text selected on the two passes. Metaphorical expressions may be conventionalised to a greater or lesser extent, so that more of our language is metaphorical than we are generally aware of. This pass through the text was intended to highlight as many metaphorical expressions as possible, without making judgements about whether or not they were in some way relevant to disciplinary

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[61]Certain phrases in this section are used in inverted commas since, though they are not unusual ways of referring to the meaning of texts, they embody assumptions that have been challenged by the constructivist theories of meaning described earlier. Specifically, the term 'content' reflects the conduit metaphor, which conveys the idea that meaning is an objective entity contained in words. Similarly, referring to what a text is 'about' is problematic, since reading *and* writing involve interpretation and texts can be *about* different things to different people. However, because these expressions are conventionalised, writing which attempts to exclude them becomes stilted and difficult. The phrase 'explicit content' is used to refer to points the informant was explicitly and self-consciously making, which are grounded in widely-accepted, denotative (as opposed to connotative) meanings. It is used, and should be read, with an awareness of the sometimes misleading assumptions it embodies.

practice in product development. In this way, it was hoped that a heightened sensitivity to conventionalised metaphorical language could be maintained. It was definitely the case that, while focusing on highlighted text, metaphorical expressions that had initially been passed over were recognised on subsequent readings (with the satisfaction of having captured an elusive prey). This approach resulted in a great deal of text being highlighted, ranging from obvious, intentional metaphors to highly conventionalised expressions and prepositional phrases in general use. Subsequent passes through the text were made looking for patterns, and recurrent or highly relevant words and expressions were jotted in the margins. There was significant overlap between words and phrases that were selected during the two passes -- that is, in many cases the same bits of text were underlined as key to the gist, and highlighted as being metaphorical in nature. However, there were many cases where text which was not recognised as key to the gist, was still seen to be strongly and significantly metaphorical. The following extracts are from the parsed transcript of the EF interview:

31.2. And, at the other end of the ID spectrum, I think it's probably looking at maybe future's concepts or something, that's well and truly off the screen now. [p]

31.3. Looking at how things will be in the future, or sophisticated language issues and how families of products relate to each other, and actually not actual design but.. looking at very big pictures of issues. [p]

A reading for explicit content might have resulted in the following words being underlined:[62]

31.2. And, at the other end of the ID spectrum, I think it's probably looking at maybe future's concepts or something, that's well and truly off the screen now. [p]

31.3. Looking at how things will be in the future, or sophisticated language issues and how families of products relate to each other, and actually not actual design but.. looking at very big pictures of issues. [p]

[62]Note that this underlining is employed only for this example, to reflect what was done by hand with a coloured pen. In subsequent excerpts from transcripts, underlined text indicates emphasis by the speaker, as described in the transcription conventions, Appendix I.

In the second pass, for figurative language, the words in italics were highlighted:

31.2. And, at the *other end* of the ID *spectrum*, I think it's probably *looking at* maybe future's concepts or something, that's well and truly *off the screen* now. [p]

31.3. *Looking at how things will be* in the future, or *sophisticated language* issues and how *families of products* relate to each other, and actually not *actual* design but.. *looking at very big pictures* of issues. [p]

Some of the metaphorical language appearing in these segments reflects a highly conventionalised conceptual metaphor discussed by Lakoff, SEEING IS KNOWING. A more novel variation of this metaphor appears: that seeing beyond the obvious, immediate future is looking at things 'off the screen', as if beyond the range of radar. Finally, two more specialised metaphors appear, which characterise relations between products in terms of a 'family', or a 'sophisticated language'.

The assignment of particular text as key to the gist, or figurative in nature, or both, is not central in itself. The point being made is that by acknowledging my reflex to read for gist first, my ability to notice metaphorical language -- particularly that which is conventionalised -- was improved over subsequent readings.

Coding and Extraction by Categories of Explicit Content and Repertoire Elements

The analysis proceeded to two distinct processes of sorting, extraction and grouping. First, a short list of categories for explicit content was set up for each interview. These categories were based on the question subject and follow-up areas described earlier in this chapter -- that is, the major groupings of professional disciplines identified, and beliefs about the nature of work, success, and excellence in their disciplinary practice or in product development generally. Segments from the parsed transcript were marked and gathered into these categories. This gathering was not exhaustive -- in that not every segment was necessarily categorised; it was also not exclusive, in that a given segment

might be gathered into more than one subject category.[63] For example, the following were explicit content categories for the EF interview, each containing segments which were judged to have explicitly dealt with that subject:

- Marketing / Market research
- Engineering / Engineers
- Design Manager / 'Director'
- Industrial design / Designers
- Good results; excellence in product
- How I'm different

The second process of extraction and grouping was done according to the appearance of words and phrases which were putative members, or 'elements' of interpretative repertoires. This took the form of a sort of content analysis, whereby every occurrence of a particular word or words could be checked and marked for inclusion in a new category. Candidate words for searching and marking were determined by scanning the highlighted text, and also by observing the evaluative tone and force designations. Attention was paid to highlighted words which occurred in particularly strongly evaluative segments, or in segments which expressed a strong bipolar evaluative opposition. However, it was also interesting to look at words which occurred in neutrally-evaluated segments, since things truly taken-for-granted would be evident even in the absence of a strong rhetorical intent on the part of the speaker. The following are examples of repertoire element categories for the EF interview; each containing segments in which a certain word appears in some form:

- overall; high level; strategic; big picture
- understand(ing)
- subtle / obvious; complicated, complex; deep
- use; user; abuse
- quantify; specify; target
- value
- translate; filter; remove

[63] In the computer implementation used, segments could be placed in categories without disturbing their appearance in the transcript. Changes made to segments in categories (such as boldening of text discussed below) were automatically updated in the main transcript.

This second process of extraction and grouping exhibited many of the problems of content analysis described in the previous chapter. While words that occurred with striking frequency in the text were often of interest (such as the word 'understanding' in the EF interview), this was not in itself evidence that they were part of a coherent theme or interpretative repertoire, since the same word might be frequently or habitually used by that speaker in an unsystematic way, or in a way not meaningful with regard to the purposes of this study.[64] In almost every case, words which were deemed significant and interesting in certain instances, were used in other instances with a different sense or in a way seemingly unconnected to the emerging theme of interest. [65] Also, in many cases a theme involved a cluster of words, any one of which might have been used only infrequently, but whose significance arises from their relationship to each other in constituting a theme.[66]

Mapping of Themes

The final step in the analysis of the interviews was an attempt to recognise metaphorical themes which organised the various interpretative repertoires discovered in each informant's discourse. The approach to this made use of the two sets of categories containing linked extracts from the parsed transcript. These two sets, the explicit content categories and the repertoire element categories, were reviewed, and words and phrases which appeared to constitute emerging themes were made bold. The transcripts themselves were reviewed and additional words that seemed directly related to the themes were also made bold. Because all the extracted segments in various categories were

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[64]'Systematic' refers to use consistently, only in a certain context or with a particular evaluative tone; 'meaningful' refers to the ability to locate the meaning of the word as part of a broader theme that seems to play a role in structuring the individual's understanding of a conceptual area.

[65]UC used the word 'process', in one sense that was considered significant, with regard to a way of working that was consistently negatively evaluated. However, he also referred to manufacturing process and thought process -- uses that were neutral and not significant in the same way.

[66]For example, it will be proposed that AM's conception of a project is structured by metaphors of movement in a space of various dimensions. However, none of the individual terms involved occurs with great frequency.

dynamically linked, words and phrases which were made bold in a segment in one category, became bold in other copies of that segment as well. The result was that words 'belonging' to different repertoire element categories appeared bold in the same segment. This made the relationships of words within the repertoires more apparent, as well as the overlapping of repertoires that began to constitute themes. A brief example of this, drawn again from the EF interview, is provided below. The following segments are the contents of the repertoire element category, 'focused; aware'. Notice that 'focus' is mixed in its evaluation -- sometimes positive and sometimes negative. 'aware' seems to be evaluated only positively:

33.2.	Most industrial designers try to **focus** themselves around form, which to me is a very.. it's just a part of the **big picture**. They seem to be **form driven**, or **appearance driven**.	[n]
179.	EF: On the positive side of the engineering map, I've got Herman Miller Inc., engineering.. who I've worked with extensively. And they are a very **result-focused**, **design-aware**, **quality-aware** engineering group.	[P]
185.	EF: ... No, the **life-cycle** is a result of their **awareness**...	[p]
198.1.	And we were asked to redesign some of their deck hardware, because of **cost** reasons: too costly, too costly to manufacture; wasn't **user-focused** enough.	[n]
198.2.	It was **focused** on things like.. its robustness, its.. **longevity**, but often was.. unpleasant to look at, difficult to **use**, and they had completely missed that area of **quality**.	[(p)/n]

Words that are bold include variations of 'focused' or 'aware' -- the elements defining this category. Other words are also bold, representing connections to other repertoire element categories, including 'big picture', and 'life-cycle'. Below are the contents of the repertoire element category '(product) life, longevity, (long time scale)'. This conveys a sense of two meanings of 'longevity': one of how long the product lasts, and the other in connection with product life which is a characteristic of improving with use and age. It is this sense which is uniformly positively evaluated, and linked to 'awareness' and 'understanding':

48.1. Engineering, they would **base** themselves on product reliability, and manufacturing cost. .. Possibly things like **longevity** of the product. (I: Meaning how long it stays on the market, or how long the individual thing lasts?) How long the individual thing lasts.. .. and other things like ease of assembly, that sort of thing. [-]

147.6. Often product, from the instant you open it, turn it on, **use** it, it's wearing out and going backwards. But there is another type of product characteristic that it actually gets **better** as it gets **used** and older. And that is an indicator of **longevity** and.. [N/P]

155. EF: **Longevity**... durability... age-ability, which is the way things.. get **better** with age. [p]

155.1. It's an **understanding** of how -- this is a jump from **quality** -- It's an **understanding** of how the product has a **product life**.. after it's bought -- it's not that.. Most products are sold for that **instant**; their **specifications** are based on a particular **point in time**, and there is no consideration given to the actual **life-cycle** of the product, which is very, very often **very long**. [P/N/P]

183.1. And, that goes.. that comes from having.. designing and engineering and manufacturing products with **very long life-cycles**. .. [p]

185. EF: ... No, the **life-cycle** is a result of their **awareness**... [p]

198.2. It was **focused** on things like.. its robustness, its.. **longevity**, but often was.. unpleasant to look at, difficult to **use**, and they had completely missed that area of **quality**. [(p)/n]

It is in this way that connections are made between the elements of individual repertoires, and metaphorical themes linking them begin to become apparent. This is the nature of the analysis that has been applied to the five interviews, a summary of which is offered in the next chapter.

CHAPTER 6.

SUMMARY OF ANALYSIS RESULTS

Introduction

This chapter presents the results of the analysis method described in Chapter Five, above. Themes that were found to play an important role in each informant's discourse are discussed, and supported by extracts consisting of numbered segments from the interview transcripts. The numbers on the left side of each segment indicate its location in the parsed transcript. The codes along the right side of the extracts indicate the evaluative tone and strength assignment for each segment. Words in bold text in each segment were identified during the analysis as repertoire elements; they do not reflect emphasis by the speaker. Appendix I contains the full transcriptions, as well as listings of the repertoire element and explicit content categories for each interview. Appendix I also describes the transcription conventions regarding speaker emphasis and pauses, and provides an explanation of the evaluative strength codes. Interpretation of these themes and their implications relative to the key questions framing the work are discussed in Chapter Seven.

EF Interview

EF had recently taken a new position as a manager of design at a large office supply manufacturing corporation, co-ordinating an extensive programme of product development and redesign across a number of product lines. The strategy was to involve a number of prominent industrial design consultancies, and EF's responsibilities included the selection of these consultancies, and acting as liaison between them and the corporation's internal engineering and marketing staff. His career prior to this had involved approximately ten years in industrial design consultancy.

Understanding vs. Being Driven - The Big Picture

EF described his role early on as mediating between the various groups and maintaining an 'overview' or a 'big picture', of how the new products would 'come together as a whole'. A theme which figured prominently in this, and which recurred throughout the interview, was a distinction between a positively evaluated condition of 'understanding', and a negatively evaluated condition of being 'based' in, or 'driven' by a particular concern. [67]

10.1.	And the managers are **moderators** between all those three.	[-]
16.	EF: The manager's role, I see at the moment in my position, is to... **get the best out** of engineering, marketing and ID, but also get them working **together**.	[p]
16.1.	Trying to be the **moderator**, to be the person who **removes** ID's **unreasonable** requests -- and also engineering's unreasonable requests, and also marketing's unreasonable requests -- like having a product that effectively costs 20 bucks to make, selling it for 19.99.	[p]
39.	EF: Well, typically... I've had very little experience with design managers, and I think in my case the term, the word manager is way off track.	[-,n]
40.	*I: What word would you use?*	
41.	EF: **Director**. I certainly don't do any management of the design process at all.	[p]
41.1.	It's.. **selecting** the right consultants, having a very **big, overall picture** of how all the products or projects come together and look as **a whole**.	[p]
41.2.	Making sure that every issue is addressed, and **understood**, on engineering, marketing, industrial design..	[p]
45.	EF: The consultants ideally are self-managing, and the whole time you are looking at how their project **goes** with everyone else's project with.. **the overall picture**.	[p]

Marketing - Driven by the Quest for Sales

EF elaborates on his experiences with marketing and market research emphasising the negative side of the understanding-vs.-driven opposition:

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[67]Bold text in extracted transcript segments is used to highlight elements of interpretative repertoires identified by the author, for purposes of location and comparison. It does not reflect emphasis by the speaker, which is denoted by underlining and elongated vowel sounds; see notes on transcription conventions in Appendix I for details.

8.1. You find that the marketing people only want what their **customers tell them**.. and they are **retail cost-based**. [(-)]

21. EF: Then -- should we go to marketing? (I: sure) The typical marketing people, I am involved with, seem to **understand** that a well-engineered product and also a well-designed product go together to make a product that is easy to market, to sell. [p]

21.1. But the people I'm involved with seem to be very, very **cost-driven**. That one of their customers will come to them and say we need a product that has this **specification** and costs x. If it costs x plus 1 cent we won't buy it, it must cost x. [n]

25. EF: Their perception is that design adds cost, typically. And, there seems to be an inability to... to see that.. **non-quantifiable** characteristics add **value**. [n]

25.1. They're very much.. **feature set-driven**; that is **quantifiable performance driven**, because you can put it on the box and say, 'this is dah-dah-dah, and it costs less than the competition.' [n]

47. *I: {...} We talked here in terms of the key contribution. What each group.. how do the groups consider that they are doing a good job, in terms of success for their own particular activity or feeling that they are doing a good job? How do you think that they judge that?*

48. EF: I would say that marketing is **based** on sales volume. [-]

58. EF: I would say marketing is purely **sales-driven**; if they sell high volumes, it's a successful product. [(-)]

EF begins to elaborate on the sales-driven nature of marketing. He introduces having your 'own opinions' as a positive attribute, and describes the need to 'filter' inputs coming from marketing:

58.1. And, from my experience, it seems that their **opinions aren't theirs**, their **opinions** are those of the **customer**. ... [n]

58.2. Whereas the industrial designer will have their **own opinions**, independent of.. engineering and marketing. [p]

60. EF: It's difficult.. My conversations with marketing people go through.. a **filter**. Definitely. (I: Yeah? You impose a filter?) I impose several filters on marketing information. [n]

62. EF: Because it's.. highly.. **opinionated**. [n]

62.1. For example, it could be **based** on a **single** customer saying, "If you develop a product, I'll buy 1 million of these." and.. not based on anything else but one particular quest for one sale to a particular customer. [n]

62.2. And that product may have no **relevance** to the **overall** corporate design **strategy**. [n]

66. EF: Yeah, I try to **filter** it to get an **overall**.. **opinion**. [-]

66.1. I try and **filter** it to **understand** what motivates them to say, "Let's drop that product -- let's push this one," and that's often motivated by a single customer.. sale. [-,n]

Finally, EF is particularly damning of market research in terms of a lack of understanding:

234. EF: I can't remember these marketing people, but I remember the experiences. .. My experience with.. marketing and market research has been pretty much wholly negative. I can't actually think of a positive exception. Where... [N]

234.3. I believe that the reasons for the market research problems come from the people doing the research have no **understanding** of what they're doing: what product they're researching, why they're researching it. .. [N]

238. EF: They don't **understand**.. what will make a person **enjoy**, and therefore **buy** or **use** the product. .. [N]

239. EF: / the company failed to.. **understand**, or even spot that there was that cultural difference. [N]

239.2. The market research was taken as gospel and the product canned. When a negative result was given, they had no **understanding** of why... so that leaves the information as being worthless. ... [N]

Engineering - Driven by Manufacturing Cost and Minimum Risk

Extracts from EF's discourse regarding engineering employ a similar distinction between 'understanding' and being 'based' or 'driven'. These descriptions are initially presented in a relatively neutral way:

8.2. The engineers will typical want to make production as **easy** and **cost-effective** and simple as possible.. **risk reduction**. [-]

20.1. they often.. don't see industrial design as particularly beneficial to the product; they see that a well-engineered product as the **basis** of people's reason to purchase. [-]

20.2. A good example was last week, one of the engineers at my company said that all the products he had worked on had a return rate of less than point five of one percent -- and that was his **basis** of a good product, that it had a very, very low return rate -- that is, it's very very reliable. That's **his understanding** of a product. .. [(-)n]

48.1. Engineering, they would **base** themselves on product reliability, and manufacturing cost. .. Possibly things like **longevity** of the product. (I: Meaning how long it stays on the market, or how long the individual thing lasts?) How long the individual thing lasts.. .. and other things like ease of assembly, that sort of thing. [-]

Statements referring to engineering using the opposition of understand vs. based continue, and become more overtly negative in evaluative tone:

75.	*I: OK.. How about for engineering now? So the reliability, cost, longevity of product, easy assembly, that's how they....*	
76.	EF: That's how they.. judge.	
76.1.	-- but there seems to be the tendency that they want to **minimise risk**, make life **easier** for themselves; to make sure things.. manufacturing goes smoothly. ... (I: and why do you..) Cost and risk; **manufacturing cost** and **minimum risk-driven**.	[(-)n]
77.	*I: What about this filter metaphor again, do you find yourself filtering things in certain ways?*	
78.	EF: Yeah, when.. an engineer says, "This can't be done like this, it must be done like that," you need to **filter**, you need to **understand** why they're saying that. It will often be said, "oh because it's cheaper to do it this way," or, it's.. whatever.	[-]
78.1.	You've got to understand why they are saying that, and often they don't actually **understand** why they are saying it -- they are saying it for a different reason.	[n]
80.	EF: It.. Often if you show an engineer what you want to achieve, they will say that can't be done, because their experience has told them in the past, if they do a certain thing in a **certain way** it won't work.	[n]
80.1.	And that precludes that solution, instead of saying, 'this is what we need to achieve, how can it be done,' and **opening up several routes** as opposed to **closing down** the **only** one they know.	[P/N]
80.2.	And that's, that's quite a standard situation. .. That, it's been tried once before and it failed, and not trying to, particularly, or wanting to **analyse why** it failed and whether that's relevant now.	[n]

In the following segments, EF positively describes his response to the trait most strongly described in 80.1 above:

84.	EF: I, I jump over it, and say, 'how can we do this?' and work backwards from the result. .. And then, it comes to light that maybe it is possible.	[P]
84.1.	And try to **understand** why it failed in the past, instead of just saying, 'it failed.'	[p]

The final extract in this sequence comes from the description of a positive personal experience of EF's, in working with engineers. The term 'result-focused' stands in opposition to the description offered in 76.1 above. The terms 'design-aware' and 'quality-aware' are taken as elaborations on the positive theme of 'understanding', as the later narrative about the quality culture at Herman Miller, extracted later in this section, also indicates.

179. EF: On the positive side of the engineering map, I've got Herman Miller Inc., engineering.. who I've worked with extensively. And they are a very **result-focused**, **design-aware**, **quality-aware** engineering group. [P]

180. *I: What does result-focused mean?*

181. EF: It means they're not too concerned if it's a difficult process or **hard work** to get there.. but the result is the.. is the thing. .. [P]

Industrial Designers - Less Easy to Typify and Closer to the Big Picture

In describing industrial designers, EF indicated they were 'less easy to typify', and covered a broader range. The positively evaluated theme of a 'big picture' is continued:

26. *I: OK {..} so now typical industrial designers -- what do you have to say to characterise a typical industrial designer?*

27. EF: Well, I think they are.. less easy to typify; they seem to run the full gamut -- certainly in my experience, [p]

27.1. and the people I know, and even my personal **skill set** is.. does run from.. intuitive engineering, conceptual engineering -- at a **higher level** than most engineers -- through to what I would think is pretty **high level strategical** thinking.. for design. [P]

29. EF: It's simplistic -- I'd say it's linear <begins drawing> from intuitive engineering -- by that I mean **creative** engineering where one might think of different mechanical concepts or arrangements or layouts to get to the desired result. [P]

30. *I: So creative in that sense.. creative means what? Can you boil it down?*

31. EF: ... Doing stuff that's **not obvious**.. [p]

31.1. Instead of engineering **a** solution, it would be.. **creating** an engineering solution, or **creating** a mechanical solution, or a very **different** arrangement of.. a different format to get to a specific result. .. [n/p]

31.2. And, at the other end of the ID spectrum, I think it's probably looking at maybe future's concepts or something, that's well and truly off the screen now. [p]

31.3. Looking at how things will be in the future, or sophisticated **language** issues and how **families** of products **relate** to each other, and actually not actual design but.. looking at very **big pictures** of issues. [p]

31.4. And I think in-between those is regular ID, where one would work on form, or ergonomics, or.. whatever. [-]

According to EF, the understanding of complex relations and the big picture is within the scope of industrial design. However, he criticises a tendency to be overly-interested in form, with a return to the negatively evaluated theme of being 'driven':

33. EF: Yeah, I think, most industrial designers seem to.. have an **understanding** how.. an **understanding** of mechanics, as far as engineering; they seem to understand how things work, and how things are made; they seem to have an understanding, but they don't really **approach** that. [p]

33.1. They seem to have an **understanding** of the importance of ergonomics, but possibly don't really **approach** that. .. [p]

33.2. Most industrial designers try to **focus** themselves around form, which to me is a very.. it's just a part of the **big picture**. They seem to be **form driven**, or **appearance driven**. [n]

A Deep Understanding - Quality and Product Life

A prominent subsidiary cluster of themes was used in judgement of outcome and product quality. In these themes, value is manifest in non-quantifiable aspects and related to ageing and longer time scales -- more characteristic of an earlier time. The notion is introduced that a product's wear during use constitutes a sort of 'life'. The phenomena involved were 'subtle' and 'complex', and required a 'deep understanding'. In particular, he viewed marketing based on market research and competition on quantifiable specifications as destructive and antithetical to this understanding.

147. EF: A good result could be.. something, a product that.. sells well, or.. has mass appeal, which is a similar sort of thing. ... [p]

147.1. Maybe that it's... My judgement of good products are things that.. generally.. eclipse their, their **object** status. [P]

147.2. There is something about them that.. This is my definition of good, good design, is that the product -- it goes the same for people or pretty much anything -- that there is.. they are **more than the sum of their parts**; they have.. something more to offer.. than their **quantifiable**.. **specifications**.. .. [P]

147.3. And that doesn't mean they're cutesy or run around or squeak or something silly like that. But there is actually some elevated, non-pretentious, non-silly.. **value** added, to them. [n/P]

147.4. And that can be a very **subtle** thing, and it's often **not obvious** and it often only comes out many years after the product's even disappeared. .. [P]

147.5. And, there are some indicators in a product that help you see that there is or see if that product falls into that category, and often they are things like.. it...

147.6. Often product, from the instant you open it, turn it on, **use** it, it's wearing out and going backwards. But there is another type of product characteristic that it actually gets **better** as it gets **used** and older. And that is an indicator of **longevity** and.. [N/P]

148. *I: Have you got an example?*

149. EF: Like these two cases for example [two matte aluminium, large-ish brief cases]. They **wear** the **abuse of use**.. very well. And they actually look **better** as they matte down or get dented. And they look progressively better and better and better. [p]

149.1. It's similar in a way to... art. -- does that. .. [p]

149.2. And often, when that characteristic is deliberately put into design as one of the criteria, it often fails -- pretty much without exception it fails. [n]

150. *I: Why is that?*

151. EF: Because.. it's significantly more **complex**.. issue than most people take for granted. [P/(n)]

153. EF: No, I think it's a.. **deep understanding** of **quality**. .. It certainly doesn't appear to be in products that are **cost driven**. [P/N]

153.1. It.. used to be only attributed to.. natural materials, like leather, or brass, or **old-fashioned** materials. But.. it certainly does exist in plastic product. [p]

154. *I: Okay quality, deep understanding of quality.. (EF: Yeah) Can you give me any more words that amplify what quality means?*

155. EF: **Longevity**... durability... age-ability, which is the way things.. get **better** with age. [p]

155.1. It's an **understanding** of how -- this is a jump from **quality** -- It's an **understanding** of how the product has a **product life**.. after it's bought -- it's not that.. Most products are sold for that **instant**; their **specifications** are based on a particular **point in time**, and there is no consideration given to the actual **life-cycle** of the product, which is very, very often **very long**. [P/N/P]

157.1. And I think that there is a general tendency with all **modern** products, because of **commercial** constraints, that.. everything to do with the product: the process, the manufacturing, the **quality**, the materials.. are taken to an absolute minimum. [n]

161.1. No I primarily think that the Japanese were.. maybe not to blame for it, but it became apparent in Japanese product first, that it was very **specifically engineered** to compete with other product and beat them on **cost** and still have the same **specifications**.. [(p)N]

161.2. but, the **non-quantifiable** characteristics weren't there. Like, 'this lasts a **long time**,' wasn't there, or, 'you can **abuse** this a lot and it won't break,' wasn't there. [N/p]

161.3. It's that, the competition based on **quantifiable characteristics** -- which is prevalent in the automotive industry now too, where.. you can compare cars, you know, on exact horse power or fuel consumption or any other characteristic.. [(-)N]

161.4. but a car might lose out on those characteristics and be a hundred times **better** car than the one that it loses to, because its strengths are in **non-quantifiable** areas. [N/p]

The nature of a 'deep understanding of quality' is elaborated in the following extracts:

191. EF: Yeah and there was also.. . '**Quality**' still generally applies to **manufactured quality**, or **material quality**, as opposed to **user quality** or **design quality**. [(-)n/p]

191.1. And you can have products that are high **quality**, but low **design quality** and low **user quality**. [n]

191.2. That might be.. products you'd typically say they were spartan or utilitarian, and didn't take into account **user needs**. [n]

192. *I: These are products which have quality in a material sense?*

193. EF: That's, that's the general **understanding** of **quality** -- I'm saying that D. J. DuPree also had an **understanding** not only of **material** and **manufacturing quality**, but also **design quality**, **aesthetic quality**, **ergonomic quality**.. all the **non-quantifiable qualities** .. which design is one of. [n/P]

Segment 193 above refers to a previous narrative example, related below. This extract illustrates the 'deep understanding of quality' in the form of a sort of 'heroic myth'. The repertoire elements of 'life cycle' and 'understanding' are used in conjunction with long time scales and an identification of product quality with personal integrity:

179. EF: On the positive side of the engineering map, I've got Herman Miller Inc., engineering.. who I've worked with extensively. And they are a very **result-focused**, **design-aware**, **quality-aware** engineering group. [P]

180. *I: What does result-focused mean?*

181. EF: It means they're not too concerned if it's a difficult process or **hard work** to get there.. but the result is the.. is the thing. .. [P]

182. *I: Quality-aware, is that quality as in, basically the same sort of concept as you were describing before? (EF: Yeah) So they have a appreciation of that and they factor it in?*

183. EF: They have a very strong.. design and **quality culture** in the corporation. -- or they used to; it may be slipping now due to **commercial**.. reasons. [p,n]

183.1. And, that goes.. that comes from having.. designing and engineering and manufacturing products with **very long life-cycles**. .. [p]

183.2. Their products they have been making for thirty or thirty-five years (are) exactly the same, and have sold.. many. [p]

184. *I: How does the long life-cycle breed that sort of awareness?*

185. EF: ... No, the **life-cycle** is a result of their **awareness**... [p]

185.1. The **culture** initially started there from.. the... when it was a privately owned company, D. J. DuPree, he used to **personally** inspect every single.. he was the owner, CEO. [p]

185.2. He used to **personally** inspect every product they made and put his initials on it with a piece of chalk before it went out of the factory. And if it wasn't up to his **personal standard**, it was not let out. [P]

185.3. And that **culture** evolved from there; where.. the **people** were **responsible** for the **quality**, [p]

185.4. and it was also very **user**.. They had an **understanding** the **user** was their.. was ultimately their client, not necessarily the person writing the check. [p]

186. *I: Meaning that the client they were working for was ultimately the user?*

187. EF: Whereas in a lot of manufacturing organisations the client is the person who gives them the check, which is a different person to the **user**. .. [n]

188. *I: So, how would you describe Mr. DuPree or his value system?*

189. EF: .. He was -- not that I met the man but I met his.. (I: legacy?) Legacy, and some of his family. ... It was.. I think it came from **earlier days**, where.. **quality** and reliability were not necessarily **quantifiable**, but they were certainly selling points. [P]

189.1. And there was.. a generally high level of **integrity**. If you said you had a **quality** product, people believed you. .. [p]

189.2. Whereas if today a manufacturer says 'we have a **high quality** product', no one would probably believe them. [n]

In the above extract, the act by CEO DuPree of chalking his initials on each product, enabling it to leave the factory, could not be seen as an effective way to run a business in a literal sense; rather, it serves the important narrative function of connecting quality with personal understanding, integrity, long time-scales, and tradition -- which then pervaded the culture of the organisation. It is this cluster of values, consistent with the interpretative themes he has constructed, which EF has sought to reinforce through the narrative.

Industrial Designers - Skill Sets and Pigeonholing; Profiles and Prima Donnas

EF's earlier characterisation of types of industrial designer was presented fairly neutrally, apart from a weakly negative description of a tendency to be 'form-driven'. Two significant themes emerged later in the interview, which were imbued with strong emotion: a frustration with 'pigeonholing' of designers (within their own community) according to a widely perceived yet unfounded distinction between being 'creative', and being 'analytical' or 'technical', and a discomfort or even antagonism toward what he viewed as 'high-profile', 'self-promoting', and aggressive or competitive designers.

EF located himself early on, within the industrial design spectrum he constructed, as having a broad 'skill set':

27.1. and the people I know, and even my personal **skill set** is.. does run from.. intuitive engineering, conceptual engineering -- at a **higher level** than most engineers -- through to what I would think is pretty **high level strategical** thinking.. for design. [P]

31.6. And I think I'm reasonable at all the way along -- I'm probably more like that actually. <draws a kind of dog-bone shape covering the whole spectrum, larger at both ends and narrow in the middle> (I: Okay) -- which is very unusual, I think. [p]

Much later in the interview, EF returns to the subject of ability and skill set, and how they are restrictively viewed within the design community. What he describes as 'pigeonholing' is evaluated strongly negatively.

216. EF: .. Ye-es. And I think it also comes from.. some industrial designers .. having, or not knowing any engineering or having any **understanding** of process, manufacturing process, and not wanting to know at all. [N]

216.1. And developing.. highly unrealistic.. unmanufacturable solutions and expecting engineers to try and make it work. .. [N]

216.2. So in that sense industrial design, the reputation of industrial design.. is a little like that. [n]

218. EF: Yes. And there's another aspect of industrial designers who.. deliberately don't show their **technical ability**, because it's seen to diminish their **creative ability**. [(-)n]

219. *I: Really.. diminish their creative ability...*

220. EF: Sure. For example.. if there's two industrial designers with the same experience, and the same level of **creativity**, same level of **skill**, and one of them can use Pro Engineer and the other can't, one is a technician and one is an industrial designer. [(-)n]

228.2. It's that... the **technical ability** is.. considered **analytical** and **creative ability** is considered **non-analytical**, and they are considered .. opposing by.. I don't know, Freud or somebody (joking). .. And that's clearly not the case, in my experience. [-,N]

228.3. And people I know, some of the most highly **creative** people I know are mathematicians. That sort; and have a razor-sharp **analytical** mind, and are significantly more **creative** than most designers. [P/N]

228.4. I think it's also to do with.. it might be an Anglo-Saxon belief that.. you can only be good at one thing. .. But you're.. certainly an English characteristic, that you're good at that, and so that's what you do. And anything that is considered remotely.. different to that core activity is considered negative. [(-)n]

An early theme of achieving a 'high profile', as part of how most industrial designers judged success, was presented in fairly neutral evaluative terms:

48.2. And I'd say that industrial design would primarily rate themselves on how.. on public acceptance of the product, and also.. its **profile** -- whether it gets publicity or not, whether or not it excels at all. [-]

48.3. If they can get, if it becomes a **high profile** product, even at very low volumes -- which means it's a marketing failure, and even if it were an engineering failure, it could still be an industrial design success. [(-)]

49. *I: When you said high profile, in what sort of context? Where, in what form?*

50. EF: It would be a **high profile** amongst the industrial designers' peers. [-]

54. EF: There is a general.. I don't subscribe to this theory at all, but a lot of people subscribe to the theory that having something that is **commercially acceptable**, and something that has high intrinsic **design value**, are exclusive to each other. [(-)]

54.1. And I don't.. I think they are mutually inclusive. Some people don't really **understand**, other people think they are exclusive.. to each other. [p,-]

The neutral or weakly negative evaluation of 'high profile' later becomes much more strongly negative in terms of 'nasty', 'aggressive', and 'prima donna':

117. EF: / So what I was saying.. the pros and cons of CompCo Industrial Design Group. I put, in this question, I put the positive and negative aspects of different people, I ended up with CompCo Design Group on both sides. [-]

117.1. Basically, I think the ID work that comes out of CompCo is totally first class, and some of the people there are very nice people and very nice to work with. [P]

117.2. Some of the people there are extremely difficult to work with.. bordering on impossible. So that also means it's in the negative side of the map. [N]

118. *I: And, you were going on about why it was a 'nasty' process..*

119. EF: The process to get to the good work is a very tough and aggressive and even a nasty process. It's very **individual based**, it's **competitive**.. [N]

120. *I: You said individual based? What does that mean?*

121. EF: It's, certain **individuals** are.. put forward as **prima donnas** -- it's a **prima donna culture**, and that's actively.. pursued, **pushed**. [N]

121.1. And that means that... only very outgoing, or aggressive, or **ambitious** people get their say, whereas someone who may be **not so ambitious** or aggressive or.. extrovert, but who is nonetheless very **talented**, will not get their way. [N]

121.2. So it eliminates.. it puts the balance in favour of.. the **ambitious** as opposed to the **talented**. [N]

In following up on his use of 'contempt', above, EF returns to the earlier characterisation of 'high profile', which is now evaluated much more negatively:

242. EF: Typically, if you look at the linear arrangement of different types of designers from **pseudo-mechanical** guys to highly **creative** futurist-conceptual guys, often the groups along the way hold each other in serious, very serious contempt. [N]

242.1. A typical one is, 'oh he is just a **stylist**' or 'he's just an **engineer**, he can't **create**.' And that also comes back to the point I had before about.. very few people, or the way people are pigeon-holed into <yawns> having only one **skill set**. ... [N]

243. *I: Why is it so imbued with emotion? 'Contempt' is not like, 'I disagree'..*

244. EF: It's because designers generally, architects or whatever, my experience is that they generally think they can do everything.. and everything better than everyone else around them -- better than any **specialist**. Which is clearly not the case. And.. [(-)N]

244.1. Most industrial designers think they are great writers, they think they're great artists, they think they're great engineers.. [N]

244.2. And I think probably even architects are even worse than that -- they really think they can do bloody-well everything. [n]

244.3. And I think that comes from.. by the nature of designers and architects, they are.. often.. **generalists** with a very **wide range** of experience, in comparison to other professions. .. [-]

244.4. So they actually think they are good at everything. .. [n]

245. *I: How does that fuel contempt about other..*

246. EF: I think the contempt comes from.. **egos**, and jealousies, and... competitiveness [N]

246.1. -- and it comes from also.. it goes.. I think it comes back to the point of how designers rate a successful product as something that is **high-profile** and not necessarily of **good quality** or high volume sales or **commercially** successful, or any of those other reasons for success. [(-)N]

246.2. That is, it's back to did it get on the front cover of ID magazine, and that tends to fuel a lot of.. **egos** and jealousy. .. [N]

Finally, when the informant was pressed about his *own* use of the word 'contempt', an apparent contradiction appeared between his description of himself as having a broad skill set, and his linking of contempt within the design community to the misguided belief of generalists thinking they 'are good at everything'. He accomplished this by recourse to the repertoire of 'understanding':

247. *I: Now when you wrote 'contempt', that was coming from you. (EF: Sure) So you were experiencing contempt; you are not outside this tradition.. (EF: No, not at all. I..) Even though you are covering the spectrum fairly broadly..*

248. EF: I hold **self-publicising** industrial designers in extremely high contempt. You want me to name some names? {..} [N]

248.1. And there are some industrial designers who have never, ever had a project in.. a product in production: they have zero **understanding** of product at any level, and they still manage to be very **high profile** people, whose opinion is held in great esteem by those who are.. either less knowledgeable or.. on some sort of bottom-touching, back-patting exercise. [N]

Summary

EF's discourse was strongly structured by an opposition between a positive condition of understanding, based on a big picture and an awareness of many dimensions of product quality, and a negative condition of being more narrowly based or driven by a particular interest or concern. Understanding is achieved through attention to those things that cause a person to use, enjoy, and therefore buy a product; more narrow, driven views must be filtered in light of this. Product quality was understood in terms of an attitude toward use and wear as a sort of life, as opposed to one which focused solely on quantifiable specifications and the moment of sale. Themes which dealt with specific groups also used the understanding-vs.-based distinction, though additional strongly negative themes were employed regarding pigeon-holing, high profiles and self-promotion within industrial design.

Table 6.1 gives a summary of the significant interpretative repertoire elements identified in EF's discourse, and clusters them in groups which reflect these unifying themes. The repertoire elements are classified according to whether their use was evaluated positively or negatively, or with a neutral or mixed tone in the majority of cases. Listings of the various repertoire element categories are contained in Appendix I.

Table 6.1 EF Repertoire Elements, Clustered by Emergent Themes

Positive Dominant	***Neutral or Mixed***	***Negative Dominant***
understand(ing) awareness		based driven
big picture overall, strategic come together relate as a whole high level	focus filter moderate translate opinion	
deep understanding quality value subtle, complex personal standard integrity earlier days user	engineered	quantifiable specific specification target commercial (pressures)
product life longevity better with use, abuse (long time scale)		instant moment of sale wearing out
creative not obvious opening up routes		closing down only route
culture of talent support commercial (acceptance) high volume	push elevate	individual ambitious prima donna ego force high-profile
skill set creative analytical, technical ability		pigeon-holed

UC Interview

UC had been employed in an industrial design and product development consultancy (ConsultCo) for approximately one year, following completion of his post-graduate degree. He described himself as an industrial designer, specialising in furniture. Though his specialised training in design had spanned a period of seven years, his professional work experience, particularly with other groups, was more limited. He reported that his stereotypes about engineers had been tempered as a result of his experiences working with those at ConsultCo, though in some ways they had been reinforced by his experiences with engineers at a client organisation, a large furniture manufacturing corporation (FurnCorp). However, he seemed to relate this more to negative consequences of being in a large corporation than to membership in a disciplinary group, since he felt in some ways a more congenial relationship with the ConsultCo engineers than he did with FurnCorp industrial designers. Though UC reported having had very little direct experience working with marketing professionals early in the interview, he later proceeded to offer a number of strongly-felt characterisations of marketing as the interview progressed. He felt that the marketing point of view was in many ways more alien, and more antithetical to what he was trying to achieve as an industrial designer.

UC employed a number of interrelated themes in describing his perceptions of different groups and excellent work. Often his negative characterisations of other groups were in opposition to things he described positively with regard to industrial design. Early in the interview, UC described what he felt was an inevitable tension arising between industrial designers and engineers:

38. *I: So, when I talk about a typical engineer..*
39. UC: Yeah, there is a stereotype that they're kind of, a bit boring. Slightly kill-joyish. [n]
41. UC: Well, (exhales).. I mean, it's probably partly a problem with industrial design, because industrial designers tend to always, sort of try to design with the processes and tools that are.. just there, but they're not really.. in the workplace in a proper sort of working sense. [r,-]

42. *I: Not main-stream?*

43. UC: Well, you know, we're always trying to sort of push.. **push** the engineers to do sort of.. 'dual moulding', and you know, that sort of thing. (I: co-injection) Co-injection mouldings (both chuckling) and all that sort of, [-]

43.1. but it's not <u>really</u> there -- it's kind of an emerging technology. And we're always going "no, it's really cool, we should use this stuff!" {..} [-]

47. UC: .. Well, yeah; they're (industrial designers are) always trying to **push** the use of new technologies and stuff... perhaps new materials. .. And like technologies would be.. manufacturing technologies as well. [p]

48. *I: So, that came out when you were talking about 'a bit boring' aspect of engineering -*

49. UC: Yeah, because you get that on the flip-side (of industrial designers' pushing). The engineers tend to sort of go 'who-oa'; actually sort of, 'yeah, that does exist, but you have to go to Germany' or something. [-]

Industrial Design - Various Aspects of 'Intelligence'

UC broadly characterised good practice in industrial design in terms of 'intelligence', which had a number of aspects that are developed in the following extracts. The first distinction was between being intelligent, and being 'crass' or 'pretentious':

73.1. I think a lot of industrial design gets a bad name for itself a lot of times, by people who.. don't have that much **experience**, or they're not that well-trained, and just come up with quite <u>crass</u> things. [N]

74. *I: OK, so we've got 'crass' things at one end.. is it kind of a spectrum, or is it more complex? --pretty linear? (UC: yeah, pretty linear) What's at the other end?*

75. UC: Well, sort of **well thought-out**.. **intelligent**, but without being.. Yeah, I'd say '**intelligent**' was down at the good end, and 'pretentious' is down at the 'crass' end. [P/N]

80. *I: {he would have a chance to tell me about the people he respected} Tell me more about what 'crass and pretentious' designers or objects are like?*

81. UC: Well, it's just kind of like really **<u>obvious</u>** stuff, that they think they're being really clever about. ... ... [N]

82. *I: Obvious, like, it was your first idea?*

83. UC: Well that kind of thing, yeah. ... Yeah, I suppose **stereotypes** come into that a bit, **cultural stereotypes**. [n]

87. UC: I think '**observation**' would come down at the good end, like in a really kind of **pure** sense. -- in a **<u>real</u> observation** sense. [P]

88. *I: Meaning what?*

89. UC: Well, probably sort of **<u>cu</u>ltural observation**. [p]

93. UC: Yeah, I think the counter to **observation** is kind of that **obvious**, 'first idea' thing, where it's just.. just **resorting** to sort of **stereotypes**. .. [n]

Good practice is further characterised in terms of 'bringing things in' from other fields and making non-obvious connections. The opposite of this was the condition of being 'in a rut':

111.1. It's like, when people get into that sort of self-feeding state, self-replicating, and **nothing comes from outside**, and it just kind of.. you just **get into a rut** basically. You only, [N]

111.2. for example, there are industrial designers, they only know industrial design, they only read industrial design publications. [n]

113. UC: Yeah, well, the whole point is.. you're sort of **bringing** stuff **in**, and a lot of the point of industrial design as I see it, and ... Probably with engineering as well, but my experience of industrial design is there's a lot of that, but a lot of industrial design is like **lateral thinking** and stuff like that. .. [P]

113.1. Which as far as I mean it, you've got to have quite a kind of.. worldly **experience**. In a way.. not in a sort of pretentious way. [P/n]

113.2. You know, the ability to see something in a completely different field or profession, or anything, and just go.. (gesture of plucking something) And be able to **draw parallels** and things like that. That's quite interesting how. [P]

115. UC: Yeah, but, it's the **intelligence** when it's **not immediately apparent**; it's slightly.. **oblique**, and you think.. It might not be an actual object or something, it might be a system.. [P]

115.1. you might **see a parallel** between -- I don't know, the way doctors process patients, and.. I don't know, you might be working on a project for processing letters for the Royal Mail, and think.. yeah, some of this stuff works really well. [p]

Another aspect of 'intelligence' was a willingness to experiment, explore, and push. This was done, however, with a particular attitude toward 'boundaries' -- not disregarding them, but being inventive within them:

180.3. I don't know, maybe that comes a bit back to **intelligence**.. I mean a lot of industrial design is working within **bounds**, but **intelligently** I think. That's probably what.. apart from the kind of **intelligence** to **observe** things in a **pure**, **child-like** way.. ... [P]

180.4. Often a lot of good industrial design comes out of the fact when you're really **constrained** -- that's when you have to start being really **inventive**. You know, really kind of **explor**ing the **boundaries**; and you go 'oh wait a minute, there's kind of an opportunity in this top left-hand corner if we just sort of **push it out** there, but it's within the **bounds** we've been given and engineering's going to be happy', you know what I mean.. [P]

180.5. they might suck their teeth (but).. [r]

181. *I: So, working within the bounds is being constrained, but it can be a healthy thing?*

182. UC: Yeah, I think that's possibly.. probably another area where good and bad industrial designers are probably separated. [p/n]

182.1. It probably goes back to **stereotypes** as well. Sort of like, a **willingness** to just kind of **push it** a bit. [p]

182.2. Because, if you're only given three colours to paint with, then you start having to be quite **creative** about what you do; you have to start **experimenting** and stuff, you know what I mean? Whereas if you're just given a whole paint box, then.. <'phuu'>. [p/n]

182.3. And the **constraints** might be cost, or.. materials or something. [p]

183. *I: So that a bad, or crass, pretentious -- not that aspect, but that pole of bad industrial designer is correlated with not having constraints, or not recognising constraints?*

184. UC: .. Well, kind of, not being.. not having the ability to be **inventive** within **constraints**, I think. That's kind of where the wheat gets separated from the chaff, I think. [p/n]

A third aspect of 'intelligence' was related to observation, and a willingness to assume a naive or 'child-like' attitude. This type of observation was essential to good practice, as a characteristic of lateral thinking and a way of overcoming preconceptions:

190. UC: Yeah, just trying to **look at it** from a **different angle**.. which is part of what.. what I understand industrial design to be, which kind of comes back to that quote about **child-like**.. [P]

191. *I: Tell me about 'child-like' -- I was going to ask you about that..*

192. UC: Well that's... it's kind of.. to do with **observation** and stuff; kind of the ability to.. **look at** things without **pr(econceptions)**.. [p]

192.1. basically everybody grows up and they have **preconceptions** about stuff. I mean, you can't help but gather **preconceptions** about anything. -- that's just kind of the way the mind works. [-]

192.2. But, it's almost like the ability to try to be able to -- you can't do it perfectly, but try to **look at** things without these **preconceptions**, or try to at least be aware of your own **preconceptions**, so you're aware that they're colouring your perception of a project. [p/n]

192.3. -- in a way that a **child** will **look at** something. You know there are those **lateral** thinking tests, like the one where people draw something like this <draws on the pad> {..} or something, and you ask adults what that is, and they'll say 'oh, that's a hat', but then you ask a **child**, a **child** might say something like 'oh no, it's a snake that's swallowed an elephant', you know what I mean, that kind of thing (both chuckling). [p]

192.4. {..} Trying to shed things like that when you see a shape like a hat, and you immediately think 'hat'.. thinking, 'well, perhaps it's not a hat -- perhaps it's something else'. [p]

193. *I: OK, that's the child-like, getting away.. without preconceptions.. that's when you mapped out constraints in the plane of the table and then you came in from a different angle..*

194. UC: That kind of thing, possibly, yeah. Just being able to **look at** what you've been given and just think.. well, yeah, why do we have to stack them on top of each other -- why can't we just, build them in some other way? You know, and it's still within the **constraints**, but then you.. Yeah, just trying to shed these **preconceptions**. [P]

196. UC: I don't know.. well, I would say, especially at the RCA, being trained, when you're doing the RCA course, it's not really about designing objects at all. It's more probably about **lateral** thinking, which partly comes into.. And **lateral** thinking does have quite a lot to do with a certain **child-like** quality of **looking at** things, you know; being able to.. [P]

196.1. you get those **lateral** thinking kind of conundrums, like.. when, a car arrives at a house, and a man goes bankrupt -- what's happened. And people are thinking of a real car and a real house and stuff, but the trick is it's a **lateral** thinking thing, and it's actually a game of monopoly (both laugh)..

197. *I: So, the training you got in ID.. (UC: We didn't get stuff like that..) But there's a similarity..*

198. UC: In some respects, yeah, I would say so. Or, you try to.. encourage that kind of thinking. Or try to be aware of the fact that, when you get given a project, try not to immediately pick the **obvious** -- you know, immediately jump on it. [P/N]

200. *I: So, here comes the leap.. that in a way what you learn in the ID course is analogous to the way you learn to ask questions to unravel those stories.*

201. UC: Yeah, I mean, the nice thing about ID is they're not particularly trained; the RCA, I think on purpose, doesn't train industrial designers as engineers, because (I: You mean, doesn't try to teach them to) doesn't try to teach them engineering, because we then.. retain the ability to basically **ask stupid questions**.. like, 'well, why can't you do this?', know what I mean? [P]

201.1. Where, an engineer is saying 'we have to do it this way', and you can say, well why can't we just kind of.. wouldn't that be the same thing? But, if you've been trained as an engineer, possibly trained to think a particular way, you wouldn't necessarily **ask** that question, because you'd know it was a **stupid question**. ... [n/P]

Marketing - Re-active vs. Pro-active, and a Copy-cat Attitude

UC began to make a number of negative characterisations of marketing, which he described as fundamentally re-active, in contrast to the concepts he had used to characterise good practice in industrial design. He was highly critical of a similarity he

observed in many products, which he attributed to their being, 'marketing-led'. This resulted in industrial design based on 'styling', involving little 'intellectual process':

127. UC: Well, I think the problem industrial design has with marketing generally, is this thing we wrote before.. we're generally trying to **push** the use of new tools and technologies, so.. in that sense it's more **pro-active**, and the trouble with marketing is that it's just purely **re-active**. [P/N]

127.2. Unless it's like a logical progression, marketing tends to have a real problem with that. .. And, unless it's like.. more functions, and they can go 'well yes, we can see that, because our trend analysis has shown us that, <'in like a decade'> everyone will be buying machines with more functions.' [n]

127.3. Also, I think that... marketing for me is a bit of a bugbear, actually, I don't like it that much. [N]

127.4. Because.. it bugs me that, like, you go into a shop to buy say, a good example would be like a TV or a video recorder. Most consumer goods are actually pretty good examples of why I don't like marketing. Say you go to buy a TV.. basically, they're **all the same**. You have a choice, you have one colour choice or maybe two: it's black, or it's grey. .. [N]

127.5. There's a **set** format and stuff like that -- most of them are **copy-cat** products, because they go, 'oh, they've brought out this thing, and it's wonderful, and it's selling, so we must have one'. [N]

127.6. It's like, we're doing this project with FurnCorp at the moment. You know, Herman Miller brought out that 'Aeron' chair? And like, that's what we're doing -- we're designing basically a **copy-cat** product. Because, Aeron came out, and everyone went, 'yeah it looks nice, but', they scoffed at it that it would never sell -- they'll just sell it to small niche markets, architects, and interior specifiers or something. But actually, it took off really well (I: oh, it's selling) It's really selling, and they suddenly went, 'oh fuck, well, why don't we have one of these?' <chuckling> Why haven't we **explored** this n-niche (mocking tone) or whatever, which was a lot bigger than they expected it to be. [N]

128. *I: This relates back to something that's typical about marketing?*

129. UC: I think so, yeah. It's going back to it being **reactive** and stuff. [n]

129.1. And, a lot of products look **the same** because things like dimensions are very.. a dimension of a product is very **marketing-led**. [n]

129.2. -- and it might be a matter of millimetres, but you get.. often when you get a sort of table of products, they'll sort of mark it, {..} for 'smallness', and 'power', and stuff like that. [n]

129.3. And often, you can't **experiment** much with the form. [p]

129.4. If you **look at** laptops and things for example, they're all virtually **the same**, because everyone is just trying to get the walls as close to the internal components as they can to make them as small as possible. [n]

129.5. I mean, it's literally a matter of millimetres because, like these things get compared in tables, and you know, if your product overall is three or four millimetres bigger, it's not as small as the other one, so it doesn't win the 'smallest laptop'.. tick (scornfully), and I mean it's really like that, it really is -- it's as pathetic as that. [N]

At this point, UC began to contrast this marketing-led similarity with what made industrial design interesting for him. These included experimentation and intellectual process, as opposed to styling and 'just churning it out':

129.6. Which, you know, it's a bit **stifling** really, isn't it, because (chuckling) everyone's using **the same** technology, (I: right, so it leads to convergence, sameness) [n]

129.7. Yeah, but, I don't think it has to be like that. You know, you get, Phillipe Starck's been doing some work for Thompson, and he's done some really **interesting** stuff -- I don't know whether it sells (I: like the one that smiles) and the one that's made of compacted chipboard -- stuff like that, you know, sort of.. **experimenting** a bit. [P]

269.1. A lot of this comes out of.. we've done quite a few.. we've done a mobile phone project, we've got this chair project, and that sort of thing; it's these kind of **copy-cat** projects, where basically... I don't.. projects that don't really involve much.. **intellectual process**, I don't find particularly **stimulating**. [N]

269.2. Ones where you're.. basically just doing.. you're just **styling**. Which is... well, personally speaking, I think a lot of other designers have a real problem with that as well -- where people just think.. oh, designers; they just **style** stuff. They just make pretty boxes for things. [N]

270. *I: So this is then, they come up to you and say, here's what we want..*

271. UC: Well, with the mobile phone thing, Motorola just brought out that little 'Star-Tac' thing; they brought out a little clamshell thing, it's kind of like about.. that big -- it's probably not much thicker than that, but it folds open. [-]

271.1. And it was like, 'well, Motorola brought out one, and we want to have one, but it's got to be.. it can't be bigger than the Motorola.' [n]

271.2. And it's like <exhales> (frustration). And then, the **constraints** get <u>really</u> stupid, because Motorola has got it that small because the tolerance between the components and the walls is.. <u>ab</u>solutely minimal. They've virtually just vacuum-fitted the components, sort of sucked some plastic around it. And there's <u>no</u> <u>way</u> you could get it any smaller [N,-]

271.3. -- there's virtually nothing you can do, because.. it's like that because the components are like that, and they're (new client) using **the same** components, but they want it to be like that but different. And it's like, fuck sake! (I: different but not bigger..) But, not <u>that</u> different.. (both) a-ah. [N]

271.4. That's all rubbish. Aw, fuck sake. ... So, yeah, I don't respect that at all, and that is detrimental; you're just **churning it out**. [N]

273. UC: ..Most of that is sort of, the **marketing-led** bit of it. [n]

273.1. You know, it's that thing about si-ize, and weight. .. They decide they want a **similar** product, and it has to compete, so it has to be virtually **the same** size and weight; you know, it comes down to this sort of slight difference in the casing, and that's got your logo on it. .. [(-)n]

274. *I: So what's the opposite of working in that way?*

275. UC: Well, yeah, this would probably come under the general title of '**re-active**'. The opposite would be more **pro-active**. ... [n/p]

276. *I: So, describe the essence of pro-active work*

277. UC: Well, there's generally more **intellectual process** involved, I think. [p]

278. *I: What kind of intellectual process?*

279. UC: ... Well, yeah, maybe it's.. when the balance kind of shifts from being a **copy-cat**, **me-too** type of product, to one where they.. kind of want something with a more, sort of -- what do they call it.. USP, unique selling point. [N/p]

Another theme UC brought out in differentiating design and marketing had to do with an objective of 'paring down' that motivated good industrial design, which he saw marketing as tending to subvert. This was manifest both in terms of the product outcome, and in a certain wordiness or jargon in process:

125.1. I mean.. it's possibly from my art training, which is still based on, like Bauhaus, I think, you know, **paring things down**. -- you don't get that so much in American products actually, going back to America. {..} The European tradition is **paring stuff down**, **cutting them back** and back until you're at the **essence** of it. It's quite **pure**.. [p/n/P]

125.2. I mean this is generalising hugely. But, a lot of products in the US you find, it's almost like they couldn't decide what ideas.. not to put in, and what ideas to keep in, so they just went 'aw fuck-it' and just put them all in. [N]

125.3. The automobile industry for example, it's just mad. It just, it has everything in it.. you **look at** a car body, and it has five different references to different things. You can't quite decide whether they want a sort of flowy shape, or, oh yes but they [also included this other thing].. [n]

125.4. Maybe it's **marketing led**, I don't know. [n]

285. UC: Well, you tend to use more.. kind of like, jargon, I think ... You get it quite a bit in FurnCorp; we're 'leveraging' (sarcastically), which doesn't really have a parallel meaning (both chuckle) -- I mean, it's an understandable word, but it doesn't really.. it's a sort of made-up word, really (chuckling). [n]

288.1. I would imagine engineering, to a degree, but.. it's probably easier to fake the marketing rubbish. {..} Well, it's just sort of, it's just wordy, generally. ... [N]

288.3. We, were like desperately.. designers are desperately trying to **pare the issues down** to the **basic** issues, like OK, right. We'd get this big sort of.. statement of what we wanted to achieve, and we'd say right, well basically, **essentially** what we're trying to do is this. [p]

288.4. And then he'd kind of go 'blah blrrrah blah' and blow it back up into big words, and we were trying to shrink it down into **understandable** and usable phrases, and he was using words like 'leverage', and.. [n]

288.5. Have you ever seen that FurnCorp advert -- what was that guy called {..} he came up with something amazing.. "leveraging the evolution of the self" (I: oh gawd {remembered seeing it on a video} {...} and you think, what does that actually mean? [n]

Finally, by returning to the early theme of 'pushing', UC asserted that marketing was more alien and 'distrusted' by design than engineering. He felt that both engineering and design had an interest in pushing, though in different ways, while marketing was interested solely in 'the bottom line':

159.2. I think a lot of the mistrust from marketing actually comes from the fact that.. ... more than almost any other.. in fact, I'd say that marketing is the most distrusted, mainly because I don't think marketing people don't come from any kind of art or technology, or any kind.. of background, generally | [N]

160. *I: so they're even farther -*

161. UC: Aw they're way off -- they're just, you know.. just interested in the bottom line, which.. yeah, is important -- we all live in the real world, but.. there are some things.. worth doing that aren't... or it's worth doing some things **better** for slightly less return, just for the sake of doing them. [N/P]

161.1. I think a lot of engineers would agree with that.. (I: Engineers would probably agree but marketing people wouldn't?) Marketing absolutely not, as far as I know. -- unless, they could demonstrate some sort of marketing survey that, you know, if you made this thing out of metal, instead of.. plastic sprayed with metallic paint, you'd sell more.. unless they had actual demographics or something, they probably wouldn't go for it. [P/N]

167. UC: Yeah, I mean, at least engineering and most of.. design, engineering sometimes and design sometimes, part of its business is **pushing it**. Designers sometimes **push** engineers, and engineers sometimes **push** designers. ... [P]

168. *I: And marketing's just..*

169. UC: Well, it's not really marketing's fault, I mean, marketing's totally **reactive**, that's just the way it works. [r,n]

Being Open and Bringing in, vs. Being Stuck in Your Ways

When UC discussed groups other than marketing, his negative characterisations tended to be in opposition to other aspects of what he characterised positively in industrial design -- particularly being 'set' or 'fixed' as opposed to 'open' and 'bringing in':

22. UC: ...I mean pragmatic in a kind of human factors sense. They're more.. **set in their** human factors **ways**. When I write 'pragmatic', I'm thinking of Robert Parker, who's quite sort of **straight down the line**, [n]

22.1. where as Jeremy is sort of more realistic -- where he kind of.. he's got more **experience** and he tends to **realise** that a lot of it.. it's not really **cast in stone**. [p]

23. *I: So he's more flexible in the way he applies human factors.. would you say more accommodating?*

24. UC: Yeah, I would, but.. yeah, but without losing sight of what he does; yeah, I'll put '**flexible**'. [p]

54. *I: Oh, well good for you. So, let's split off FurnCorp engineers here.. so tell me about a typical FurnCorp engineer..*

55. UC: I mean, like we've got this project to do, the FlexWork project: it's movable, and that's meant casters, or.. sort of movable and liftable, sort of like that. [-]

55.1. But they've got this **mind-set** that all their furniture has to be made with.. like minimum three quarters inch MDF and... inch and a half legs.. one-eighth thick gauge in it. Absolutely solid as hell stuff. Really, really heavily industrial. They build stuff to last forever basically -- once they sell it, they don't want to mend it. It's a strange **mind-set**; [n]

58. *I: So, how would you describe.. what adjectives would you use to describe this sort of attitude of..*

59. UC: ..'**Blinkered**', probably.. yeah. ... **Staid**. [n]

60. *I: What would be the opposite?*

61. UC: ... Well, just more **open** to suggestions.. yeah, just a certain **flexibility**. [p]

UC returned to his characterisation of intelligence -- this time, in connection with experience. Experience could have either a positive or a negative effect on one's ability to be open, depending on intelligence:

95.1. It's... if someone's got enough.. **knowledge** and competence, and **experience**, and confidence in their **experience**, of their profession.. they're more **open** to **playing around** with it; they're more **open** to **change**, they're less precious about their.. [P]

96. *I: <scribbling> confidence, competence, less precious.. and it's related to experience?*

97. UC: Yeah, possibly.. Yeah, **experience** and.. but, I think that would be **experience** with.. an **intelligence**. [P]

97.1. Like.. the downside of **experience** would be like FurnCorp engineers, who-o |

98. *I: so experience can be a negative? (UC: yeah.) OK, tell me*

99. UC: You know, (adopting a dull, mocking tone) "I've been in this business **for thirty years** and I know the way everything should be done." [N]

100. *I: {writing} so, tell me about this intelligence.*

101. UC: Uhm.. .. Well, it's kind of like the ability to **realise** nothing's **set down in stone**, and the stuff they learned in college **thirty years ago** has probably completely **changed**. ... [P]

101.1. Sometimes you work with people who really.. dislike the fact you **question**.. what they're saying and stuff like that. <:::> [n]

101.2. But, I think someone with **intelligence** would .. wouldn't **automatically** dismiss something like that. [p]

'Bringing in' was again linked to a lateral approach, and drawing parallels; being stuck in your ways was linked to having been engaged in something 'for a long time':

217.3. Yeah, so they were really difficult to work with, we just had to spend hours and hours, going over the same thing and over and over again. But, a lot of it was just... you'd come up with one argument, and they wouldn't go for that one, and you'd talk about something else. Then, you'd think of another **angle to approach** it from and, no, they wouldn't really go for that. So you'd try another **angle**, and stuff like that. [N]

217.4. But, basically they were pretty much **stuck in their ways** -- which is the frustrating part. [n]

221.2. They never seem to **draw** any **analogies** with, even really **obvious** stuff like domestic furniture. They never kind of **bring** any innovations or **lessons** that have been learned with domestic furniture **into** the stuff they produce. [n]

221.5. They seem to fail to grasp this... and the odd thing is, it must be in their personal experience, that sort of thing. I mean, they go home -- they don't have FurnCorp furniture at home. They have domestic furniture at home that they cherish and look after because it's theirs. But even something as **obvious** as taking their personal experience, they don't seem to be able to **transpose** it to their work life. [n]

223. UC: No, well they're very **stuck in the ways** of contract furniture as well -- that people buy a system and like to keep it **for fifty years** or something. [n]

251. UC: Well, yeah, this is Ronald basically. He's been doing what he does **for a long time** -- he's a bit **set in his ways** to be honest. And, in this particular instance, his ways do not suit the project, and they're being really counter-productive. [N]

Doing Your Job, vs. Just Processing

The various aspects of bringing in, being open, and thinking laterally embodied in the themes above, are related by UC to being fundamental to the nature of contributing in work and even 'living your life'. The opposite condition, being stuck in a rut, was related to compartmentalisation in large corporations, and led to a thoughtless approach to work described as 'process':

35. UC: I think it kind of depends partly.. It depends what sort of, I mean the engineers we've got are generally quite **flexible**, but ... [p]

35.1. My experiences of.. working with people who work in an in-house group -- be they engineers, engineers are probably worst, but even industrial designers.. well, I'm thinking of FurnCorp here, I mean they're so.. jaded. Virtually **useless**. You know, they've been so beaten down, they're virtually **not doing their job**. [N]

102. *I: Why is it important to you that they not just dismiss things?*

103. UC: Well, I don't think that's.. it's just a bit like **living your life**, really. [n]

103.1. Some people like to live their lives by **routines**.. you know, this is the way stuff is done. .. (I: and if you do that, you're not really) No, I don't think so. You're not really **doing it** anymore. [n]

103.2. I mean, going back to ID, you **get into that rut** and you stop being a **creator**.. and you're just a **processor**, basically. [P/N]

105. UC: Yeah. ... '**Automaton**' or something like that. Oh, good word. [N]

177. *I: / now, you mean people in-house (UC: yeah) One of the first things you said was that there was a big difference between in-house people and -*

178. UC: Generally, yeah.. I think, people who are.. generally, people who are actually quite good at their job tend to get squashed by, like massive numbers, in in-house teams [N]

178.1. -- I'm talking about in-house teams in certain sectors of industry, not like an in-house team in a consultancy, necessarily. 'Cos I think they're more.. almost by definition -- it might even be a marketing person, by a huge stretch of the imagination -- almost by definition, somebody who works in a consultancy that has to.. **go out there** and get jobs and stuff, they tend to work with a much **broader** band of people, so they tend to be able to **bring** much more **back into** their work. [P]

179. *I: This is kind of that 'world experience'?*

180. UC: Yeah, or just kind of general **experience**, partly the world, and partly with other.. professions as well. [p]

180.1. Because, well a lot of this is coming from FurnCorp as well.. I mean, a lot of the people there are very **compartmentalised**, like industrial designers still sit (in the same place). You know, and marketing are probably in a different building, across town or something. And engineering's three floors down, and they never interact unless they have to. [n]

209. UC: Well, the productive bit is, we're working together on a project, and most of it is that he (Thomas) **pulled his own weight**, basically. And Judy **pulls her own weight** as well. And they were sort of prepared.. to come up with.. two or three options they were happy with, and then come back to.. [P]

209.3. So, Thomas would come back and say, well look, we could come up with this and this and this, but he was still **open** to suggestions -- well we could change this.. [p]

210. *I: So 'pulling their own weight' in this case,*

211. UC: But he was quite **receptive** as well. He understood that we might not want to put tabs on the sides, 'cause you would see this kind of flashing. He'd say I could do it like that, but.. [P]

Good Industrial Design as Achieving a Balance

Another prominent, positive theme UC uses to discuss industrial design is a notion of balance and mediation between poles of art and technology. He introduces this with a highly negative description of architects (or more precisely, architects in training) who have lost contact with practicality for the sake of being 'too philosophical':

119. UC: Well probably architects would come off way down here, in the ooze. {..} Architects know fuck-all about anything. They really do. They do.. they know absolutely nothing about.. (I: they know nothing about everything?) yeah, exactly. It's amazing. They do, though, architects don't really know anything. They come up with s-stupid concepts.. [N]

119.2. My experience with architects, I was trained at the same college as architects, and they really don't have much of a clue about anything, I don't think. [N]

119.3. But they're kind of like way off on the scale of trying to be too urban, and too philosophical. ... [N]

119.4. If you've ever been to one of the architectural association shows?.. (I: no, I haven't) Well, you'll speak to [students at] architecture shows, not interior design but architecture shows, and you just think, well, I personally think, maybe me being a little bit pragmatic about the whole thing, but I just think, "where's the building?" (both chuckle) This is lovely, we've got lovely pictures, with this kind of glow, and oooh, and quotes from.. Beaudelaire and stuff. Yeah, but where's the building? [N]

119.5. That's possibly why I do industrial design -- because I see it as half-way **in between**.. [p]

120. *I: So, industrial design is more.. what?*

121. UC: It's kind of where, as far as I see it, where a harder edged technology meets the sort of <'all fluffy'>/ [p]

122. UC: / industrial design, as a kind of a **mediator**... a bit **between**.. it sounds like a cliche, but a bit **between** art and technology. [p]

122.1. Although, stra-angely enough, 'technology' comes from the Greek word 'technos', which means, 'art'. Strange, eh? {UC mentioned "Zen and the Art of Motorcycle Maintenance"; I mentioned the Willem Flusser essay}

123.4. And, I think industrial design is.. well it's quite **interesting** for me because I see it as kind of, almost comes stuck **in the middle**. [p]

125. UC: Well, in the fact it's kind of difficult to say whether it's kind of like technology or kind of like art -- it's a bit **in between**, because we want things to work, in a beautiful kind of... cerebral sense, but we also want them to look nice. So we want these things to be like really clever mechanisms and like.. [p]

139. UC: Well, I think the nice thing about industrial design is the fact that it's.. I mean some people might see it as a drawback, but I think its **broadness** is.. is a good aspect of it. .. [P]

139.1. The fact that basically, industrial design will **touch**.. human factors, and engineering, and interior design, and graphics, and.. fashion, and.. [p]

139.2. So, I mean, obviously, I'm really biased, because I do it, but... yeah, it.. goes back to that kind of **mediator** thing, I think. .. [r,p]

UC elaborates on his experience of doing good work in design, with an analogy describing a balance between functional and aesthetic considerations as achieving a 'weightless' state:

141. UC: I dunno.. I read a really nice analogy once, about designing, and... I can't remember who it was, but the analogy was that it's a bit like throwing a ball in the air. [p]

141.1. You know, you throw a ball up into the air, and there's a moment, at the top of its arc where, its upward velocity perfectly matches gravity pulling it down, and for that moment, it's **weightless**.. and that's.. when you know, it's good. [P]

141.2. Often, but sometimes you go past it, and you kind of knock back, and get to that kind of **weightless** moment where everything is kind of **balanced**.. yeah, **balanced**. [p]

142. *I: can you tell me more about what it's like..*

143. UC: Yeah, it's going back to that thing about technology and art, where you manage to.. not **compromise** either, to its detriment [p]

143.1. -- I mean obviously when you're designing, things get **compromised**.. but you don't want.. so things aren't **compromised**.. yeah, so the aesthetic isn't **compromised** to its detriment so it becomes an ugly object, and its.. for example mechanism or whatever it is isn't **compromised** so it becomes a ridiculous.. so you're not doing sort of stupid engineering, which kind of doesn't work and breaks.. <:::> [P/N]

147.1. It doesn't really happen that often, to be honest. But when it does happen, all the shit you had to go through is just worth it. [P]

148. *I: How do know.. do you feel it?*

149. UC: Yeah, I think so.. it's probably like two sides of your brain are **balanced**.. the more sort of technology aspects of it. [p]

149.1. Because, you want it to work. You want it to function as a proper object; it has to be there, people buy it, they expect it to function. [-]

149.2. But you manage to **balance** that with the way you think it should look.. and it just **looks right** and it **works right**.. it doesn't **work right** at the **expense** of looks, and it doesn't **look right** at the **expense** of it working.. of its function. .. [P]

155.4. But.. I suppose that's partly it.. I suppose that's partly.. maybe that's it, you do find that kind of **weightless** point, but you **explored** beyond it, below it, and [P]

157. UC: You usually have to, yeah, go past it all <:::> I guess you have to go on holiday or something, and come back and **look at it** with a fresh eye. [P]

In describing what he strives for as an indication of good work, UC discussed a recent project which he had not felt positively about. This brought out a several interesting themes. Besides previously established negative themes of being set and 'processing' as unsatisfactory ways of acting, a new notion was introduced, in which the sketch or hand drawing was in some way the most direct manifestation of an idea. In the case UC described, as the design departed from this ideal representation, UC's interest dropped. A criterion of 'using' a design, to represent the designer in a portfolio or to a client was also introduced.[68]

251. UC: Well, yeah, this is Ronald basically. He's been doing what he does **for a long time** -- he's a bit **set in his ways** to be honest. And, in this particular instance, his ways do <u>not</u> suit the project, and they're being <u>really</u> counter-productive. [N]

251.1. And basically, we're taking a<u>ges</u> doing something that.. we're basically taking three days work to do something we probably could have done in a day. But he insists that he wants computer files, when we could probably just **draw** it **by hand**. [N]

253.2. It's <'Bill's/billed/built'> and I just wanna get, I just want to finish it. (I: you just want to get out of there) I've got.. I'm getting to the point where I don't actually care what it looks like anymore, I just **<u>process</u> it through** and just.. leave it, you know. -- which is not nice - [N]

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[68]The first articulation of using a design in a portfolio was made by the interviewer, rather than the informant. Though this weakens the assertion that this is a criterion applied by the informant in distinguishing work that holds his interest, the suggestion was based on the interviewer's experience in design contexts. It was also enthusiastically supported by the informant (255: 'ex<u>act</u>ly', rather than simply 'yeah'), and reintroduced by him later in the interview (265).

254. *I: No, it's not the kind of thing when you're done and you would want to put it in your portfolio -*

255. UC: Exactly, 'cause it's not really worth doing stuff like that, but uh, sorry, it's getting a bit like that. [n]

263.2. It's partly trying to sort out in your head stuff moving past each other, and will this catch on this or not, and then being able to draw.. it's much easier if you've got the rough layout printed out, and just be able to **take a pen** and go.. 'that's not quite **right**, why don't we just.. carry that curve on a bit longer before we bend it into something else.' [n/p]

263.3. It's really easy to do that **by hand**, rather than trying to <'rrr'> stretch this stupid computer program to do it. And eventually, you just go 'aw.. fff'; you try it four or five times and you think, that's as **close** as I'm gonna get to it. It's **not right**, but.. [p/N]

264. *I: That must really.. rub you the wrong way -*

265. UC: Yeah, it's... I hate doing that. Because, it's like you were saying before, it's like.. you're doing something you know is not going to turn out like you've **sketched it** and like you've been trying to **draw it** and stuff. And then, you get into kind of a negative spiral -- immediately you're **interest** drops off. [p/N]

265.1. Because like, it's just <'pfffff'>... and you get to the point where you just want to finish it and you just don't really care because it's gotten to the point you know you're not going to **use it** (I: ri-ight) -- you're not going to show it to clients. (I: you've already detached yourself, and it's like, this is no-ot -) It's gotten to the point where I'm not going to put this in my portfolio; [N]

265.2. it's got beyond the stage where it's.. salvageable. It's like, aw fuck it, just get it over with. .. Which just makes it worse and worse and worse and worse. [N]

In the description above, 'using' a project means putting it in a portfolio to aid in gaining further work. The impulse to just finish something which falls short of its ideal conception stems from its reflection back on the designer. UC's earlier distinction between intelligent and 'crass and pretentious' work made it clear that there was a strong identification between the designer and the object which was produced:

75. UC: Well, sort of **well thought-out**.. **intelligent**, but without being.. Yeah, I'd say '**intelligent**' was down at the good end, and 'pretentious' is down at the 'crass' end. [P/N]

76. *I: What else about crass? Does 'pretentious' apply to the object, or the people, or both?*

77. UC: Both I think, actually.. because a lot of industrial design you can't separate it that much. [-]

78. *I: You mean you can't separate the identity of the object?*

79. UC: Well, you know, if someone **thinks** in a.. crass, pretentious way, they tend to **produce** crass, pretentious objects. (both chuckling) [N]

79.1. I'm being very judgmental here, obviously I wouldn't put myself down at that end. (both chuckling) {joking about whether he'd describe himself as 'intelligent', or 'crass and pretentious'}; {he couldn't put himself all the way on the good end} because there are a lot of people who I respect who are a lot better than I am. [r]

Summary

UC established several themes with respect to good practice in industrial design, including an ability to draw parallels and 'bring in', an ability to be inventive within constraints, and an attitude toward observation and questioning which was described as naive or child-like. These three themes were subsumed under the positive characterisation of 'intelligence', which was variously contrasted with being set in one's ways, or being 'crass and pretentious'. Other important themes regarding the process of working included a central idea of balance, and the primary importance of an idea -- most directly reflected in a hand drawing or sketch.

Table 6.2 gives a summary of the significant interpretative repertoire elements identified in UC's discourse, and clusters them in groups which reflect the themes and oppositions discussed above. Listings of the various repertoire element categories are contained in Appendix I.

Table 6.2 UC Repertoire Elements, Clustered by Emergent Themes

Positive Dominant	***Neutral or Mixed***	***Negative Dominant***
open bringing in coming from outside drawing parallels transpose		mind set set in ways in a rut tried and tested
ask, question flexible open to playing around with		set down, cast in stone dismiss
create, creator intellectual process thought-out		process, processor knocking, churning out automaton
pulling own weight		jaded, beaten down useless not doing it
broadness touch in-between mediator		compartmentalised narrow
observation child-like, pure stupid questions lateral thinking oblique, not obvious reverse angle different tack	see look at	preconceptions obvious stereotype
inventive explore, experiment push	constraints boundaries	stifling
pro-active		re-active copy-cat all the same styling marketing-led
open to change move along with change educate	experience	set in ways same for thirty years
right balance		compromised

AM Interview

AM is an experienced engineer, also working at ConsultCo. He and UC had worked together, though only for a short period of time. While AM figured in one of UC's positive experience descriptions, UC does not appear to have figured in AM's responses other than general positive references to the industrial designers at ConsultCo.

Work as a Network of Relations and Influences

AM's discourse shows several themes relating to the process of work. Figuring prominently are themes in which the engineer is placed within a network of influences. In this process, the continual 'analysis' and exchange of 'requirements' is evaluated positively, while acting on 'assumptions' may lead to trouble.

4.	AM: People who really, I think, start to **influence** things, project engineers. Which I believe is a different category to what we do.	[-]
8.	AM: I think people are doing scheduling.. manpower.. and materials. Now the materials, also selections.. there is a **feedback** or an **analysis**.. quite a **close relationship** between an engineer and a project engineer.	[p]
10.	AM: I suppose it is client **related**.. or heavily client related.	[r]
10.1.	On the other hand, there can also be a lot of situations where you need to be **directly involved** with vendors, or suppliers, which then tends to **move**.. I think then, when you wear that hat of the project engineer you are becoming more **involved** with the engineer itself.	[-]
10.2.	But, it's really a **balance**, at the moment here in ConsultCo, we tend to **balance** both of those two in the same job.	[(p)]
20.	AM: Other technical people who are around the table, could be a quality engineer ... whose particular function really is **feeding back** information from a supplier.	[-]
20.1.	I've had a lot of significant **dealings** with quality, **directly relating** to.. **feeding in** the technical **requirements** of the manufacturing process **directly** to the engineer. So it's **affecting directly** the **design process**.	[p]
21.	AM: Who else ... I suppose industrial design. ... which in my opinion (lowers voice) here at ConsultCo, we tend to get a very good **relationship** with industrial designers and they're continually **analysing** and, you know, we have a **direct relationship** between the two, and we both know what our **requirements** are.	[P]

30.1. BUT I think **directly related** across this way.. marketing to general management. And these two are looking for obviously a **direct relationship**. (He drew a line on the diagram linking the two.) [-]

36. AM: sure, sure.. I really should **link** those, anyway. I'd like to **link** those, and those as well. and I think you'd tend to get a **natural link** between those

38.3. And there's **direct feedback**, in both directions, so the engineer is getting **feedback** from the quality engineer, and I think the engineer is giving to the quality engineer as well.. what is coming now **on-stream** and what **requirements** they will need to consider. [p]

38.4. I find this invaluable -- I find that even before I lay pen to paper, shall we say.. I shouldn't say that now 'cause we're using CAD tools, but I like the quality engineer **involved right up front**, of what their production processes are capable of generating. [p]

44.2. But my **direct relationship** here, would be.. this person (quality engineer) would be **floating** between, demographically, I would say between an engineer at the design centre, and the manufacturer who's making the component, and **relating** to the two **directly**. [p]

46. AM: I think I've been lucky, like I said, I've worked at companies that do have this **open policy** of being able to generate.. different sectors of their **design process**, and needing these different people to be **inputting directly** into.. the.. [p]

48. AM: Shall I start with that?.. A typical engineer, I think, is obviously a professional person.. been educated to traditionally a degree level, and.. [p]

48.1. will generally be very **conservative** in the things they do -- I think for obvious reasons, they need to **take into account** when they're designing components or products, failure, how the components will be used, so they're really looking to **get input** from many different sources to.. **influence** what they're doing. [-,p]

Moving Within a Project

In AM's discourse, the project becomes spatialised. It is a process with significant extent in time; it has a front, and it is moved through; problems may be 'raised', and they may cause the engineer to be 'reset'. AM's early characterisations of marketing continue the theme of a network of connections. The only negative aspects are related to discontinuous involvement by marketing in the process, leading to possibly wrong assumptions being made by engineering.

17. AM: Other people you may have there will be a marketer ...

17.1. In my experience, it's tended that they only **influence**, they do **influence** the engineering concepts ... the problem is the **further through** the project you get, the more problems they can **raise**. [(p)/n]

18. *I: What sorts of problems?*

19. AM: Well, problems like completely different concepts, or operability problems. [n]

19.1. And you know as well as I do -- or I think you do, the **further into** a **project** you go, the more costs you're incurring, and the more **commitment** you're making to a production process. [-]

19.2. The marketing people can, **further down the line** cause.. you know, for obvious reasons, I mean they want to change things for the right reasons and the right attributes, but they can **reset** an engineer quite significantly. .. [n,r,n]

19.3. So there is a **relationship** there, but I don't think it's a very strong relationship, except for companies who are **feeding** that **back** very rapidly. [n,-]

19.5. You tend to.. I tend to find that this function only **feeds in** as and where necessary, and yet there are a lot of **assumptions** we have to make, which we really shouldn't. (I: because they're not in..) Yeah, they're not **involved** on a continual basis. [n]

Engineering project work, besides extending in time, necessarily involves moving vertically, between an overview, and working in-depth, or being buried inside. Moving through these dimensions flexibly, or 'floating', is described positively, while being rigidly constrained by circumstances or training is described negatively.

14.2. just.. **through**, they can **oversee** a complete schedule, or a complete project, whereas sometimes an engineer can't, I think, on an **in-depth** basis. So there are different priorities for each job. [-/-]

16. AM: This is more a higher level, **higher level view** (I: more strategic?) Yeah, more strategic, and a higher-level view, and an **overview** possibly, of what's happening or a particular project. [p]

16.1. I think sometimes, when you're an engineer, you have to get **buried inside** (I: yeah) **down** a particular **niche** (I: right) just to get that done. [-]

16.2. But like I said here we tend to **float up and down** those **levels** -- we need to float up and down those levels, just for **flexibility**. [p]

44.2. But my **direct relationship** here, would be.. this person (quality engineer) would be **floating** between, demographically, I would say between an engineer at the design centre, and the manufacturer who's making the component, and **relating** to the two **directly**. [p]

64.2. But, like I said, I think companies need to **float** between the two -- it really depends on what they're developing as well. [r]

78.1. If you **float** to the other end, I think there's far more **flexibility** -- people will work from home, they'll work longer hours, or hours to suit the companies, or the components they're designing, you know, the projects.. [P]

228.2. I think people who are very specifically **down** one particular **niche** of design or development or engineering.. they're great at doing what they do, but you do need that **broad** base of different scenarios to gain that extra **experience**. [n/p]

Engineering - Freedom and Openness vs. Indoctrination, Rules and Regulations

The primary distinction AM made among his fellow engineers was according to the type of process they followed or were comfortable with -- whether they followed a 'free' and 'open' approach, or whether they were dominated by 'indoctrination' and 'rules and regulations'. He felt that the training process for engineers tended to be one of indoctrination, but that there were differences between engineers themselves that allowed some to transcend or 'break out' of this indoctrination.

46. AM: I think I've been lucky, like I said, I've worked at companies that do have this **open policy** of being able to generate.. different sectors of their **design process**, and needing these different people to be **inputting directly** into.. the.. [p]

48.2. I think here at ConsultCo, engineering is a very very.. **open process**. It's **open** in as much as we tend to have a very **free** and **open policy** about what we need to do to achieve the development of a new product. [P]

48.3. There are many companies, I think, where engineers are actually **suppressed**, and.. completely **straight jacketed** (I: ah), and not allowed to **deviate** from particular **rules** (I: oh really) **and regul(ations)**, [N]

48.4. yeah I think so, and in fact, I have been in those environments -- they're not very... **creative** -- in fact I think it takes the **creation** completely away. Like I said, I think here at ConsultCo we're very lucky -- we have that **open** policy that allows us to be very **creative**. [N/P]

48.5. So there are two ends of the spectrum to engineering. [-]

50.1. On the other hand, engineers can be.. stubborn animals, just partly because the training process.. **indoctrinates** so much.. data, and process **limitations** on how things are manufactured, or should be, or shouldn't be. [n]

50.2. That can tend to affect.. **lateral thinking**, or I believe it can. [n]

52. AM: I just think there's such an **indoctrination** of.. data, and **rules and regulations**, and tables, and what you can what you can't do, what is considered a good process or bad process, that that can affect.. well not affect, but that can influence directly, the thought process, the **creative thought process**. [N]

52.1. And some people can **break out** of it and some can't. [p/n]

55. *I: Well, just draw that spectrum, and label the two ends, with a few adjectives that come to mind. ...*

56. AM: **Freedom**... **Indoctrination**. <scribbling> That would be the two boundaries. .. You get {AM uttered words as he was writing them down, but associations not clear. paper diagram shows '**Indoctrination**' with '**regimentation**', '**rules and regulations**', under it; '**Freedom**' has '**creativity**', '**open boundaries**' under it.} It's pretty much those two extremes. [N/P]

57. *I: When you think about the ways of working, say these are two different people, how would you describe the way this person works vs. that?*

58. AM: If you take this end, the **indoctrination** system, they **run through** a **thought process**.. very much like a computer runs through: a **sequential process**, which.. **delineates** the way things should be done, whether it be right (chuckling) or wrong, they will **go through** that sequential process, to come to the inevitable conclusion they're looking for. [N]

58.1. On this end ('**freedom**'), you get far more **chaotic**, **creative**, chaotic, sort of **openness**.. in the process to create and develop new products. [P]

58.2. I just don't believe you can get many new products from this end, I think it has to come from this end, obvious.. But.. why not make the moon out of Swiss cheese, you know, that's the type of **thought process** you need to have; a great deal of **lateral thinking**, to get that. [n/P]

AM continues to describe the 'indoctrination' process in terms of boundaries, rules and regulations. He introduces risk as a new aspect of the distinction. He allowed that some engineers were more comfortable with the low-risk aspects of the 'indoctrination' approach. While trying to maintain a neutral tone, he did trace this behaviour to a personal insecurity on the part of those individuals.

63. *I: What do you think are the strengths of that end ('indoctrination')?*

64. AM: I think the strengths are.. there is **low risk** ('**indoctrination**').. and obviously this is **high risk** ('**freedom**'). I'm not saying they're uncalculated, I think they're both calculated.. but obviously the high risk end is... far more can go wrong than probably the low risk (end of the spectrum) -- [-/-]

64.1. there is a lot more history, this is history based, this is not. The '**freedom**' end is new and developing products and techniques... the **low risk** end is, 'well we've used this process before, let's use it again'. I think that's really what drives it. [-/-]

65. *I: At one point you said people that worked more in this ('freedom') way, had been able to transcend or break out of a way of thinking that had been indoctrinated. What would you guess would be different about these people that allows them to do that?*

66. AM: I think, one big thing I can see, and I see in myself, is being able to visualise things in a three-dimensional environment.. conceptually possibly in your mind.. there are a lot of things, and you know, and to not allow **boundaries** to **inhibit** your **thought process**. [P]

66.1. This end ('**indoctrination**'), I believe.. absolutely, you need people to have **rules and regulations**, to stop this end flying, far too far to the right. [All of AM's spectra had the 'positive' end to the right] On the other hand, I enjoy this end ('**freedom**'), far more than I do this end.. [-,P]

73. *I: Presumably there are people who are content at this other end?*

74. AM: I think there are people who love to work under **rules and regulations** and take the **low risk route**. [n]

75. *I: why?*

76. I think that's to do with personality, I think.. if a person in possibly, I don't know.. an insecurity, in one way or form, subconsciously insecure, then sitting in a secure, possibly low-risk design environment, they feel far better with themselves, than they do with a high-risk environment. .. [(-)n]

76.1. That's my opinion.. and my sort of thought process of why people do it -- but like I said, it's no criticism of people this end, I think it's good, you do need that **balance**. [r]

78. AM: (exhales).. I think if you take this **indoctrination** end, this can very easily become the nine-to-five job, clockin' in clockin' out, eating meals at **regular** times -- just doing the things which companies have done for many years. [N]

78.1. If you **float** to the other end, I think there's far more **flexibility** -- people will work from home, they'll work longer hours, or hours to suit the companies, or the components they're designing, you know, the projects.. [P]

78.2. but they'll get a lot more enjoyment. I don't think there's so much enjoyment at this end. [p/n]

Creativity is associated with opening up boundaries in AM's discourse. Situations of indoctrination are stifling and restrictive. Company environments dominated by these attitudes become complacent and lethargic:

92.1. You know, on the other hand I have seen examples of.. the **indoctrination stifling creativity**, such that a company could have had a fantastic product, but never developed it. [N]

101.1. but, this is where the **creativity** and the excitement comes in. You can **open up boundaries**, to make products leaner, and meaner.. faster, quicker, cheaper and more cost-effective, just by these new technologies, and the **freedom** to allow you to use the new technology rather than possibly a **conventional** process.. **of the past**. [P]

162. AM: Engineers.. examples of engineers are generically.. met all ends of the spectrum. [-]

162.1. I've met engineers that are very very **experienced**, very **regimented** in their.. approach and their methodology, of.. how they would develop or design a product. [p,n]

168.2. But, it's what we would consider (as) called 'the old boy network'. And, it's more a question of <::> 'I know best'. That, like I said, that can be very **stifling** .. and **restrictive** <scribbling>. [n]

169. *I: How do you describe the results of that sort of environment? (stifling, restrictive).. products, or..*

170. AM: Oh, very bo-oring, very bo-oring, very staid.. products which don't change their form significantly. [n]

170.1. You can see repetitions of problems **continuing through** products, and the **life of products**. [n]

170.2. There's not a drive to change those problems, unless it's such a catastrophic problem that they have to, they have to change it, they have no option. [n]

170.3. I think that's a very **lethargic**, **complacent** company, and there are not many of those **surviving**. So, it's a sort of **complacency**. [n]

175.3. Things are limited, or things are.. the **boundaries** are set which we have to **work within**. And those boundaries sometimes are very **restrictive**. And, you know, you have to **work within** them. [n]

Though AM indicated on several occasions that the 'indoctrination' approach to practice was appropriate at times, and that this was another area in which 'balance' was appropriate, his evaluations of it were generally quite negative. When asked, he explained his personal preference for the 'freedom' approach. He describes the excitement and personal reward he derives from influencing the outcome of a project. Particularly in (72.1), he describes the satisfaction of proving a new approach and seeing it followed by others.

67. *I: Why is that? Tell me what you enjoy? (about the 'freedom' end)*

68. AM: I find it is very **creative**, I get a kick from the **creativity**, of being able to try different things.. try different things, new products, new technologies.. [P]

68.1. certainly I don't think it's a self-gratification thing, I just think I enjoy the.. **creativity** of being able to see something come to **fruition**. You tend not to see a lot of **fruition** at this end (**indoctrination**) [r,p/n]

68.2. -- you can be a very small cog in a machine; this end you can be a very large cog of that product. And I think you can **influence** this end far more than you can the **indoctrination** end. So that's.. [n/p]

69. *I: Influence, in?*

70. AM: **Influence** in personality possibly.. style.. process, you know manufacturing process -- everything that possibly would be **restricted** at this end is not, it's just the converse. [p/n]

71. *I: You're talking about the product?*

72. AM: I think the product and the components; [-/-]

72.1. I've seen fantastic ideas of components that you possibly would never consider as a particular process to manufacture a component, and, you know, it's been done, and it's been **proven** that it's been done. And, from that point, other companies or other people will **follow that lead**. So... it's very exciting, and I think this end is far more enjoyable than the **indoctrination** end -- for me it is. [P]

100. *I: I'm curious about how you combine a certain positive amount of history, with what you describe as 'clean sheet' design...*

101. AM: Sure, I think what happens is, if you take a **clean sheet design**, you would certainly take **reference** to the **rules and regulations** of what you need to do, [r]

101.1. but, this is where the **creativity** and the excitement comes in. You can **open up boundaries**, to make products leaner, and meaner.. faster, quicker, cheaper and more cost-effective, just by these new technologies, and the **freedom** to allow you to use the new technology rather than possibly a **conventional** process.. **of the past**. [P]

Finally, at the conclusion of the interview, AM told the story of his own personal growth toward the more open approach he now espoused.

220. AM: You get a different aspect.. other people **want different requirements**, what they're trying to achieve, and it's good.. [p]

220.1. Initially, when I was younger I.. you tend to try and kick against these things because there can be.. they can be counter-productive or unhelpful because they're causing problems. [n]

220.2. But now, I think, the more information I get from those people, the more it makes my life actually easier.. to design products for them, or **fulfil** their **requirements**; [P]

220.3. without asking those questions or finding out from those people, you just don't get that information or that **feedback**, and you need that. [P]

222.3. and I felt very reluctant to **accept** their.. their **input** for that reason -- and it was very naive, very naive of me. [n]

222.4. Yeah, it's very funny, you change your view on life, but.. I have. -- very much so. [p]

222.5. But.. I've learned to live with that, and in fact, build on it, use it as a building block to make my.. my job more **fulfilling**. {...} [P]

223. *I: And that's happened during the course of..*

224. AM: During the course of **experience**, working with different types of people.. different sectors of the company. [p]

224.1. You know, at one time, companies would rigorously **delineate** or **demarc(ate)** between different departments. There was a specific **boundary** -- I think those **boundaries** are disappearing, more and more so. [n,p]

224.2. Twenty years ago, I probably wouldn't even have known the quality engineer, let alone who he was, or where he worked, let alone talking to him. [n]

224.3. And those **boundaries**.. I mean, my design now is **influenced** -- I can actually **influence** the way I design something so it makes his life a lot easier, and it can make his products more repeatable. Now that's a good thing, rather than just designing with a **horse-drawn, blinkered approach**. [P/N]

224.4. I don't think that's the right way, and (lowers voice) if you look at the Japanese philosophy, that's the way they work; they work in this collaborative environment, of getting **input** from everybody, and that's good. [p]

Industrial Designers - Flexible vs. Adamant

AM characterises industrial designers in terms that relate to the theme of a process with inputs and feedback. He primarily differentiates between them on the basis of being flexible versus 'adamant'.

21.1. Obviously the engineer always tries to **fulfil** what the industrial designer **wants**.. that's not always the case and I think there's a **compromise** between the two, particularly on difficult technical problems. But obviously, that's the aim, is to get industrial design.. intent into the product. [-]

21.2. Here, like I said we've had a great **relationship** -- I don't think that's quite such a great **relationship** in some companies; I think that can be quite strained. [p/n]

21.3. And these (industrial designers) can be two ends of the spectrum -- significant (chuckles) ends of the spectrum. [N]

23.2. It just depends on how much an industrial designer can **compromise**. [-]

23.3. I've been in very, very particular situations with injection moulding components where the industrial designer **wants** a particular style, or an attribute on a moulding, and the engineer has been **forced** to manufacture the tool a particular way, just to achieve that. [n]

23.4. Whereas, like I said, I've had experiences where a tool could cost, fifty thousand dollars on a conventional process, and it's probably doubled in cost just because there were **certain requirements**. [n]

23.5. But, obviously it really depends on the **drive** of the industrial designer, how strongly they **want that influence**. .. OK, what else... [r]

136.1. There are examples of individuals who are absolutely **adamant** (chuckles) they'll have it a particular way. On the other hand, I can think of people, particularly in this building who are very very **amicable** about, if.. the manufacturing process doesn't achieve what they **want**, they're quite happy to **bend** slightly. And, you know, working that way is far easier than working in a **rigid**, in.. not indoctrinated, sorry.. **adamant**, **regulated** way that they will have it a particular **route**. [N/p]

146.2. I'm not saying this vindictively, but, yeah, far more effort is needed to correct those problems, just knowing that.. a **slightly different route**.. would have.. come to a.. a **near same requirement** -- and probably not even noticed by the end user, but it was **adamant** that that was **wanted**. [(-)N]

AM also describes what he sees as the objectives of the industrial designer, in terms of art (113.3), and a desire to convey a feeling of simplification through imitation of more natural forms. While acknowledging a constructive influence from human factors in industrial design, he sees the nature of their 'requirements' as sometimes unduly influenced by fashion, and arising from what the individual 'would like to see':

25. AM: I think there are more and more.. everything we see in life is becoming this **amorphic shape**. [-]

25.1. That is becoming.. Although, I think.. and this is my theory, that the industrial design -- which I know very little of.. this **amorphic shape** that we're trying to achieve is actually giving us a **feeling** of simplification of a product. [(p)]

25.2. But, it actually compounds the **problem** for the engineer, because trying to define these **amorphic shapes** it's very difficult -- that's the real problem. [n]

27. AM: I think, what I believe is that industrial design is trying to reflect more of.. **nature's ways**. [-]

27.3. I think that's one of the driving factors. But other things coming from the industrial designers or the human factors concepts, things today are becoming far more ergonomically **influenced**, and simplified for the user as much as they can.. and that's gotta be a good thing. [p]

111. AM: I think industrial design is very very heavily **influenced** by fashion... very heavily. Not always for the right reasons -- I think sometimes for the wrong reasons. [N]

113. AM: I've seen examples of, you know, pastel colours... being an **influence** particularly on say five, ten years ago.. colours of buttons that were just so obscure, or components that were just.. difficult to manufacture, difficult to process, and really just to **fulfil** the.. **whims**, I think, of the industrial designers. **Niceties**. [N]

113.1. And -- this is me wearing my engineering hat -- there's nothing wrong with a red button and a **simple** green button, which most people in life will understand. To change it to a pastel pink, or a mint green, is sometimes.. not always a good thing, I don't believe. [P/n]

113.2. It just depends on the environment. [r]

113.3. But I think, heavily **influenced** by art. Industrial design is an art form.. it has to be an art form.. [p]

119. AM: Yeah, industrial design of things.. I mean I have an example at home, of a really beautiful tap, made in porcelain, and it's nice to grip.. while it's dry. As soon as it gets wet, you cannot turn the thing, and of course it does. You just cannot grip it; (but) it looks beautiful (mild sarcasm). [N]

120. And that is, to me.. (I: how do you feel about that?) Well, I just find that so ironic, that the industrial designer <lowers voice> has **fulfilled** probably what he **would like to see**. Yet from a **functionality** <chuckles> point of view, it **fulfils** nothing.. in fact hinders the use of it. [N]

121. *I: How would you describe the process or the way of working that led to that?*

122. AM: I think.. I think industrial design (lowers voice) tends to come from a **view from within**, of.. what an individual **would like to see**.. would like to, you know, tactile feel.. [(-)]

154.1. Which, in a way, is probably, I'd say it's a **compromise** on their personal **signature** of a product. I see industrial design as a very much a personal signature... of something, and that's what makes it so unique. [(-)]

Long Term vs. Short Term Involvement; The Life of a Product vs. Pain and Damage

AM sees it as significant that industrial designers are involved in a project for a relatively short time in his view, in contrast to what he describes as engineering's involvement 'for the life of the product'. AM recounted a detailed story of a negative experience with a particularly inflexible designer, which carries through themes from the previous extracts as well as describing the results in terms of 'destruction' and 'pain':

140. AM: I've had examples of, I can cite an example of a plastic moulded component which was **wanted** by an industrial designer and he wanted it straight.. a **requirement** for straightness along one edge. [-]

140.1. Now, **I know** for a fact that the sheer size of the component they **wanted**, to get a component straight within ten millimetres would have been difficult, and the vendor was promising a straightness within one millimetre. Now, there's no way on earth they could do that unless they were retrospectively correcting all of these problems, that they could never achieve that. [n]

140.2. Now, the industrial designer heard, "I can achieve that," and **accepted** it carte blanche. And, **I know** for a fact that it wasn't the case. [n]

140.3. And, subsequently, **through** the **life of that product**, there was continuous problems.. continuous problems; it never went away, it must have **cost** the company involved.. endless amounts of **money** just to resolve the problem. [N]

140.4. Now, that **influenced** the **direction** of process, and manufacturing process selection.. which could have (rising tone) been done in a different **route**; it could have been achieved in a different.. manner, with a **slight deviation** for the industrial design -- that was the unfortunate thing. So that's why I cite the example that way, because there would have been a **compromise**, and that industrial designer did not want to **compromise**. [N]

143. *I: So the vendor promised, the industrial designer wanted to hear that..*

144. AM: Wanted to hear it, chose not to.. **accept**, I would say, the **recommendation** of their engineering staff, and **drove** that **requirement through**. [N]

145. *I: refused to..*

146. Refused to **compromise**,

146.1. and also... one thing that I find industrial design will only be **involved** in **the process** for a short period of time, while the product is being developed. Once it's finished, traditionally they'll **move on** to other things. .. Engineering tends to be **involved** for the **life of a product**, so that **pain** is felt for far longer period, and it's not (chuckles) forgotten easily. (both chuckle) [N/p]

146.2. I'm not saying this vindictively, but, yeah, far more effort is needed to correct those problems, just **knowing** that.. a **slightly different route**.. would have.. come to a.. a **near same requirement** -- and probably not even noticed by the end user, but it was **adamant** that that was **wanted**. [(-)N]

146.3. Now, I find that a very counter-productive thing, because although it achieved exactly what the industrial designer **wanted** -- though it didn't really, because they had distorted parts; they didn't have what they wanted. But the **thought** of having this one component rather than maybe two, or a different style.. was very **appealing**, and that was **driven through**, that **requirement** was driven through. [N]

150. AM: He's a very well-known person, and I'm certainly not going to name names, because he's still in the environment he is.. but the point being he's gained.. very great respect in the industrial design environment. On the other hand, he left a **trail of destruction** as far as I was concerned **behind** him. [(p)/N]

152. AM: And the **pain**. Yeah, you know, he lived with it for possibly.. two or three months while he was on that project. I lived with that **pain** for nearly six years (I: oh gaw..).. big difference. Now, I see that as a very negative attitude, just to get the achievement that he **wanted**. [N]

152.1. And, you know... it was almost, and I don't (lowers voice) suppose I should say that because I do respect what he does, but it was almost a.. nonchalant attitude to, 'well, it's not my problem'. But it was, it.. the whole.. scenario was caused just because he **wanted** things a particular way. Yeah, it was.. **painful**.. it was painful. [N]

152.2. But, on the other hand, he's a very **creative** individual, very.. conceptual.. person, and.. not easily **influenced**. [r]

152.3. And that's the problem, that's the bit I could never understand. He was not easily **influenced**, particularly from an engineering point of view, yet I found it so hard to understand a vendor could come in, promise something, and he'd **accept** it so easily. [n]

152.4. I think it was more a case of he wanted to hear what he wanted to hear, and not consider anything else. Whether it was just to... push the problem **to one side**, that's possibly a consideration. You know, 'it's not my problem anymore, on to the next'.. but yeah, it was a very **painful experience** for me. [N]

152.5. And, I have to be honest, that individual is probably the worst example I have ever.. worked with. All the people I work with here are fine, I don't have those problems. Because they are very.. **compromising**, if.. and **accept recommendations**, and that's a good example of us both working and collaborating, together, to achieve a good result. [n/P]

AM's early criticisms of marketing were rather mild. He had more strongly negative characterisations of management, also structured by themes of short-term (deceptive) and long-term (real) views, and employing metaphors of survival and life cycles.

82. AM: I think just the nature of being in marketing or possibly management, there's certainly a trend, or you certainly couldn't have... I don't believe a successful company could have a management or marketing environment which would not be **forward looking**. They need to be **forward looking** just to **survive as a company**; [P]

82.2. They need to have... a **vision** of.. and what worries me with management, not so much marketing but with management, that they can have a very.. **shallow**.. **view of the future**... possibly considering shareholders and stockholders more so than... **product life cycles** or... ultimate, ultimate, I would call it **survival, of the company**. [N]

82.3. I think there are too many financial **pressures** on managers to make the wrong decisions -- or there can be. .. [n]

82.4. I always cite the philosophy of one company in particular, that comes to mind, is Mitsubishi, who manufacture large ocean-going ships.. in Kyoto, Japan. [-]

82.5. They built a shipyard which was.. they knew it was going to sit idle for ten years. They invested heavily into that shipyard, knowing that in ten years time most of the world's fleet of oil tankers would need to be replaced. [p]

82.6. Now I see that as, if you look at that strategy as a **short-term goal**, then that **short-term**.. decision looked wrong; but, wow, they came up trumps and they got the goods because they knew they had that captured in ten years. [P]

84.1. Now that's a very typical.. Japanese decision, I believe; I believe that's a Japanese philosophy that they consider design and research and development as very very.. serious for their **survival**. [P]

84.2. I believe other western countries and that includes the U.S., not as much as Europe, but it does include the U.S., they tend not to have that **long-term vision**. I think it's changing, I think they need to do that just to **survive**.. but its more, 'how quick are we going to get the return for the shareholders'.. and that can be **damaging**, and.. **deceiving**. [N]

84.3. I think that they may be able to **deliver** in one or two years, but in ten years time they don't have a product. And that means they don't **survive**, simple as that. [n]

86.1. But I'm sure... most marketing, and most management environments have to be **forward-looking**. On the other hand, I've seen some seriously.. **damaging** decisions. [p/n]

88. AM: What could sometimes be **short term goals**... I mean decisions, such as <scribbling>.. closing.. closing divisions to save money... terminating developments.. just to save money again. ... I'm trying not to be too damaging here (I: it's OK..) these are pretty obvious things. Shareholder concerns, you know (I: sort of short term, profits down this quarter..) Yeah, very very very.. shareholder's profits, I mean I've seen so many large companies do this, and then **suffer** ten to fifteen **years later**, because they've made the wrong decision. [N]

170.1. You can see repetitions of problems **continuing through** products, and the **life of products**. [n]

170.2. There's not a drive to change those problems, unless it's such a catastrophic problem that they have to, they have to change it, they have no option. [n]

170.3. I think that's a very **lethargic**, **complacent** company, and there are not many of those **surviving**. So, it's a sort of **complacency**. [n]

172.3. I think those days are numbered, you know, the AT&T's and the big corporate.. can't, just can't **survive** like that anymore. So, like I said, I think they're disappearing anyway. .. [p]

AM had described management and marketing as closely linked, and described less strategic, more development project-related decisions with the same themes as above. An important distinction was between 'redevelopment' and 'clean-sheet design'.

90. AM: I think products... existing products, which need.. can buy them some time, and be redeveloped. <scribbling> Product.. existing.. to be redeveloped. [-]

90.1. Or, what I consider sometimes '**reclad**'. You can take a machine and just **reclad** it with new **skins**.. whereas or rather a **clean-sheet design**, [N/p]

90.2. I mean typical in the copier market, I know for a fact, they'll take an existing machine which, **technically**, **internally**, **has no better characteristics**.. but they'll just put a new **clad skin** on, and.. sell it with that industrial design, making it look **sexy**, you know. [N]

90.3. Certainly, it gives them, it gives them the sale, but does it give them a sale when they're fighting Japan Inc. with a product that runs three times faster, half the running costs; [n]

90.4. it's a **false** economy I believe. But it means they save pennies, or pounds, in product development by not re-engineering from a **clean sheet design**. [n]

90.5. So I believe in **clean-sheet design**.. is really the way you'll.. get the **improvements** of the product that you really need. It has to be the way forward. [P]

191. AM: I'm feeling so-ome negativity, because, I think.. For the right reasons, time compression is needed, but there are some instances where the time compression used, can cause erroneous.. errors, and introduce errors which shouldn't really be there, if there was a correct procedure for checking. [r,n]

193. AM: I think it <u>is</u> **marketing driven**, I think it's time to market, we **want** to be better than, quicker than the competition; we must have the product yesterday. [N]

193.1. If that's the case, and it's partly to do with **company survival** as well, it's a question of there's no choice, it has to be done. .. [r]

197. AM: It was being driven by marketing saying, 'We needed this part yesterday;' plus, they were being **driven**, or the quality environment was being **driven** to order the tools before we'd even finished the components.. [N]

199. AM: I think they're saving their own jobs, basically. They're **delivering** what possibly their senior management **require** of them, to achieve a particular target date, and that.. [N]

199.1. it's all very well manufacturing something and **delivering** six thousand of them on a particular day, but, if it's all garbage.. I personally think that's futile. ... [N]

199.2. But, I know for a fact there are a lot of individuals out there that will just.. they'll sweat because their upper management have told them they've got to **deliver** a product no matter what, on a particular day. [n]

199.3. Now that isn't good, because that is.. that's **detrimental** to the whole company, if you're making scrap, it's costing. It's costing. [N]

199.4. Again, it's **fulfilling** a **short-term goal**, of achieving, 'I hit my target, you know.. I'm OK, Jack.' .. [N]

199.5. It doesn't ultimately **deliver** what the company needs, which is a good product that means the customer will come back and buy another one. [n/p]

199.6. If they're going to buy something that is scrap, or is not going to **fulfil** the **requirements** that they want, then I don't believe it **delivers**, not in my terms -- [n]

In following up on the damaging effects of short-term goals on product development, AM described the ongoing deleterious effects of shipping inferior product as a 'self-inflicting wound':

199.7.	and if I was buying a product, and it went.. and I've had examples of this, it goes wrong when I don't expect it to go wrong, just for a manufacturable consideration, then.. I tend not to go back to that company and buy again. And, if I was a company looking at my marketing analysis, I would be very concerned with that.	[n]
199.8.	So, that decision, of.. it's almost a **self-inflicting wound**.	[N]
199.9.	The decision of the senior management to get products out on time, just to **deliver** because they say they've launched it, will give them an inferior component or a product, which will then be sold to me. ..	[n]
199.10.	I won't go and buy that product, and they will have the problem of then trying to convince me, which is very difficult. And then, they sell less! So, they're **compounding their own problem**.	[n]
201.1.	I think it really is **driven by finances**. It's all to do with balancing books, it's got to do with **delivering** shareholders'.. shares and stockholders.	[n]
201.2.	They're expecting, and quite rightly so.. they're putting their hard-earned money into a company, they expect a return on it, and if they're not going to get their return, the company will dry up. It's as simple as that.	[r]
201.3.	On the other hand, companies dry up that don't have good products, so.. it can be, like I said, a **self-inflicting wound**.	[N]
201.4.	And the successful companies produce good products. Good, **fulfilling** products, where you think 'wow, I want to go back and get another one of those.'.. and you'll keep going back.	[P]

Work as Delivering on Obligations and Commitments

A theme which is evident in the extracts above (199.-199.6; 199.9, 201.4), and which AM employs when he speaks about his own performance, has to do with delivering on commitments and fulfilling an obligation. This is evident in explicit references to money committed by the company on the basis of engineers' decisions, as well as in descriptions of the type of feedback from production lines he finds most gratifying.

19.1.	And you know as well as I do -- or I think you do, the **further into** a **project** you go, the more costs you're incurring, and the more **commitment** you're making to a production process.	[-]

46.1. basically, where the **money starts to be spent**. As soon as we start to do anything, money gets spent. It's as simple as that. [-]

48.1. will generally be very **conservative** in the things they do -- I think for obvious reasons, they need to **take into account** when they're designing components or products, failure, how the components will be used, so they're really looking to **get input** from many different sources to.. **influence** what they're doing. [-,p]

84.3. I think that they may be able to **deliver** in one or two years, but in ten years time they don't have a product. And that means they don't **survive**, simple as that. [n]

120. And that is, to me.. (I: how do you feel about that?) Well, I just find that so ironic, that the industrial designer <lowers voice> has **fulfilled** probably what he **would like to see**. Yet from a **functionality** <chuckles> point of view, it **fulfils** nothing.. in fact hinders the use of it. [N]

138.1. (If) that's something that the industrial designer wants to hear, and he wants to **wear blinkers**, he's quite happy to go along with that. Of my experience... I tend to be very cautious of what they're saying, unless I see the **evidence** of what they're **delivering**. [N/p]

185.1. That's the risk that bigger companies, or companies that are **spending money** are doing now. I've seen complete <u>tools</u>, hundred thousand dollar tools, scrapped, for one wrong decision. [N]

195.2. So, although I **fulfilled** the **requirements** of the component -- the data of the component, the space envelope of the component -- it didn't.. relay the **requirements** of, 'well by the way, I'd like to have it made in this orientation, and I want it made in this particular fashion, just because, by the way, it causes a problem when you put it together. [n]

209. *I: {noted it had been two hours. ... } How do you.. feel, just to kind of sum it up, when you're doing a good job. How do you know you're doing a good job?*

210. AM: (chuckling) Isn't that a hard question to answer.. I think, it's difficult to say, but.. from an experience of working for a consultant, the only way I can really respond to that is by having my customers first of all not come back to me, frequently... (I: with problems?) **Come back** with either problems, or questions.. in one way or form coming back with a communication. [p]

210.1. If they're **coming back** with communications by the way just saying, 'yeah, everything's fine, it's being manufactured at the moment'.. I know, I believe that I've probably **delivered** what I should be doing. [p]

210.2. If those questions are **coming back** with, 'we have a problem and we can't resolve it,' then obviously I **haven't delivered**. [n]

210.3. So to me, the **communication** of the **requirements** [specifications determined by the engineer] are very important, and that's why I feel so badly about that example I cited of that injection moulding, which so <u>easily</u> could have been rectified at the earliest stage possible.. [p/n]

210.4. and, didn't let the customer down, I mean they were still **fulfilled** with the product they got. But it just.. tarnished, what I believe was probably excellence as far as I could.. consider. [r,n]

211. *I: So, excellence in your activity, in your work?*

212. AM: In my **duty**, and **delivering** my part.. of the **bargain**, shall we say. [p]

214.3. But I feel very **fulfilled** and **satisfied** when I see components manufactured, and going together in a form which I believe they should be going together. [P]

214.4. And, getting **feedback** from the production lines at the customer, or client saying, 'Hey, this is easy to put together, we've never had anything go together so easily. That's very **fulfilling** knowing that. [P]

Internal vs. External

AM's discourse also contains a recurring distinction between the internal, technical characteristics of a product, and the external look or feel. AM sees himself, as an engineer, as more likely to attend to this internal realm than other people; he also describes this realm in a way that suggests it to be more fundamental to what ultimately matters for a company:

90.1. Or, what I consider sometimes '**reclad**'. You can take a machine and just **reclad** it with new **skins**.. whereas or rather a **clean-sheet design**, [N/p]

90.2. I mean typical in the copier market, I know for a fact, they'll take an existing machine which, **technically**, **internally**, **has no better characteristics**.. but they'll just put a new **clad skin** on, and.. sell it with that industrial design, making it look **sexy**, you know. [N]

90.5. So I believe in **clean-sheet design**.. is really the way you'll.. get the **improvements** of the product that you really need. It has to be the way forward. [P]

128. AM: I think industrial design is trying to get **back to nature** -- that would be my take on it. The more **natural** a product can look, and the more **curvaceous** it can look, I believe the more.. **appealing** the industrial designer thinks it will be. [-]

128.1. I suppose it depends who you're aiming at, but it tends to be.. that does tend to be a good rule now. There are a lot of people buying things just because of the **shape**, just because of the.. not because of the **technical characteristics**, just by the shape or the colour or the feel, or the texture of a product. .. [(-)]

128.2. I'm probably more.. pessimistic of it because of being an engineer; I probably want those **technical characteristics** rather than.. you know, what it **looks like** -- is it going to **perform** for me. [p/n]

128.3. But that's probably an unfair view; I think for the **general public** you'd probably find that they will buy a product on how they **look**.. also on how they **perform** as well, but I believe that first glance of a product which catches the eye, can also be the one that catches.. the sale. And for companies that's got to be a good thing. [r]

In describing things he finds particularly satisfying, AM mentions the elimination of parts or the introduction of new processes, even though these may only be appreciated by other engineers. Again, there is recognition of a special 'internal' realm, of which the engineer has privileged understanding.

216.1. to be able to value engineer something, to be able to make it very cost effective.. [p]

216.2. Although a lot of those things are not visible on the **surface**, and I know.. only **I know** that or another engineer **knows** that, [-]

216.3. it's very **satisfying** to know that maybe you've eliminated ten parts and made one part to do the same job. Yeah, it's very **gratifying** to see that. [P]

216.4. And, I get a kick from doing that.. and the customer or the client's manufacturing line saying, 'wow, we've never been able to put this together so easily'.. it's very **gratifying**. [P]

In a final extract, the kind of internal contradiction mentioned by Potter and Wetherell (1987) occurs, when AM had been asked to describe some products he felt particularly positively about. Though the internal/external theme had been applied with a fairly consistent evaluation (internal, technical being more real), AM proceeded to describe a product which he liked because its cladding made him feel it was well built, even though he 'really knew' that it wasn't:

204. AM: Uhm.. things, mechanical things.. uh, well, I have an Aiwa personal audio cassette player, which I believe is very.. I don't believe it cost any more to manufacture than possibly a Sony one, or anything else. But it's just that they put.. the feel of the product.. they put a lot of metallic components on the **cladding**, which makes it feel like it's very sturdily built -- [P]

204.1. now I don't believe it is.. I mean, looking at it and **analysing** it, it's no **better built** than the Sony one, which uses plastic components. But, it just gives that **external** feel of quality. [p]

204.2. And, I think that's me **hiding** my senses of **really knowing** that, well, **underneath** that **cladding** there is a very similar product. [(-)]

206.1. Because, I've seen products which are, like I said, no better **internally**, they don't **function** any **better**, but (oh) they feel good, when you first touch them, they.. make your senses come alive. [-,P]

Summary

AM's discourse is dominated by a view of work which places him, as an engineer, at the centre of a web of influences, commitments and obligations. Responding to these influences in a flexible way, with the freedom to draw on new technologies, is the way of working he evaluates positively and generally prefers. However, a balance with a way of working that acknowledges history, rules, and regulations is necessary. AM describes two realms, the long-term survival of companies and the production 'lives' of products, as things of critical importance that are misunderstood by those who take a short-term view in marketing or management. These are more closely related to a fundamental, internal realm of product development, to which engineers are more attuned. He acknowledges the importance of industrial design, though distinguishes between those who are flexible in light of other requirements, and those who are adamant in insisting on personal whims.

Table 6.3 summarises the repertoire elements identified in the extracts above, and groups them according to themes. Listings of the various repertoire element categories are contained in Appendix I.

Table 6.3 AM Repertoire Elements, Clustered by Emergent Themes

Positive Dominant	***Neutral or Mixed***	***Negative Dominant***
directly relating flexible open chaotic creative	relate influence process history driven risk	rigid indoctrinated suppressed boundaries delineate, inhibit insecurity
bend, deviate compromise feedback analysis		adamant forced driven through
	requirement influence	would like to see
overview higher level view	buried down in niche	narrow
float balance reference	move	
long term vision knowing investment clean-sheet design	survival	short term deceiving damaging redevelopment
deliver fulfil duty bargain		let down pain
internal technical		skin cladding sexy wantable appealing
individual control		

BB Interview

BB's educational background was the most formally varied of the five informants interviewed, including a technical undergraduate engineering degree, an MA from a design college, and a certificate in marketing. His career had primarily been in consultancy, having migrated from product design, through graphics, and into marketing and corporate identity. At the time of the interview, he had recently joined a multidisciplinary design and marketing consultancy in this capacity.

As mentioned earlier, only about an hour was available for this interview -- half what the previous interviews had required -- so the decision was made not to try to follow the interview script. An effort was made to ask questions in similar areas, though with less structure imposed by the interviewer. The course of the conversation was somewhat more determined by the informant, and seemed to include longer, more elaborate narratives than previous interviews. In the analysis, it was found that content could be sorted into similar categories as in the other interviews.

BB related several detailed and lengthy examples in narrative form, from his own work experience, to illustrate the essential nature and contribution of various aspects of his work. BB's presentation of his work and its contributions was coherent, fluent and practised in comparison with the previous interviews. Frequent references were made to material in a thick portfolio he retrieved shortly into the interview, though he was not delivering a prepared presentation. This may have been a manner of presentation he was accustomed to, either from his recent job search, or the more general need to sell to prospective clients in a consulting role.

Strategy, vs. Concepts and Implementation

BB described what he did as 'strategy', and a significant theme was the hierarchical precedence of this sort of activity, coming before concept generation in design, which in turn preceded the technical activities of 'implementation' and 'production'. These activities were not in any way considered less important, and BB presented his experience and familiarity with them as personal advantages. However, he clearly asserted the precedence of 'strategy', and certain limitations in perception that, at least typically, were associated with specialisation in other non-strategic activities.

7. BB: And what I would do there is I'd put in brackets 'implementation', so these technical guys are technical in terms of **implementing** the product and getting it .. built, getting it.. manufactured, or tooled up, whatever. [-]

10. *I: Technical.. emphasis.. <writing>. So if this is described as 'implementation', what corresponds to that (the opposite)?*

11. BB: Concepts.. -- concept development. ... And what I do is, it comes the other way around, the bit that **comes before** that, which is **strategy**. I am the strategist; I will formulate the strategy for the project which.. creates the brief, if you like. [p]

13. BB: That's my job now. I'm a **strategist**, if you like. [p]

15.3. That's at the more **strategic** level; at the more fundamental, more kind of, if you like.. **day-to-day** level of whether the product's being used or how the identity is being used, it would need to **reflect** how the **user's** going to use it, how it's going to be manufactured, the price at which it's going to be manufactured. So, yeah, that's what I kind of.. do. [p]

16. *I: So, you operate at both levels, at the corporate identity level and also at the -*

17. BB: Yes, because the brief includes both, and my main, fundamental job is to create the brief, and run the job. That doesn't mean I come up with the concepts, because the concepts are only the interpretation of the brief. I come up with the brief, initially. [p]

21. BB: Right, yeah, I mean, if we're talking.. I think we can narrow it down, I mean.. fundamentally, 80% of my work is involved in corporate identity or product design.

21.1. The remaining 20% is involved in environmental, interior, museums, exhibitions. But, in those instances I would do the business development, the **strategy**, and then let go.. I'd leave it, because my background, I don't know much about interior design -- I've worked in it but.. [-]

21.2. but when it comes to corporate identity and products, I get more in(volved) because I have more of an affinity with it. [p]

31. BB: I think fundamentally you've got to be able to think.. **strategically**. You've got to be able to think in.. a **wider** way, in a **wider** sense, as opposed to a **detail** sense of design [P/-]

31.1. -- you've got to get away from 'that's got to be blue,' or 'that's got to be a sans-serif face,' or, 'that's got to be blah,' and **come back** and say what... [n]

31.2. Let me give you an example. This company I'm dealing with at the moment, their logo is a castle. A designer would look at that as a design, and they'd say, 'a castle.. I think it should be red,' or, 'I think it should be three-dimensional'.. [(-)n]

31.3. My job is to find out what that castle **represents**.. for the company. You've got an existing logo, it's a castle; what does that castle **mean**? What is it **saying**? What are the **core values** of the company you want **reflected through** this castle [p]

31.4. -- is it to do with strength? Is it to do with heritage? You think of the different ways you can illustrate a castle. Is it to do with detail?, is it to do with.. hand-crafted.. architecture, if you like? Is it to do with heritage, is it to do with strength.. what is it? [(-)p]

31.5. So that's taking a **step back**. So that's thinking **strategically**, number one. Number two, you've got to think -- not only strategically, but **creatively**. You've got to be able to **apply** that **strategic thinking** -- which is **marketing** -- in a creative way. [P]

31.6. In other words, think of and come up with solutions which the company really weren't thinking of. An alternative.. different.. not an irrelevant but a different, creative way of actually.. formulating some sort of **strategy** for them. [P]

63.1. But it must relate back to the requirements, the brief -- and that brief has many stated requirements. It has a top-level, **strategic** requirement, it has a.. a functional requirement, in terms of can it be read, can it be printed, can it be reproduced, can it be made into a sign, can it.. does it, when birds shit on it, does it.. all these different functional requirements are fundamental. -- and the production requirements, I mean, can it be produced, can it be.. at a cost. So it's: strategic, function, production. [P]

BB identified 'strategic' thinking with marketing (31.5, above), and described a 'marketing-led' approach as more 'holistic', and focused on things of fundamental importance to organisations, commercially and in general.

21.3. I mean, we do.. a lot of petrol station design here. My.. where I really love getting involved are the type of projects that are more **holistic** projects, like a petrol station.. which involves corporate image, it involves product design, it involves environments, it involves.. user interface, ergonomics, at a large scale and a small scale.. everything -- it involves technical aspects of production, lighting, it's an **all-encompassing** project, basically. And it involves.. value engineering because quite often you've got thousands off, so whatever you design has got to be value engineered and it's got to be manufacturable, to a price. [P]

23.1. really, very very **marketing-led**, it's all about branding, it's all about brand equity, it's all about.. **values** of the company, and -- really, really, it's a very exciting field. [P]

65. BB: At the end of the day, it doesn't matter how good a design is, if it doesn't sell, as a product, if it doesn't **get out** to the **market** it's supposed to **get out to**, and it doesn't.. perform the **communication** function it's supposed to perform -- in terms of the graphic -- then it's useless, it's worthless, everyone's wasted their time. I don't care how nice it looks, I don't care how innovative and how many designers appreciate it, it is absolutely worthless, [N]

87.4. So, I've changed the company around from being a **technology-led** company to being a **marketing-led** company. i.e. the application of the technology.. to **a market**. [P]

87.18. So, we began to brand the product; so it's looking at **the market**, not looking at the **technology**. [p/n]

89. BB: Now that.. am I a designer doing that? No, I'm not -- that is pure product planning, that is pure branding. But, a design background certainly gives you.. a viewpoint which is.. allows you to think **creatively**, and think in a **marketing-led** approach. [P]

90. *I: And to sum up the difference between a person who's thinking of it as buttons and a person who's thinking about branding and a marketing-led approach, what is kind of the essential.. difference?*

91. BB: The latter, has a much more **holistic**.. view, of the thing, related to what the company is doing, in relation, at the end of the day, to what they're there for -- that's to **serve a market**, to make a margin, and that's what it's all about. [P]

91.1. At the end of the day, we're all here to do one thing, make a margin (chuckles), at a really really **fundamental** level. Whether we're consultants, whether we're.. [p]

91.2. our clients, are there to make a margin -- they're there to make a return for their investment. -- and they use design, to make a return on their investment. Let's not pretend that they do anything else. [p/n]

91.3. As far as marketing people are concerned, they see design as a part of marketing; they don't see it as some sort of isolated function -- it's part of marketing, just like pricing is, just like promotion is. It's a **tool**, in order for them to increase their return on investment. [n/p]

99. BB: Oh yeah.. I live it, I breathe it. I think it's so, so **fundamental**, everything we do. [P]

99.1. And, I.. I still believe in the more.. **esoteric** philosophy, in terms of.. I think design can change people's lives, and can.. product design especially, can change and mould the way we live. [r]

99.2. But, in the context of what we **do** as consultants.. all we're here to do is increase the return on investment to our companies. And, I think we must never ever overlook that. [p/n]

Design - Answering the Brief vs. a Fashion Statement

In discussing designers, BB felt that they were at times blind to the more 'profound' issues at stake in corporate identity, and to the fundamental nature of commercial concerns:

59. BB: Yeah, I think, I mean 'counter-productive', in terms of ... working with designers, quite often designers.. well, not often but sometimes, designers -- especially graphic designers I'm finding -- they do have.. a kind of inclination to hit on images which tend to be, sort of **fashionable**. [n]

59.1. And, it makes them blind, sometimes, to things which.. are so kind of **profound**, like corporate identity, is going to be lasting for years and years and years. [n/P]

59.2. You don't want to look at things, well, it may look good now and they're **fashionable**, but I don't believe corporate image is a **fashion** industry. [n]

59.3. And, while there are certain things that make companies look sort of.. fresh and up-to-the-minute.. [r]

59.4. there's that aspect of it: trying to be **objectiv**e about the image you're creating, to answer the brief, as opposed to mold the brief into some sort of **fashion statement**. [p/n]

59.5. That's one aspect, and the other aspect is... the forcing of graphic design elements into something which **looks** -- in terms of form, in terms of proportion, in terms of typography -- looks good, but in **practice** creates difficulties. [N/p]

59.7. I.. <'One'> has got to kind of get away from the.. **art** kind of.. **statement**, to really relating the design to fitness for **purpose** -- exactly what is it **supposed to be doing**. [N/P]

59.8. A product is not a piece of sculpture. It's not a piece of fine **art**; it's not a sort of one-off thing. A product quite often has to be manufactured in hundreds of thousands, and it's easy to design something which looks good as a one-off in a degree show, or equally in a home. [n]

59.9. (But) To do something that is mass-manufactured, and still **innovative**, still kind of aesthetically, kind of.. **push the barriers**, is very difficult. [P]

61. BB: In product design, I think definitely that; it's doing something which is.. **commercial**, which meets the requirements of the marketplace, meets the requirements of the company, in terms of budgetary requirements, but yet.. [P]

61.1. is creative, yet is different, it has an edge, it creates a product **differentiation**. And not just follow kind of the old cliches. That's, in product design, is one thing, definitely. [P/N]

61.2. And in graphics, it's this aspect of.. creating a graphic, whether it be a literature or an image, which.. satisfies the **commercial** marketing requirements (tapping fingers in palm) of a company -- within its marketplace, within its.. whole kind of internal structure. [P]

61.3. It has got to be able to work in those environments, and not just satisfy the kind of.. the whims and **desires** of the designer producing it. [P/N]

65.1. because our discipline is <'in its'> application. It's **applying** our skills to.. something, somewhere, a **market**, a bla-bla-bla, a need, a requirement, a function. It isn't a means to an end in its own right, it isn't like.. a piece of.. **art**. That's the difference between art and design, design is the application. Design is.. has a reference point if you like, to something else. [P/N]

Engineers - Looking at the Technology vs. Looking at the Market

In discussing technical people, BB described a different sort of blindness when compared to the 'marketing-led' approach. He described engineers' tendency to focus on technology for its own sake, rather than considering its usefulness from the point of view of a customer, or a market. Specifically, he describes how engineers consider product features simply as added buttons on the object, rather than in terms of their value to customers. This was illustrated by a lengthy narrative which is conveyed in the following extracts:

87. BB: Yeah! Yeah. .. Another example, I mean more marketing, because I've recently done some marketing consultancy, was **straight** marketing. A company called me in to look at their whole image.. their whole branding, their whole promotion. [-]

87.1. -- company called ClassCom. They manufacture.. design, manufacture, in terms of software, electronic hardware, and the product itself -- this computer, which is for schools. And it.. takes the register. So, if you go into a classroom, the teacher has a list of names, and you tick off the names, and it's sent remotely to the PC in the school, so the head can have a run-down of attendance within the school, instantaneously, at any time of the day. It also does Email, paging, amongst the teachers. [-]

87.2. Great idea.. having problems selling it. One of the problems is price, but.. there's another problem. All their promotion -- this is their promotion, before I got involved (showing me a page in the portfolio) -- all their promotion is about how clever they were.. how wonderful this thing is because it's wireless; how wonderful this thing is because.. it's.. got all these fancy sort of EPROM chips, and battery life, and.. you know. It was all to do with the **technical aspects** -- how clever the engineers were. [n]

87.3. And I'm saying, at the end of the day, your promotion should be about its benefits; **technology in its own right** is useless. It's what it can do. We need to push what benefits it has to the **user**. And this -- it's got nothing to do with design, this is bloody **technical** kind of people, being stuck up their own asses because all they think about is how clever they are, and they don't worry about **the market**, about the **consumer**. [P/N]

87.4. So, I've changed the company around from being a **technology-led** company to being a **marketing-led** company. i.e. the application of the technology.. to **a market**. [P]

87.5. So, that's what we did and we produced this (showing the front page of a newsletter). It used to be called 'Radio Ears'... I mean these.. these.. it really winds me up.. these teachers, what do they know -- I mean they thought it was a bloody transistor or something. What do they know about radio waves? Who cares whether it's radio waves or radio.. It's.. it's a product which allows them to take the register, that's all it is. That's all they care about. [n]

87.6. You know, it's amazing, absolutely amazing. And they couldn't see it, until we produced some market research, and it really began to hit home. [N/P]

87.7. And... that was the fundamentals of the promotion. And then what they did.. then we got into branding. (aside) I'm getting excited now. (both chuckling).. [P]

87.8. This product was fundamentally an attendance registration.. but it had other features. It had emergency alarm, so if there's a problem with violent children, press it down; there's a fire alarm system.. so that was to do with security. There was Email, paging, so that was to do with electronic communication. [-]

87.9. What they used to do, they used to flog this thing for thirty grand, and they used to charge another thousand pounds to have an extra button, i.e. 'Email'; another thousand pounds to have an extra button, i.e. 'alarm'. [(-)n]

87.10. So the electronic engineers were looking at this purely as buttons on a product, because that's the way they perceive the thing. They said, all right, **technologically**, we can re-program it, add a button, and it can give you Email. So again, they're looking at it from their point of view. [N]

87.11. I said look, that is not how you should be marketing this -- you should market this product, not as a product about teaching or about schools; you are **in** the attendance registration **market** (slightly pedantic tone). You're **moving** now **into** the electronic communication **market**, you're **moving into** the security **market**. You should brand these products [p]

87.12. -- still **within** education; it's a very specific **niche** and I think you should stay in education, don't try to get out of education, because you **understand the market**. [-]

87.13. But brand your products and create three brands: ClassCom electronic attendance; ClassCom security; ClassCom communications. So you could actually sell these products, if you like, separately. [p]

87.14. And the problem they had was, no one.. schools weren't willing to pay thirty or forty K for this product. So I said to them, why don't you create a brand -- which is what we did; we called it 'Watchdog', which is a security product. So you sell the security product to the school, because there's a real security problem now at schools, for ten K. [-,p]

87.15. What you've got to do, in technological terms, you've got to actually input all the radio frequency network -- the RF network -- so there's transceivers on the walls, so these things can talk to each other. Once you've put the infrastructure in, the rest of it is easy, right? [-,p]

87.16. And the biggest cost for these folders is.. the infrastructure costs about eight K. For two K you can give them the security function, so for ten K they've got the security function, which is cheap -- they'll buy it. [p]

87.17. More importantly, they'll have the infrastructure. So a year down the line, you can go around to them and say, right, you have the infrastructure, we can sell you the electronic communication, we can sell you the.. attendance. [p]

87.18. So, we began to brand the product; so it's looking at **the market**, not looking at the **technology**. [p/n]

88. *I: Right; I think it was really telling that you said the engineers were thinking of these things as buttons on the object..*

89. BB: Now that.. am I a designer doing that? No, I'm not -- that is pu-ure product planning, that is pure branding. But, a design background certainly gives you.. a viewpoint which is.. allows you to think **creatively**, and think in a **marketing-led** approach. [P]

Communication with a Target Audience

The most prominent themes in BB's discourse establish and elaborate on the essentially communicative relationship between an organisation, its products and promotional material, and a group of receptive consumers or users who constitute a 'target audience' or 'target market'. Corporate image is the shaping of this target

audience's perception of the essential attributes or 'core values' of an organisation, or similarly the 'brand values' of what the organisation produces. This communication is accomplished both through an image that 'reflects' these aspects of the company, and through the company's products.

15. BB: The common elements are the fact that no matter what you design, it, in my view, it will have to **reflect** the **core values**, the corporate culture, the aspirations of the organisation you're designing for. [P]

15.2. So, whether it's a product, or whether it's a piece of literature, or whether it's a reception, or whether it's an office, or an exhibition, it has to in some way -- well not in some way; it has to in absolute terms **reflect** I would say those **values** of the company, and that is what corporate image is about. [P]

27.2. That's the fundamental job of corporate image. If you.. go away and design a logo.. really nice corporate image for them, and **behind** it still this mad kind of.. unstructured.. mayhem, then the corporate image is a **facade**, it's worthless. Because it will.. the truth will **come out**, at the end of the day. [N]

29. BB: Corporate image can only **reflect**, in my view.. can only **reflect** what **really** is true. If the truth is that this company's got no **direction**, then it doesn't matter aesthetically or in terms of the design, how wonderful the corporate image is, it will be tainted by exactly.. the organisation. [N]

29.2. And another really important point is that, no matter.. no matter if a company thinks it's going to have a corporate image, it has a corporate image, whether it likes it or not, a company has a corporate image -- it has a **perception** among its **target audience**. [n]

29.3. And why not deliberately put that **perception** that you want to **put across**. This idea of companies saying to me 'we don't need a corporate image' -- you've already got one, you've got one, whether you like it or not. (I: The question is, is it one you want to have?) [P,n]

29.4. More importantly, is it one that **reflects** your company? And if it is one that **reflects** your company and your company isn't what you'd want it to be, then we've got to change the company, and then **reflect** the new company <:::>. [P]

42. BB: The-ey were legitimate, as much as they **reflected** one aspect of the company, but it didn't **reflect** the **all-encompassing** kind of thing that the company, .. [P]

BB describes this communicative function as being of primary importance, and its effectiveness as the ultimate criterion of the quality of a design:

65. BB: At the end of the day, it doesn't matter how good a design is, if it doesn't sell, as a product, if it doesn't **get out** to the **market** it's supposed to **get out to**, and it doesn't.. perform the **communication** function it's supposed to perform -- in terms of the graphic -- then it's useless, it's worthless, everyone's wasted their time. I don't care how nice it looks, I don't care how innovative and how many designers appreciate it, it is absolutely worthless, [N]

93.2. but at the end of the day, design is there to facilitate organisations, companies, whatever, to **communicate** with their **target audience**. [p]

93.3. If they're **commercial** organisations, it's to **communicate** with their **target audience** in order to increase their return on investment. Their **target audience** could be their **customer**, it could be their shareholders, it could be government, it could be unions, it could be anything. And if it's unions, their immediate aim is to have better employee relations, but the ultimate aim is to increase the return on their investment, (chuckles) know what I mean? [p]

95. BB: Yes, I think, at the end of the day, it is. Because, I've worked for trade unions, and what they're **fundamentally** doing is they're **communicating** a brand, and a set of **brand values** to their **audience** -- their audience just happen to be their members. I'll give you an example.. <flips through portfolio> Their audience happen to be their members, and they have, just like any other company, a set of **brand values**, a set of **core values**.. they're about. [p]

96. *I: (looking at portfolio) Now this is RMT..*

97. BB: Royal Maritime Transport Workers Union. It's about movement, it's about transport, it's about.. British racing gre-en, industry, it's about service.. but we convinced them their **target audience** weren't just their members but it was the travelling public as well. [p]

97.2. -- and these were our ideas; they just wanted a.. to have a bloody.. flag.. These were completely our ideas, or my ideas.. It's **applying strategy**, to trade unions. .. Great job. (chuckling) [P]

A particularly important objective of this communicative relationship is the creation of a differentiation between competing products -- in the minds of the target audience, or in a sort of objectified market. This means of differentiation should simultaneously establish a similarity across a company's products, linking them to the corporate identity. This is described as a 'visual language', which endows a product with 'personality', or 'character':

67.1. And, quite often, I think it is good practice for designers to do things which are a little.. bit **pushed** about boundaries and **explore**.. in order to **come back**. So, you will **push** a client, you want to push them out, in order to come back if you like. But, it's the skill in making a client realise that's what you're doing.. making the client realise that it is possible to come back. [P]

68. *I: Can you give me an example of that?*

69. BB: Yeah, I mean.. There's examples of product design where we've done some really.. wild and wonderful things, but elements of that design can be configured into something which is more to the liking of the client. But, unless we did that something which was more radical, then.. coming back you still end up with some elements of it, it's keeping some elements of it in there. .. [p]

73. BB: I think it creates a **differentiation** -- a product **differentiation**, amongst its competitors. [p]

75. BB: Oh yeah.. Why does it work? (I: For them, what do they want, how does it |) The point is it doesn't work. If you went to the radical solution, it wouldn't work and it doesn't work, because the client wouldn't be happy with it, and it would be so.. far.. removed from.. **market expectations**, from present.. company products it wouldn't work [n]

75.1. -- but, there's always elements within those radical concepts that can work within a conventional product, but gives the product the **differentiation**, and begins to form, if you like, the **visual language** for the product range. [p]

75.2. So, in my view, I think if a company is producing a range of products.. with time, you should be able to take all branding off of a product, and **the consumer**, **the market**, should be able to recognise that product is from that particular company; so we should create a visual.. product interpretation of a company's corporate image.. and, it's happening more and more. [p]

75.2. So, in my view, I think if a company is producing a range of products.. with time, you should be able to take all branding off of a product, and **the consumer**, **the market**, should be able to recognise that product is from that particular company; so we should create a visual.. product interpretation of a company's corporate image.. and, it's happening more and more. [p]

75.4. Take the badge off, take, you know, that.. And gradually, gradually, <'these things **come**'> **through**. [p]

75.5. Now, I'm a designer.. {..} been to the RCA.. you've got product, all sorts of designs (around you) all day, and you begin to become a bit of a trainspotter when it comes to car designs.. but gradually **the market** begins to look at that. [p]

75.6. And, if you look at how new car designs develop -- look at the new XK8, the Jag.. it has kind of.. design cues from the entire.. from other Jaguars, which begin to form a corporate image, or what we call 'brand equity' -- the **product character**, of that. [p]

75.7. So, I think the next thing in terms of product design is that -- is companies.. Samsung, Phillips, whatever.. beginning to create visual.. cues, **visual**.. **language** for their products. It's what I call a 'product-manifested' corporate identity. [p]

BB explains the need for this differentiation as a result of an increasing technological similarity between products. He describes this differentiation in terms of the four dimensions of market perception -- the four P's. [69]

77.1. As products become.. technologically.. **similar**, performance, in fact. As more and more companies.. factor in the technological aspects of products [-]

77.2. -- I mean, if you look at a lot of televisions, the tubes are made by one or two companies, so.. you know. Computers, it's all Intel. [-]

77.3. As you.. As products become technologically very **similar**, performance-wise very **similar**, in price, in terms of distribution networks, where you buy them from -- you go to a shop and you've got <'you all choose'> from one shop. [-]

77.4. So, the **differentiating** factor wouldn't be price, it wouldn't be technology, it wouldn't be distribution... it could be promotion [-]

77.5. -- on marketing now, I'm hitting on what they call the five P's. .. So it's Product.. Promotion.. there's Place, which is distribution.. there's Price, {recaps list, there's only four} and the fifth one is People. Right? [-,p]

77.6. So, the **differentiating** factor will be.. not Product, 'cause they'll be the **same** in terms of performance. It will not be Place, because you buy a product from very **similar** outlets -- very similar methods. Price will be.. OK, some people can differentiate with price, but.. it's not a differentiating factor. [(-)n]

77.7. So really, service.. it's the people in your organisation, which is fundamental. OK? And, the Promotion, the advertising, how that **comes across**, will be the **differentiating** factor. [P]

77.8. When you come to this Product bit.. OK, technologically yes, they'll be **similar**. But, the **differentiating** factor will be the design, the aesthetics, the.. details, the **personality** of the product. [-/p]

77.9. So that is what will **differentiate** the product, create a **personality**, create a corporate image. And that **personality** will be a **reflection** of the company. [p]

77.10. So, if it's.. Sony, or if it's Samsung, it's very kind of innovative, sharp, front end. If it's something like Roberts Radio, it's traditional English, solid, reliable. [P]

77.11. Lots of different **core values** that one **reflects through** the product, and therefore through the details, through the materials, through the form, colour, bla-bla. [p]

78. *I: A consistent.. I was just thinking -- a kind of a thought experiment, was.. what would be wrong with designing a series of beautifully detailed objects, but .. that they were all quite different, or that they had no common element..*

79. BB: Yeah, but.. The reason why I think products from the **same** company will begin to look **similar**, begin to kind of have a **visual language** that **links** them, is because they will **reflect**, they will begin to kind of have a **perception** of the company itself. [p]

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[69]BB identifies five P's in his explanation; in addition to Product, Place, Price, and Promotion, he adds People -- or the quality of service.

79.1. So the company itself will give itself a **perception**, **through** its advertising, through its service: that it's professional, that it's reliable, that it's here to stay, it's not gonna go bust -- all these different kinds of.. issues.. will **come through** its promotion, will come through its service, and will be **reflected through** its products. [P]

81.1. That is important, obviously, but.. **product character**. The product, it must start.. you know, Sony Walkman, the **character** of the product, it **reflects** the whole organisation, it is.. [P]

81.2. I mean, I think, the most obvious.. obvious manifestation of this is cars.. how the **product character**.. is so **different** from car to car. But I'll bet you if you.. drove them, when you closed your eyes, you wouldn't notice a lot of difference between a 106 Peugeot and.. a Polo. [p/-]

81.3. You know, it's begin.. that's where designers and marketing really begin to **differentiate** a product. And of course, the **character of a product** is gonna **come through** it's advertising as well, its promotion. .. [p]

81.4. And then, on the other side, corporate image, graphics.. again.. as products, services become more and more **similar**; as the.. distribution channels, the communication media which those companies **communicate** with their **target audience**, become more **similar**, the **differentiating** factor in a company, will be its corporate image. And that's what will give the company its differentiation. [-/p]

Marketing - A Real Understanding

In distinguishing his own particular background, BB felt that his technical and particularly his design background differentiated him from those he described as having a 'straight' marketing background. Some of the extracts above convey his perception of blindnesses that design or technical backgrounds are prone to. When asked about frustrating or negative experiences with other marketing professionals, BB's response was that he felt they were less prone to the blindnesses he regarded negatively, though he faulted some for not having an adequate understanding of their markets and their competition. He later qualified these instances, saying the individuals weren't really marketing people, but were people in a marketing role who, 'didn't have a clue.' BB explains what it means to have a 'real understanding' of a market, in the two following narrative extracts:

102. *I: What about marketing people.. are there negative characteristics or counterproductive, or frustrating, that you encounter with people you might describe as coming from a straight marketing background?*

103. BB: Less than.. less than others, I think. I think a lot of marketing people.. you know, **understand** branding issues, **understand** what the value of design is to them. .. [p]

103.1. A surprising amount of marketing people don't **understand** their competition, I've found. It's surprising the amount of marketing people really don't have a grasp of exactly.. I mean, I'll give you an example here. [n]

103.3. This company is a company called VoiceCo.. part of InterCorp. Their whole corporate philosophy was to be second to BT. No one can compete with BT in terms of telephones, in this country. So their sort of remit if you like is to be the second natural choice for the **consumer**. [-]

103.5. but if you're going to say to me you want to be the second natural choice to BT, you've got to bloody **understand** what all the rest of them are doing. -- what product they're having, what ranges, what prices, how they promote, what features, and have it really.. [P]

103.6. I got there, and they (whispers) didn't, they didn't have a clue; they just had a list of competitors. What does this mean? [N]

103.7. So I proposed to them we forget about design for a minute and, let's talk a bit more **fundamentally**, and look at us being marketing consultants. [p]

103.8. And we proposed that we do sort of research in terms of all their competitors, itemise and categorise all product ranges of competitors.. cordless, corded.. {..} what they call <'pergolas'> which is basically the phone which is on a stand, so it's like a boat shape -- that's a different range. Answering machines -- telephone answering machines, business phones -- all different categories; and the range within the categories, then the prices. [p]

103.9. (I: This was of the competitors) All the competitors; every company should have that, as a diagram.. a **fie-eld representation**. [p]

103.10. And examples of their packaging, examples of their brochures, examples of their.. below-the-line advertising, above-the-line advertising.. so you have a **real understanding**. [p]

103.11. And then, what that will do is give you a **real indication** of where the gaps are. This company is not producing something like that, or is producing it but it's too expensive, or it's producing that, but it doesn't have the features. So you can begin to **realise**, when you match your product range to them, where you're strong and where you're weak. [p]

103.12. And then we'd go to basic SWOT -- I don't know if you've heard what a SWOT analysis is.. A SWOT analysis is the **fundamental** of any marketing consultancy. SWOT: S. W. O. T. -- Strengths, Weaknesses, Opportunities, Threats. So you always do a SWOT analysis; Strengths and Weaknesses are internal. <:::> product range; Opportunities and Threats, are competitors. Where the really good products are, threatening your sales; where the opportunities are -- the gaps. [p]

103.13. (whispering) And they weren't doing this; they didn't even have a clue what we were bloody talking about.. I found that so surprising. That's my experience of marketing people [N]

103.14. -- these people were meant to be marketing people. In fact it turned out they weren't really, they were product managers, in a marketing department. I think if those people were in.. Sony, or BT, they'd be pretty sharp, and they would have had that sussed; I think it's sometimes just the marketing people I come across. [n/p]

105. BB: Yeah. I might give you another great example.. not of marketing people, but of people in a marketing role who haven't got a clue. [N]

105.1. DefensCo; they were designing {glances at watch and realises he's got to go} and producing defence equipment. Rows and rows, teams and teams of engineers. Really sharp, really shit-hot people. And suddenly, the defence market.. fell out of the ground and there was nothing there to do. [-]

105.2. So they had this technology to give moving images through a conventional telephone line, i.e., a videophone. They came to us and they said, uh this is what we're gonna do.. they'd totally totally designed it, <:::>. [-,n]

105.3. And <'we sort of said'>, OK, you've got the **technology**, but who-o's gonna buy it? For what price? How are you gonna distribute it? Where are they gonna buy it from? What's the brand? What's it called? What's it look like? [n]

105.4. Now.. all these re-eally **fundamental** issues that you'd address and you would answer before you'd put pen to paper.. they already had bloody working rigs up. They had teams and teams of engineers working on it, without having an **understanding** or the intention of how the hell this thing is **going** <'**out**'> to **market** -- who's gonna buy it, even what price. [N]

105.5. What if, in the end of the day, after you did all this work, you realise that to produce one telephone will cost you two thousand pounds? Who the hell is gonna buy it? You've just wasted all this money. Incredible. I was shocked. And it's DefensCo we're talking about -- not a small outfit. [N]

106. *I: How do you think they got to that point?*

107. BB: Because it's.. there's some **technical** director who had all these teams of engineers he didn't want to lose, so he had to find something for them to do-o. There was no **strategic**, corporate.. **control**, of someone slightly lower down, who was responsible for this team of engineers. [n]

107.1. I think we frightened the life out of them (laughing). [p]

107.2. So what we did in the end, we wrote.. I wrote a report and said that.. you could do this you could do this you could do this you could do this. That's gonna cost loads of money, and need a complete restructuring. But, really, what you could do -- what you should do, is sell the technology; produce the product in terms of it's technology, and sell the technology to a telecom operator who would then brand it, have the infrastructure to sell it.. [P]

107.3. and they did that. And they did sell it to BT; and if you look on BT videophones now, (I: I've never seen one) There aren't many of them, but they do exist.. it's got.. DVS: DefensCo Video System on it, and they flog them <'onto'>... [p]

Summary

BB saw his activities as fundamentally strategic, establishing the parameters within which other more traditional design and technical specialities conducted their work. He described an holistic, all-encompassing view, related to a marketing-led way of thinking. In terms of product design, this way of thinking takes the viewpoint of 'the market' or a consumer, rather than that of a detail-oriented designer or technical specialist. In terms of corporate image, the focus is on the need to create differentiation, and communicate core values to a target audience, through products and other media.

Table 6.4 summarises BB's repertoire elements identified in the extracts above, and groups them according to themes. Listings of the various repertoire element categories are contained in Appendix I.

Table 6.4 BB Repertoire Elements, Clustered by Emergent Themes

Positive Dominant	***Neutral or Mixed***	***Negative Dominant***
strategic broader, wider profound lasting	concepts implementation	
marketing-led fundamental commercial holistic		purely technical aspect fashion statement
reflect get, put across communicate	target audience perception image reflect	facade
differentiate character, personality visual language edge	expectation same, similar	radical
core values brand values		
real world fundamental level real understanding		
purpose, application		one-off art
creative		straight

RK Interview

RK is Director of Marketing at an innovative electronic product manufacturing company (ProdCo). His first degree was technical, followed by an MBA from an American technical college. His career has included research and development, as well as manufacturing experience. This interview was conducted over RK's one-hour lunch break. Because of the shorter time available, and other adverse conditions, I did not attempt to follow the interview script.

Understanding Both Sides of the Loop

RK described his role as product marketing. He described this as a new field, differentiated from other activities that might be 'classically' thought of as marketing -- including marketing communications and brand management. He characterised product marketing as achieving a balance or a combination of two realms of understanding: one of technology and the processes by which products are manufactured and delivered to customers; the other of the wants and needs of customers themselves. These two branches formed a 'loop', 'beginning and ending' with the customer:

2.2. there's the logistics process, operational process, manufacturing, getting the bits **through** manufacturing and **out to customers**;

2.4. and then there's.. you'd probably call it a customer.. **customer process**, customer satisfaction, customer service, whatever. It's essentially, you know, getting information **from the market**, and **feeding back to the market** what you're trying to do.

4.1. I mean you take sales.. they're very involved in the day-to-day business of **facing the customer**; they're involved operationally, they may own the distribution centre, involved in the logistics process; they play a key role in **feeding back** from the **marketplace**, they have a **contact** with the **channel** -- not necessarily with the **end user** -- and they **reflect back** to me what the buyers at all the large retailers are saying. [-]

4.2. I mean, you're often as not saying it to the **buyer** at a retail chain as you're offering it to the **end user** . You've got a **pull from** the end user, because you've got to **open up** a **channel to** the end user **through** the buyer, or through the retailer. .. [-]

5. RK: Product marketing is classically involved with the researching areas of new business, being **in touch** with **consumer trends**.. having a view of technology, and then coming up with product proposals that are.. if you take this technology and this **user need** and combine them into this product, and try to engineer the product, manufacture it, and hope that the sales guys can sell it. [p]

7.1. I mean, product marketing is quite a new discipline; it's difficult to find people with product marketing experience. You practically.. [p]

7.3. But people don't know what product marketing is; it's a kind of a unique **combination** of.. I mean, you have to **understand** the technology. [p]

7.4. At the moment, the big thing in.. the computer world is Java -- so I have to know what Java's about, and all the issues around Java. So.. <:::> So, I have to **understand** what that means to the industry; and although I can program, I don't really need to know how to do that, but I need an **appreciation** of what it means to.. what programming means.. {..} [p]

7.5. <'You've also got to understand'> kind of marketing techniques, and **understand** issues like segmentation, channel strategy, channel conflict, what globalisation means to a product range, and that kind of thing. [p]

7.6. Have a **real** finger on the pulse of what **the market needs**.. [p]

9.2. Product marketing is in a central area between the two, trying to **balance** the **commercial view** of the world and the **technical view** of the world, and steer them both in the right direction. [p]

19.1. And there's where ProdCo works quite well -- we do have this **market understanding**, **understanding technology** and where it's headed, and then there's new components, and stuff we can get off the shelf. We're quite good at integrating technologies and **combining** them together. [P]

41. RK: I think it comes down to an **understanding of processes**. You've got to **understand** how things are made, and how they're sold. .. To say it **begins and ends** with the **customer**.. it's really tacky to say that, but it does. [p]

41.1. If you're going to **into the head** of the **customer**.. what do they do when they **want** a new product? You advertise for them; they walk into the shop; they hand over their credit card; they take the product away. [-]

41.2. How's the product gotten into the shop? What were the buying decisions that go into that? How was it manufactured? How were components procured? How has it been assembled? [p]

41.3. Once you have an **understanding** of all the things that happen there, then when you go around the **other side** of the **loop**, and **ask** the **customer** what they **want**, and try to **deliver** what they **want**, you have a better **appreciation**.. [P]

41.4. because you can **understand** how it's going to be **delivered** to them, and you have a much better **understanding** of how your products going to have to work. Influences decisions on packaging.. structure of product, contents of product package, form of the product, localisation requirements of products and that sort of thing. [p]

RK described having made an effort in his career to gain experience on both sides of this loop, something he felt was a necessary attribute of senior management, in order to avoid a number of potential pitfalls:

43. RK: I feel like I know something about that because I've done all the jobs.. Having done R&D and then into manufacturing and now into marketing, I feel like I've been **round the loop**, round **with the customer**. [p]

43.1. To be honest, (that's) almost been a deliberate policy of mine, the way I've progressed in my career. But I don't think in companies there's enough of that. If you want to get good general managers, they have to have done that. A lot of companies just don't do that. [p/n]

44. *I: And the result, when you have someone who hasn't had that breadth of experience?*

45. RK: Well you get engineers who design products that can't be manufactured, marketers who **specify** things where there's technology overload. .. Very high technology products which have no **market application**. .. Sales companies which get wiped out.. whose sales **positions** just get **wiped out** by new technology. (I: Trying to sell something technologically outdated) Yeah. .. you know you can get wiped out very easily. [N]

Engineers Can Miss out on Market Needs

RK distinguished his understanding as a product marketing professional from that of engineers specialising in the technical side of 'the loop'. He indicated that they often had an inadequate understanding of the 'reality' of the needs and wants of customers, particularly regarding product complexity.

9.1. The thing is that engineers are.. can often miss out on **market needs**, on an **appreciation** of <:::>. .. To engineer a product is quite difficult thing to do, but really trying to **understand** what it is the **user really wants** is not really an engineering function. [n,-]

9.2. Product marketing is in a central area between the two, trying to **balance** the **commercial view** of the world and the **technical view** of the world, and steer them both in the right direction. [p]

9.4. <'And so then the'> engineers can knock out more and more wonderful and exotic, very technical products.. but occasionally you need a **dose of reality**, like, (saying) the **customer** doesn't **want** a button in this area; they **want** as few buttons as possible, and therefore it needs features that will make it easier to use. [(p)n/p]

23.1. One of the problems I've always had with HP's products is they look like they were designed by engineers for engineers; I mean, the graphic treatment is incredibly complicated -- you've got to figure out what each button doe-es. You know, there's always loads of buttons all over it, each of which has a purpose which the **user's** got to try to figure out. [n]

23.2. And you can get kind of overload of information -- it's like looking at the flight deck of a 747. It shouldn't be that way; the detail should reveal itself over time. [n/p]

78. RK: And, you can always get into **conflict** because, I mean.. I've had an engineer say 'well that feature is redundant because the market won't **want** it'.. well, what the fuck do you know about **the market**? (chuckling) [N]

78.1. You sit in front of your computer all day, and the only way you get out into the **world** is to use Netscape, and you think all the crap on the web is how the **real world** is. [N]

78.2. If you want to see the **real world**, walk down Church Street here and do your shopping in the local market. .. The **reality** of life, living on £200 a week or whatever it is. [P]

Conflict Due to Cultural Barriers

RK discussed conflict between groups and generally in the development process. On the technical side, RK described what he saw as an inevitable conflict between design engineering and manufacturing, which he traced to the inevitability of unforeseen problems, and an ignorance on the part of some engineers about the constraints of a manufacturing environment:

37. RK: There's a huge **conflict** between engineering and manufacturing -- always will be. It's difficult **bringing** new products **to market**, and it doesn't matter how many prototypes you hand build, how many calculations you do, how much you know about manufacturing. When it comes to be manufactured, there are problems you will find in it that no mortal could have thought (of). ... [-]

37.1. You know, sometimes, the design constraints are huge. I had a great example in Hong Kong, where we were using foam, expanded polystyrene packaging, which we were trying to move away from; we were legally required to do so. We went to this sort of folded box. [-]

37.2. So, we had this box, which was designed by a designer back in England. I think it involved twenty-three folds, you had to hand punch out about three tabs, and it took about forty-five seconds to assemble. And then, as soon as you assembled it, unless you packed it up and put it in the outer sleeve, it kind of flopped open. [n]

37.3. The young women who worked on the line were literally in tears, they were embarrassed they couldn't make this thing.

37.4. The guy had probably done the best job he thought, to make a fold-up box, and.. it was useless; we ended up having to redesign it. So, you can have things like that go wrong. [n]

37.5. And there was **conflict** in the factory; the designer said 'oh we can have it folded up', and we said 'try, just come out here and try'; do that job for eight hours a day, five days a week. [n]

37.6. But I mean, eventually we got to a better design; in the end we had a machine that was able to fold all the boxes, so it actually was a better solution than the original one.. but those things take time to evolve. That can be a source of **conflict**. [p]

Though he initially traced the conflict in this case to unforseeable circumstances, RK proceeded to describe a lack of understanding traced to laziness or an attitude of superiority that was ingrained by certain types of engineering education:

37.7. But you can also get the thing where.. there are a lot of engineers who are quite lazy. They'll never think about the way the thing is going to be manufactured. They just have no concept -- it's just not something that's taught in.. [N]

37.8. When I did an engineering degree, I can't even remember one time when it was suggested to me that I was ever going to design.. a) design anything, that would b) be manufactured. [n]

37.9. I did a very theoretical degree in engineering science and economics at Oxford University. [-]

37.10. Now I never went into a factory when I was there. But, you know.. And I escaped with this attitude that factories were dirty places full of stupid people. Now, the factory I ran in Hong Kong was the only environment I've ever been into in my life, where I would be quite happy to take this food and up-end the plate onto the floor and eat it off the floor, the floor was so clean. So factories are not dirty places with stupid people. [N/P]

This sort of inadequate appreciation was described by RK as a 'cultural barrier', and a similar barrier was described in the case of marketing's activities:

37.11. But, you kind of get these cultural barriers between organisations -- I think a lot of **conflict** boils down to that. [-]

37.12. Like, every organisation you go into, everybody thinks the marketing department is stupid -- they just looked up the words ‘segmentation’ and ‘channel’ in the dictionary and rehearsed them and learned how to say them, and don’t have any **appreciation** for that. [N]

37.13. I mean, the thing about good marketing is, you should say it and it should be **obvious**; but having got to the positioning statement or the brief or whatever, is not easy. [P]

39.2. But, you put up a channel marketing brief, or **define** it (the product): a small electronic organiser powered by two double-A batteries, with a liquid crystal display and a keyboard, used for personal information management. And it’s kind of like, ‘no shit, Sherlock,’ (chuckling); it’s a great product. But fifteen years ago, I mean, no one had thought of it. [(n)p]

Product Marketing - Repertoires of Abstraction and Involvement

In discussing product marketing's role in terms of the other side of 'the loop' of understanding -- that of the customer or the user -- RK employed two quite different repertoires. The first repertoire emphasised acts of definition and objective judgement, with the product as an abstraction.

17. RK: Well, there’s a difference between execu-ution and **definition**. .. Product marketing should really be there to **define user needs**, not to **dictate** the solution. And then, to **objectively** measure whether the proposed solution does actually meet the **user requirements**. [p]

17.1. So, I mean, in terms of.. If you try to **define** the electronic organiser.. The marketing **requirement** is for a small, battery powered device, for organising individuals’ personal information. I mean, that’s the broadest **definition** of the product. And you know, <‘created this **market berth**’> for these devices that people will pay 300 pounds for. [p]

17.2. So, strictly speaking, we’ve made no statement about the technology, we haven’t said it has to.. well, we said it had to be electronic, but even then you don’t.. I mean, a mechanism for recording <'all that'> information, you can come up with Filofax, or you can come up with an electronic organiser, but it’s essentially **serving** the **same user need**. [-]

19. RK: Well, I think that’s where the kind of fusion of ideas comes in, that it then starts to become a trade-off. So, you look at.. costs of different.. what the cost drivers are. So then you may get into trade-offs about the **physical form** of the product can take, and the **technology** you’re using to **solve the problem**. [-]

31. RK: There are some things which you can make an **objective** decision, and some you can't. I mean, colour has always been **subjective**. Form is often going to be **subjective**, but physical size is **objective** -- if it doesn't fit, it doesn't fit. [-]

39.2. But, you put up a channel marketing brief, or **define** it (the product): a small electronic organiser powered by two double-A batteries, with a liquid crystal display and a keyboard, used for personal information management. And it's kind of like, 'no shit, Sherlock,' (chuckling); it's a great product. But fifteen years ago, I mean, no one had thought of it. [(n)p]

The second repertoire stressed emotional involvement and interest in products, described in terms of 'passion' and 'flair'. Both repertoires were drawn on in a complex way as RK discussed several subjects, including aesthetic decisions. RK twice brought up aesthetic decisions about the colour of a product's keys, as well as another reference to exterior casing colours. In both cases he stressed the need to approach decisions rationally, prominently citing the effects of certain colours on perceptions of product size in his logic. However, in both cases, he also seemed to contradict this rational approach, by indicating that such decisions ultimately came down to 'flair', 'an eye', or the chairman's 'aesthetic sense'.

25. RK: No. I mean, that's where the problem comes, because ultimately.. you can have a team of people working on things, but when there's **dissent**, if the dissent is not solved by **logically** offering the solution up to the product brief, like you say, 'well, it's too big.. it doesn't fit in your pocket' -- things like that are obvious. [-]

25.1. But when you say well, I don't like.. I mean, an issue we have at the moment in our new products, 'I don't like the colour of the keyboard'.. kind of thing. And then one group says it should be black on white lettering, to make the product look.. to make the keys look bigger. Another group thinks it should be white lettering on a black keyboard, to make the product look cool, and **aesthetically** pleasing, like a notebook. [-]

26. *I: So, how do you approach that sort of disagreement?*

27. RK: Well, you really have to approach it **logically**. Light keys make the keyboard look bigger, which is a very good thing. There is little doubt that they make the product less **aesthetically** appealing, although they might possibly make the product look more familiar, in terms of it looks like a computer keyboard. [-,n]

27.1. And then you say, well do you actually want it to look like a computer keyboard, or do you want it to look like the keyboard on a notebook computer, which is possibly the **competing market**. And then you say well, yes, notebook computers basically now have black keys, so.. there's different forces coming into play. [p,-]

28. *I: What do you think ultimately is the appropriate way to make that sort of decision? Or, how do they get made?*

29. RK: Well, I think ultimately there's.. If you can't resolve it, then it literally goes to the top of the company. The chairman has a very strong **interest** in design, and has a very good **aesthetic sense**, and he will make decisions like that. .. [p]

73. RK: We haven't really talked about conflict very much.. I think one of the biggest sources of **conflict** is around an **aesthetic viewpoint**. People have **opinions** about things, and their **aesthetics** are different. [(-)n]

73.1. I think to be good at marketing you've got to have that. The best marketing people... marketing **flair** might just be an **eye** for something; design, colour, <'moulding'> or whatever, you're having to express. [p]

73.2. Engineers also have these views, but some are good and some are not good. [n]

73.3. And designers.. there are good graphic designers and there are bad ones. Just because you are one doesn't mean <'you're a good one'>. .. [n]

73.4. This ability to **understand** what's appropriate for the **target market**, and what's classically good or whatever.. is hard to achieve. I.. I think.. my experience is **aesthetics** cause the most **conflict**, in things. [p,-]

75. RK: Yeah, like, 'I like that font' or 'I don't like that font;' you know, 'I like that logo,' or 'I don't like that logo,' but they couldn't **explain why-y**. -- or, 'that goes and that doesn't go.' [n]

79. *I: How do you, in cases where there are these aesthetic.. just disagreements in aesthetic judgements..*

80. RK: Well, I think you have to work through the designer; I think a really good designer will help you **understand where you're heading**; he'll bring you **back to basics**. [P]

80.1. He'll say "look, this product is small.. if you paint it white you're going to make it look bigger" .. you know, you could cool it down, you should cool it down, warm it up". [P]

80.2. Even if you paint them gra-ay -- this (Mark II) is a very neutral grey. The original series three finish was very blue, actually. If you look at them <'from this angle'>, compared to this it will look blue, have a blue sheen. -- and other products we've done have a green sheen to them. [p]

80.3. A lot of the **personalities** pan out in very subtle things. And a good designer will be able to do that for you -- kind of **guide** you there.. and achieve **balance** in products.. and a **consistency** that runs through your products.. and help you get there. [P]

In discussing excellence in marketing and an understanding of the consumer or user, the repertoire of passion and intense emotional involvement played a major role in RK's discourse. This understanding of needs and buying decisions, was metaphorically described as 'getting inside the head' of the user. RK recounted two narrative examples illustrating the importance in this process of actually *being* a user of the product:

46. *I: {difference between somebody who's really good and somebody who's mediocre has ability to understand, conceptualise, take into consideration whole process} and that comes directly from experience, somebody who's experienced it?*
47. RK: Yeah. I mean, I think you've got to have a bit of **flair** in there as well. [p]
48. *I: What are the ingredients of the flair?*
49. RK: .. I think there has to be a **passion** for the products you're making. You have to **be a user** of the product and really be a.. I mean to get **inside the head** of the **user**, it helps to be a user. [p]

49.2. I'm like, how can a man be the product manager for Tampax? You can do the focus groups and that kind of thing, but you're never going to **use** the product. So how can you know what that.. you can't make that **emotional thing** that you need to **with** the product if you don't use it, and I just thought that was daft. [n]

53. RK: I remember reading something about Atari.. this is going back a long way, fifteen years.. Atari basically had the games **market** to themselves and failed; they just lost all **their market** to Nintendo or whoever. And the guy that ran Atari banned his children from owning one, because he didn't think it was good for children. But he was running the company. In his mind, his whole.. objective was to destroy the American family. [N]
53.1. I mean you just can't.. <mouth full> you have to.. If you **use** the product, you **understand** the weaknesses. It's like ... <pause, sounds of silverware> [p]

RK returns to the repertoire of 'passion' later in the interview when he discusses two employees, one of whom he evaluates positively, and the other negatively. It is clear that a genuine, intense involvement with the product is a necessary ingredient in 'judgement', and 'being right' about products. However, the rational repertoire is also reintroduced (108), and merged with the passion repertoire in the final segment (110).

106.7. So.. you-u've got to be **interested in products**; people who are not interested in products and just turn up and **do it as a job**.. so what. .. There's also this distinction between getting people working around you who just **love it** and **live** and **breathe it**, as opposed to people who are in love **with the idea** of <'it'>. [P/N]

106.8. It's interesting, I've had two people work for me the last two years, one of whom I inherited and then moved on to somebody else, and one of whom I recruited and then kept. And the guy I recruited and kept is doing.. the job I never let the other guy do. [p/n]

106.9. Because I knew the other guy was never going to give me any reward from it, because he was just gonna go off and.. just have all this knowledge in his head and never **pass it on** and never **synthesise**.. He was a **collector** of.. [N]

106.10. I mean.. you could ask him anything <'much'> about Ja-ava, and you know, Lotus notes, and internet; he knows loads of people in Silicon Valley -- great contact list. [(p)n]

106.11. But at the end of the day, he's just a **bullshitter**. Whereas this other guy.. he's **always right** about products. [N/P]

106.12. I'll say, 'I think we should do this.' He'll go away and he'll research it, and come back and say 'no you shouldn't, you should do this.' -- and I'll go, 'you're mad! you're mad, you're mad'.. and he'll go 'right, maybe I'm mad'.. but six months later damn it he was **right**.. I just hate it. [P]

106.13. But I mean I really trust his **judgement**. I let him do the things he wants to do because I trust his **judgement**. [P]

107. *I: And this fellow who was just a collector of information and had all these contacts didn't synthesise it..*

108. RK: Yeah, and it ends up being **home-brew**. I think actually, that's an interesting word that we use. <:::> you know, all these home-brew.. theories and assessments of how things are. But, at the end of the day, they might just be your **opinions**; it means you can't **rationalise** them. That's all the bits -- you have to **distil** it to something of value. [N/P]

109. *I: Well, this fellow who has such a reliable judgement, does he use home-brew theories? or..*

110. RK: Well, I think he's got good **intuition**, but he's also does.. he's very **research based**. He reads a lot; he does fact-based research and <'analysis'> things, does little models. He **collects statistics**. -- I mean, ask him the weight of a mobile phone, he knows it. He's a collector of facts. And, he's got a good **aesthetic sense** (inflected tone) -- he dresses nicely. .. He's well-spoken. And, to find one of those, is quite difficult. [P]

Individuals and Personalities

Another theme involved in descriptions of excellence in product development, closely related to 'passion and flair', is one emphasising the role of individual personality. RK

referred twice to Formula I auto racing in an analogy with companies and product development; the second time was a lengthy account of the role of individuals and radical innovation in the steady increase in racing speeds:

54. RK: I've always thought there's an interesting analogy in all this to.. I'm interested in formula I car racing. That always amazes me, the kind of **passion** and the technology that goes into it, and there's this bit of luck going in. .. [p]

54.1. And you ask yourself.. There's usually some teams that are consistently doing very well, and some that come up and stay there or dip down again, and some that do very well and then disappear. And often it just comes down to the **individuals**.. I mean, sort of consistency of the time of the **individuals**, and the **focus** they've got on it. [p]

54.2. Some companies have got the right combination of **individuals**, the right **focus**, and just get on with it and **do it**. .. and other companies don't. .. [p/n]

99. RK: Yeah, and you have that.. and it's obviously traced back to an **individual**; an **individual** has an idea for a **radical change** in something. <::> [p]

Relating his talk of individuals and personalities back to product development, RK describes boring products, lacking interest and personality, in opposition to products from a culture which challenges and experiments. This culture is attributed to the influence of individual personalities:

54.3. I think that a lot of the Korean companies -- Goldstar, Samsung -- they **turn out** incredibly **boring** products.. just awful. There's no **interest** in those products at all; I would never buy one. [N]

54.4. Their technology is probably as good as anybody else's, their prices are cheap; I'm sure they use the same designers that everybody else uses, but this kind of **passion** and **flair** are really lacking. [(p),N]

54.5. If you look at a Sony product.. there's quite obviously this.. **thread running through** it which is a **cultural** thing they've built up over many years -- they've got it in their culture -- and I suspect it probably comes from one or two **individuals** who were there right in the **beginning** and laid the law down.. this is what works and this is what doesn't work.. and set a cultural tone for **challenging** the status quo, **exploring** new ideas, not just doing what everybody else does, being **adventurous**.. and a management system that will fund things like that. [P]

56. RK: I think it ultimately will come down to **personalities**. I think it's very easy for companies to get **derivative** in their.. approaches, and just **copy** what everybody else does. It might be that some.. they've got product marketing people in there who don't know <'bollocks'>, who've made it look like everybody else. .. [N]

RK mentions the negative effects of upper management dictates or dogma that limit individual creativity. He indicates that this problem manifests itself in a less severe way at ProdCo, though it plays a role in the 'keyboard debate' related earlier:

58. RK: But then, you get a company like Ford, there is this **dictate** that there will be a company look to the car. In three or four years, all the cars got this kind of.. round headlights and smiley face radiator.. which might look good on an escort, but on a Scorpio they just look ridiculous. And kind of wins the ugliest car of the year award, and sales <'went through the..'> whatever (negative, dismissive tone). [N]
59. *I: So, that sounds like an element of dogma..*
60. RK: Yeah. And I think you can get.. you know, senior management **dogma** can be really harmful, and it can **limit individual creativity**. I think senior executives have got to be quite **brave** to let some of this stuff **go through**. [N/P]
61. *I: Do you feel you have that problem at all at ProdCo?*
62. RK: I think we're too small.. but I think there is a problem. I mean, some of the **old guard** won't let some things **get through**. I feel like saying well, let's **do it**.. [n/p]
63. *I: Like what sorts of things won't they let go through?*
64. RK: Well, this keyboard debate is an example... also some **positioning** things as well.. I think you can be **differentiated** for too long. There are times when you need to go with the **flow**. And you can be the **best** product -- I mean, you can be **like** everybody else, but just be the best. [n/p]

The following narrative was told to illustrate an approach to differentiation that involved being 'like everybody else', but having a higher perceived quality:

64.1. You know, you buy a laptop; everybody aspires to buy a Compaq laptop, because Compaq have always done the best.. PC's. The keyboards have always had the best feel to them, a more robust feeling, the mouldings are a better quality, the after-sale support is better, they smell nice when you get them out of the box -- whatever it might be, but there's a kind of quality feel. [P]
64.2. I've literally just opened a Dell laptop out of the box this morning. A new PC, going to be with me for the next 3 years, I will live and breathe with the thing. And I looked at the mouldings.. they've all got this na-asty kind of.. sheen.. you can see scuff marks as they were ejected out of the mod, hanging up on the side, because the draft angle wasn't enough. It's like, ugh. [N]

64.3. I'm sure their original model looks beautiful -- it's got kind of elliptical shapes on it, buttons all kind of nice form.. [(p)n]

64.4. but they've all been moulded with a split line right down the middle of it, rather than at the top. And you kind of think, why didn't they just think about it? [N]

64.5. They just designed it for cost. There isn't a quality feel about it -- the initial perceived quality is very low. [n]

RK was asked to speculate about the process that might have led to the low perceived quality evident in his new computer. The answer is interesting in that RK negatively opposes a position of abstraction (getting a feature set out to market to automatically garner a market share) against a positively evaluated position of involvement and interest:

67. *I: If we carry on with the Dell computer example, just hypothesising, what do you suppose happened? Where do you think the ball was dropped if it started out as a beautiful model?*

68. RK: ... Good question. I don't think there's an ownership thing or **passion** lacking.. it's kind of.. [(p)]

68.1. and they've probably got a product manager for laptops who's interested in **market share**.. and price. He sees it kind of, 'if I can get these products, and this **feature set out** to **the market**, then I will get my market share increase' and.. [(-)N]

68.2. Dell is an American company, and that business is all about **market share**. [N]

68.3. Whereas possibly his counterpart at Compaq says, 'well I've got to make my **market share**, and I know that by putting out the best products, I.. that's how we build the market share.' [P]

68.4. So I will make sure that, when the product goes out, I will be **interested** in the industrial design and will make sure.. [P]

68.5. and the engineer who's been tooling things for years has always tooled things that way, will put these draft angles on it and will use this quality of plastic because he always has done. [p]

In a final set of extracts, RK describes the necessary ingredients of successful product development in his experience. This description reflects both the rational and the involvement repertoires. Primarily, he identifies the need for 'mad' people who generate many ideas, others who play a more evaluative and regulatory role, and still others who execute to a high standard. Product aesthetics are placed somewhat outside this relationship, as a third consideration.

105. *I: Well, how about if we were to come back to the conflict {.. and} how you see the essence of good work, good practice.*

106. RK: You've got to have a few **ma-ad** people who are very **intuitive**, off the wall, come up with just.. <'whatever'> ideas. [p]

106.1. You've also got to have people who will **focus** the process and.. set **limits** on.. obj -- I mean, sort of the **objectives** and **limits** <'on it'>; does this **meet** the **objectives** or not meet the objectives? ... [p]

106.2. And you've got to have people who just **wo-ork things through**, who will do very sound engineering. -- to make a good product that's easy to manufacture. It's a **mixture** of all those things. [p]

106.3. I mean, I think.. for me as a.. new product development.. manager, it's a cha-allenge to do all those things; because you.. you've got to make sure you don't do just **me-too** products. .. You've gotta make sure that you're **innovative**, without being **too wacky**. [n/p/n]

106.4. And you've got this **aesthetic**.. **spiral** thing.. to **live up to**, in the case of our products. We're lucky that we're up here (hand defines level in the air) and that we're not starting here (lower) and take ourselves up. [p]

Summary

RK's discussion of product marketing focused on the understanding of two different processes: the process by which products are manufactured and delivered through channels to customers, and the process by which an understanding of the customer's wants, needs, and buying decisions is gained. The latter, described as 'getting inside the head' of the customer, was part of product marketing's role of constructing an abstract definition of a product. In RK's discourse, two distinct repertoires coexist: one of abstract product definitions and objective decisions, the other of involvement, passion, and flair. Though the abstract repertoire figured in many of his discussions of process, it seemed that the involvement repertoire was ultimately used to describe the difference between mediocrity and excellence in product marketing. A strong theme of the essential role of individual personality accounted for the difference between consistently innovative products and those lacking in interest.

Table 6.5 summarises representative repertoire elements from the RK interview, and clusters them by the themes identified. Listings of the various repertoire element categories are contained in Appendix I.

Table 6.5 RK Repertoire Elements, Clustered by Emergent Themes

Positive Dominant	***Neutral or Mixed***	***Negative Dominant***
define rational logical explain	dissent opinions	conflict
synthesise distil judgement	collect intuition	opinion home-brew
in touch understand get inside the head real world needs trends	through manufacturing through channel out to customers end user target market channel segmentation	
personality individual (creativity) explore challenge passion interest flair eye	copy	derivative dogma dictate boring design by committee

CHAPTER 7.

INTERPRETATION AND DISCUSSION

Introduction

The last chapter focused on summarising the content of the interviews and the results of the analysis that was carried out on them. The purpose of this chapter will be to interpret these results in light of the objectives of the study, which were to examine divergences in taken-for-granted knowledge and beliefs between specialised disciplinary practitioners, and specifically the development of a method for surfacing these beliefs through individual interviews.

Because the informants interviewed for this study were not all actual co-workers or even members of the same organisation, few conclusions can be supported about the nature of conflict or tension that might arise between them in joint or collaborative work. The number of informants interviewed was very small, and special criteria were not employed in their selection -- other than ensuring a nominal range of backgrounds across design, engineering and marketing. As a result, generalisable statements cannot be made about how widely-held any particular beliefs or ways of thinking might be. In many cases, the insights obtained through this analysis are consistent with the results of other work, and even with common sense knowledge about interdisciplinary conflict. The goal will be to show that the use of a multi-layered analytical approach which looks both at explicit content and at metaphorical language provides a richer view, and one which suggests more practical applications to improve collaboration.

Though the generalisability of the results of this study is limited, useful comparisons between the interviews can be made for the purposes of developing the method and to suggest what sorts of insights might be obtained with multidisciplinary working groups. First, general observations about the interpretation of analysis results, and common thematic elements will be presented. Subsequently, three prominent aspects of

commonality in descriptions of typical negative behaviour of groups, offered by respondents who were outsiders, will be compared with information gained from analysis of the discourse of other respondents speaking as 'insiders' from those groups, to see what relationships may exist. Finally, some interesting patterns in the use of examples and narratives by the different informants will be discussed.

Interpretation of Analysis Results: Common Thematic Aspects of Interviews

It is necessary to move beyond the words and phrases that are elements of the interpretative repertoires employed by informants. The analysis was intended to shed light on themes which informants used systematically in their discourse (in terms of positive or negative evaluative tone), with respect to groups of people they worked with and their descriptions of the process of working. Themes are structuring relationships found in the interview texts, between elements of each informant's interpretative repertoires; it is expected that these themes will be metaphorical in nature. For example, in considering the discourse of the informant EF, the simple fact that he employed variations of the word 'understand' in a systematically positive way is not in itself surprising -- it would not be expected that many informants would have a negative evaluation of the condition of having 'an understanding'. Rather, it is necessary to explore what is being understood, and how it is being understood, both from positive descriptions and from negative descriptions of situations where understanding is lacking. In interpreting the interview analysis results, it seemed fruitful in each case to ask what was the nature of the special understanding, or special knowledge, that the informant or members of his group had unique access to in comparison to other groups.

Special Knowledge and Understanding

In each interview, the informants emphasised differences between themselves and members of other groups on grounds that involved a unique or special understanding.[70] In each case, interesting aspects of the informant's 'thought world' (Dougherty, 1992) emerge when the nature of this understanding is examined.

In EF's case, 'understanding' is associated with an overview or big picture, contrasted with being driven by a single, more narrow concern. Gaining an overview requires filtering and interpreting the driven views of others, resulting in the formation of one's own opinion. Understanding, for EF, centres on those things which will, 'make a person enjoy, and therefore buy and use a product.' Specifically, this involves designing products in anticipation of their life after purchase, which involves ageing and abuse. This is engendered by an attitude toward quality based on personal integrity and a commitment to the end user. Commercial pressures, the treatment of products as commodities, and competition based on quantifiable characteristics are all held to be antithetical to this understanding.

RK also explicitly discussed 'understanding'. His understanding involved the two branches of a loop: the path or process by which a product found its way through manufacturing and ultimately into the hands of a customer, and the path by which a customer became aware of a product, wanted it, and decided to purchase it. Understanding of the manufacturing and distribution path was gained through personal experience of each step along the way; understanding of the customer decision path was described as 'putting yourself into the head of the customer', greatly facilitated by being a user and having an intense emotional involvement with the product.

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[70]EF, BB, and RK all distinguished themselves individually, even from other members of their 'own' group; UC and AM made strong positive and negative distinctions within their respective 'own' groups, but did not emphasise their own individual distinctiveness within that positive grouping.

BB also used variants of the word 'understand' in a significant way in his discourse, though less prominently than EF or RK. However, this reveals limitations inherent in any approach which emphasises content analysis without a consideration of the purposes to which larger units of the discourse are directed. A great deal of BB's discourse, illustrated by the majority of his narrative examples, was directed to support the advantages and 'fundamental' nature of his unique understanding. In terms of corporate image, this had to do with his ability to formulate a strategy to guide design and implementation, based on an understanding of meaning and representation to a target audience. In terms of marketing and product design, it had to do with an understanding of product from a market and competition point of view, as opposed to a technological one.

The word 'understand' was not found to be an important element in the repertoires used by UC in his discourse. However, if one broadens the question to ask what were the characteristics of special knowledge and understanding he identified, especially in comparison to his negative characterisations of other groups, then useful insights emerge. UC prominently described a number of positively evaluated behaviours as 'intelligence', including characteristics essential to good work such as drawing analogies and parallels, bringing things in, thinking laterally, and being inventive within constraints. These sorts of activities were deemed essential to being effective in work; those he described negatively as 'useless' and 'jaded' were unable to 'grasp' this. The other major theme he employed with regard to doing good work, the ability to transcend preconceptions and stereotypes in observation, was also described as a type of 'intelligence'. Similarly, activities like experimenting and pushing boundaries were described as 'intellectual process'.

AM's discourse had a number of interesting themes dealing with special knowledge and understanding, without being clearly flagged by a particular word as in EF's case. When discussing products, AM distinguishes between an internal, technical realm, and the external cladding or skin. It is the internal realm over which he, as an engineer, is specially knowledgeable. While he makes positive overtures to industrial design, and

credits them for improving product ergonomics, he makes it clear that it is continued innovation in the internal realm which is necessary for the long-term growth and survival of companies.

A second area in which AM claims special knowledge in his discourse is in 'what's really going to happen' in anticipating and avoiding difficulties in manufacturing and assembly process. Success is achieved when the engineer's thinking, manifest in the product's design and process specifications, have left nothing unanticipated. When problems arise it is variously described as painful, or as a failure to uphold a commitment. When he describes things which he finds most gratifying[71], and which he uses to gauge whether or not he's doing a good job, AM brings in both these realms of special knowledge: [72]

216.	AM: I like to.. and this is my analogy.. I like to be able to throw the parts into the air, and let them fall together when they come down. Now, it doesn't always work, but..	[p]
216.1.	to be able to value engineer something, to be able to make it very cost effective..	[p]
216.2.	Although a lot of those things are not visible on the **surface**, and I know.. **only I know** that or another engineer **knows** that,	[-]
216.3.	it's very **satisfying** to **know** that maybe you've eliminated ten parts and made one part to do the same job. Yeah, it's very **gratifying** to see that.	[P]
216.4.	And, I get a kick from doing that.. and the customer or the client's manufacturing line saying, 'wow, we've never been able to put this together so easily'.. it's very **gratifying**.	[P]

Other Common Thematic Aspects

Other commonalities were noted between themes identified in the interviews. These were not necessarily seen as consistently across all interviews as the notion of special and

[71]AM also describes how the successful use of a new process, which no one had previously considered but which then becomes the standard adopted by others, is exciting and gratifying (AM: 72.1).

[72]As noted earlier, bold text in extracted transcript segments is used to highlight elements of interpretative repertoires identified by the author. It does not reflect emphasis by the speaker, which is denoted by underlining and elongated vowel sounds (see notes on transcription conventions in Appendix I regarding representation of emphasis).

privileged knowledge described above, but nonetheless played a significant role in more than one. It is important to note that, though these commonalities will be discussed in terms of the use of certain words, it is not the words themselves that are of interest, but the themes they are part of.

The first such common thematic element is one of 'balance', or 'combination'. Most informants included some notion of balance fairly prominently in their discourse. As with 'understanding', this would seem to be a word that few people would be likely to evaluate negatively, so in itself the use of the word in a positive sense is not terribly enlightening. It is necessary to consider further, just what things are being balanced, and how they are balanced, to see interesting differences between the informants' discourses.

UC described industrial design as 'in between', or a 'mediator' between poles of technology and art. He placed a balanced, or 'weightless' condition at the centre of his description of the feeling of doing good work. In this case, the poles being balanced are aesthetic judgements of visual form and engineering implementation, the goal being that neither is compromised as a result of the other. In judging this state of balance, it does not seem that anyone other than the designer, UC, is involved; the thing being judged is the object being designed, and the criteria appear to be an internalised sense of what is 'right', developed over years of design training. It is clear elsewhere in UC's discourse that this balance point involves a certain amount of discomfort for engineering, as an inevitable result of industrial designers' tendency to 'push' conventional practice. Indeed, all informants who were involved in design (industrial or engineering), described an aspect of their work in terms of pushing -- either of 'boundaries' of convention or of expectations.

AM used the word 'balance' less frequently, but in connection with the positively evaluated theme of moving flexibly or 'floating' between polar working styles. Floating occurred in a vertical dimension, between having an overview and being buried in detail; it also occurred laterally between the poles of 'openness' and 'flexibility', versus

'indoctrination' and 'rules and regulations'. The image of floating suggests the engineer is dynamically adjusting his position in response to circumstances and changing project demands. AM makes it clear that his preference is generally away from the pole of 'indoctrination', allowing for the necessity of occasional 'reference' to it.

RK described product marketing as occupying a central position, trying to, 'balance the commercial view of the world and the technical view of the world, and steer them both in the right direction.' (RK: 9.2) His descriptions are more often in terms of a 'combination', based on the understanding of processes described above.

The words 'balance' and 'combination' did not appear in any form in the BB interview, and no particularly strong theme of this sort was identified. However, a necessary sort of tension was described on two occasions in connection with expressive aesthetic attributes of designs. First, in discussing design in terms of fitness-for-purpose (positive) versus being a fashion statement (negative), BB qualified the opposition by saying a design, 'must, inevitably reflect something of the designer. It’s very difficult, it’s ve-ery difficult; it’s a real fine line.' (BB: 61.4) He later described the process of 'pushing' a client with more radical designs, in order to 'come back', as a way of forming the basis for a 'visual language' -- which did figure prominently in his discourse. (BB: 67.1)

EF, similarly, did not employ any prominent theme of balance or combination in his discourse in this interview. As described earlier, the process he described in connection with the necessary 'understanding' in his role as a 'director' was described more as one of selecting and filtering. In terms of distinctions between aesthetic and technical of the sort UC made, EF described poles of 'creative' and 'analytical', as well as 'pseudo-mechanical' and 'creative futurist-conceptual', though he described these in terms of complementary abilities and skill-sets rather than as poles requiring a balance. (Indeed, he was critical of views holding them to be inherently oppositional in nature.)

It should be noted that little significance can be attached to the *absence* of a particular theme such as 'balance' from an informant's discourse. There is no reason to believe this could not simply be a result of the course of a particular interview, since the script was not developed to explore this theme. Furthermore, if asked specifically, any informant would probably construct a theme of balance to apply to their work, as many people undoubtedly see their work involving trade-offs between conflicting goals and demands. The significance of the use of a theme such as balance in the above interviews is in providing an additional insight into entities the informant perceives as significant, and something about the nature of the relation perceived between them. For example, the use of the term 'balance' conveys more of a sense that the entities involved are inherently distinct, opposing, or immiscible, in comparison with terms like 'combination' or 'mixture'.

A second area of commonality in themes which seemed to highlight interesting differences between some of the interviews was that of time scale. AM, in his discourse, links several positively-evaluated themes to long time scales. These include long-term versus short-term vision with respect to management -- the former being linked to company survival and growth, while the latter is described as deceiving and damaging. Regarding engineering, AM emphasises its link through clean-sheet design, technical improvements, and quality, to the long-term survival of the company. He also describes engineering's involvement 'for the life of the product' in contrast with industrial design's short-term involvement:

140.3. And, subsequently, **through** the **life of that product**, there was continuous problems.. continuous problems; it never went away, it must have **cost** the company involved.. endless amounts of **money** just to resolve the problem. [N]

146.1. and also... one thing that I find industrial design will only be **involved** in **the process** for a short period of time, while the product is being developed. Once it's finished, traditionally they'll **move on** to other things. .. Engineering tends to be **involved** for the **life of a product**, so that **pain** is felt for far longer period, and it's not (chuckles) forgotten easily. (both chuckle) [N/p]

152. AM: And the **pain**. Yeah, you know, he lived with it for possibly.. two or three months while he was on that project. I lived with that **pain** for nearly six years (I: oh gaw..).. big difference. Now, I see that as a very negative attitude, just to get the achievement that he **wanted**. [N]

EF also employs a positive evaluation of long time-scales, in general and in connection with product life-cycles. However, his use of 'product life' and 'longevity' was significantly different to AM's. EF describes the life of an individual object in terms of how it 'wears the abuse of use', and looks progressively better with age. (EF: 149) AM is describing 'the life of a product' as the development, evolution, and support of the processes by which it is manufactured.

UC, by contrast, employed a generally negative evaluation of long time-scales, identifying them very strongly with the negative theme of being 'set' in one's ways. He positively describes his company's role as 'educating' their somewhat stodgy client, that technology and work processes are changing (like fashions), and must be moved along with. (55.2-.3; 63-.1; 223-.1; 251)

By comparison, BB does at one point describe corporate image as 'profound', and 'lasting for years and years', in opposition to the tendency of some graphic designers to 'hit on images that are fashionable'. However otherwise, BB's and RK's discourses are relatively neutral in their evaluations of time scales.

Other possible areas for thematic comparison include the basis upon which things are described as 'the same' or 'different', and the basis upon which things were determined to be 'right', or 'real'. For example, UC, RK, and BB all have fairly strongly evaluated characterisations of products that are 'the same', which raises questions of what constitutes a meaningful difference. Where UC spoke derisively of products that were the same apart from 'a slight difference in the casing, and that's got your logo on it' (UC: 273.1), RK described how differentiation was accomplished primarily through styling

details and the logo in many products (RK: 54.6, 56.2), and BB emphasised the role of logo and styling in establishing a 'product-manifested corporate identity'. (BB: 75.7) Finally, It has been described above how UC seemed to regard hand drawing and sketching as a more immediate reflection of an internal conception, against which 'right' was judged.

The aspects of thematic commonality discussed so far emerged from the review and analysis of interview texts obtained in this study. Though they are more detailed, they are consistent in many ways with Dougherty's (1992) characterisations of departmental 'thought worlds', and Phillips' (1994) 'industry mindsets'. Dougherty identified three aspects of themes that differentiated her departmental thought worlds: what is seen when looking into the future, aspects of development considered most critical, and how the development task is understood (Dougherty, 1992, p.188). Phillips modified categories of cultural assumptions developed from anthropology, which included the origins of truth, the nature of time and space, and the purpose of work activity (Phillips, 1994, p.393). This study has focused on the informants' understandings of the nature and purpose of their work activities, and some results seem to support different attitudes toward time scales. The results of Dougherty and Phillips suggest that attention to what informants rely on in determining what is right, true, and real, could yield further insights.

Other Observations About Specific Words

Before moving on to compare insider and outsider characterisations of groups, I want to note some other observations centring on the use of specific words by different informants. These examples indicate divergences in connotative meaning which could present obstacles to the informants taking each others' perspectives.

UC and RK both referred to the particular jargon associated with marketing. RK complained that in many organisations, non-marketing people had no appreciation for the meaning of the words, or the importance of the concepts. UC indicated that it was sometimes helpful in advancing his points to 'fake' the marketing language, which he also

described as 'just wordy', and 'rubbish'. In particular, UC used the terms 'leverage' and 'niche' with a disparaging, sarcastic tone.

EF indicated a positive view of 'commercial acceptance', and 'mass appeal' as objectives for design, and had a weakly negative evaluation of designers who were uninterested in these things. However, though his new position will undoubtedly involve responsibility or a close attention to business issues, he uses relatively few marketing-associated terms in his discourse. In particular, he repeatedly uses the word 'commercial' in a negative or strongly negative way, in connection with 'competition based on quantifiable characteristics' -- at the centre of what is hostile to his 'deep understanding of quality'.

As described earlier, an episode which played a role in the genesis of this project involved the word 'compromise'. It is interesting that different senses of this word were used by UC and AM in their discourses in ways that mirror that experience. The natural use of this word in two different senses by UC and AM becomes understandable when viewed in the context of the two different sets of themes, (or thought worlds) which were evident in their respective discourses. While both informants use the term in both senses, the most central use of the term is quite different in the two cases. UC uses the term negatively, in connection with the 'weightless' state at the apex of a trajectory; moving downward from this point in either direction is associated with compromise. The focus is on compromise as a diminution in the value of the object, which the designer seeks to avoid. AM uses the term in a positively evaluated sense regarding work with industrial designers. As described earlier, his themes placed the engineer at the centre of a web of influences, in which mutual flexibility was highly valued. He also described the outcome of his work in part in terms of fulfilling a duty, commitment, or bargain. The use of the word 'compromise' in the sense of a mutually satisfactory, negotiated outcome, is completely natural with regard to this sort of process.

Another striking difference between the UC and AM interviews occurred in the use of the word 'process'. Both informants used the word when referring to manufacturing processes, and also to thought processes in general. However, in descriptions of *ways* of working, the word played a central role in AM's discourse, as he made distinctions between flexible and open, creative processes and those he described as rigid and indoctrinated. On the other hand, UC used the word 'process' in this sense entirely negatively, in connection with being in a rut; process connotes a sort of un-thinking action, in opposition to creativity.

Comparison of Insider and Outsider Descriptions

A general belief underlying this project is that no particular disciplinary or individual point of view can make an objective claim to being 'right', in an activity as complex as new product development. Rather, the refinement of different perspectives will generate different capabilities and insights (Boland & Tenkasi, 1995), but will also inevitably be subject to certain blindnesses. (Winograd & Flores, 1986) An aim of the current work is to show that insights into the nature of divergences can be gained through attention to aspects of language that are taken for granted. The analysis and interpretation has sought to demonstrate the ability of the method to surface the sorts of beliefs which could potentially be involved in friction between members of working groups. The last part of this discussion will compare some consistencies in the negative typical descriptions of groups by outsiders, with typologies and themes from the thought worlds of insiders, to see what insights result.

Object Blind

The industrial designers interviewed in this study offered negative descriptions of marketing with a strong common element. Possibly the most concise encapsulation of this criticism was offered by the informant in the first trial interview, who described marketing people as 'object blind' -- that is, they tended not to see a product as a concrete

physical entity, but as 'the sum of its parts', or an abstract aggregation of features. This was closely paralleled by EF's description of marketing people as 'feature-set' and 'quantifiable performance' driven, without an understanding of 'what will make a person enjoy, and therefore buy or use the product.' (EF: 25-25.1; 234-238). UC made a similar characterisation, blaming marketing for 'copy-cat' products and a sameness resulting from relentless comparison of products according to size and features summarised in tables. (UC: 127.4-129.2) UC described marketing as 'most distrusted' and 'way off', coming from a background neither in art nor technology, and 'only interested in the bottom line.' While both design and engineering were engaged in 'pushing it' in different ways, marketing was 'totally reactive'. Marketing could only 'ask people about things that already exist,' whereas most designers 'like creating new things.' (UC: 127-127.3; 169; 273-273.1) After the tape-recorded interview had ended, UC added that in his view, a marketing person would approach work the same way whether they were working on a new chemical plant or a new chair. This indifference to the nature of the actual physical object being designed was very negatively regarded by UC. In total, all three industrial designers interviewed perceived an aspect of the marketing approach to work which was fundamentally hostile to things they felt were most important in designing new products.

The BB and RK interviews emphasise different marketing activities, but share some elements and prominent metaphors which structure marketing vocabulary. In general, the vocabulary objectifies markets through a number of metaphors, but a dominant one involves spatialisation. Markets are spaces which may be shared or dominated by competitors who enter, leave, or are even forced out; markets are opened, they grow and shrink. Markets are arenas within which competitors or products compete with each other for market share.[73] These products are in some sense 'the same', by virtue of

[73]Another clear metaphor is that of conflict and battle, as in BB's reference to SWOT analysis: strengths, weaknesses, opportunities, and threats; in sales, companies have positions which are 'challenged', 'taken over', or 'wiped out' in 'the field'. The word 'strategy' itself has military origins, stemming from the Greek *strategos*, 'general', or 'commander-in-chief'. (Weekly, 1967; The Oxford Concise Dictionary of English Etymology, 1986)

membership in a category which in turn defines the market -- be they lawn mowers or personal computers. However, within this market, products are differentiated by their features and attributes, as well as the other three dimensions of market perception: price, place, and promotion.[74] Markets may be grouped or sub-divided; they also have internal structure, segmentation or niches, and conduits or 'channels' through which products and information move. A market is defined and understood both in terms of the competitors who occupy or have a presence in it, and the consumers who constitute it and determine its size. The marketing vocabulary objectifies and makes real entities and structures which, like the financial markets referred to by Winograd and Flores (1986), have no concrete existence independent of human communication and language.

The BB and RK interviews contain elements and themes which employ the metaphors described above, and are not inconsistent with some of the characterisations offered by the industrial designers, apart from their negative evaluations. Where UC was critical of marketing's indifference to the physical object, BB characterised marketing knowledge as 'fundamental', and 'a set of rules or principles' that could be applied to various fields (BB: 1.1-1.2). RK made several references to the 'definition' of a product, independent of its 'physical form' or the 'technology used to solve the problem', which determined a 'market berth' (and price) for the product, and provided a basis for objective assessment of 'proposed solutions' (RK: 17-19). BB refers to the construction of a 'field representation' detailing competitors, their products, prices, ranges, etc. as essential to a 'real understanding'. (BB: 103.5-103.11) BB's particular discourse placed more emphasis on a communicative process, by which 'images' and 'perceptions' were directed towards a 'target audience'. This language presupposes that perception of such images can be accurately anticipated in a prior strategy, implemented through design, and then 'aimed' at a coherent target group of receptive individuals.

Both BB and RK have varied backgrounds in fields other than marketing, and both modified or complemented the themes described above with other themes, such as those of

[74]BB identified a fifth 'P', namely 'people', or the company's customer service.

products having qualities of character and personality. It must be reiterated that the industrial designers' negative characterisations of marketing were not directed toward either BB or RK, since none of these individuals had ever worked together. RK was explicitly negative in his characterisation of a product marketing approach based on, 'getting a feature set out to market,' in order to obtain rather than 'build' a market share. This stood in opposition to what he regarded as essential qualities of involvement, 'passion', and 'flair'. Both RK and BB discussed differentiation and similarity in terms which were not as stark as UC's (UC: 127.4-127.5; 271-273.1). RK allows for a company's business to balance a certain number of 'good old, standard' products, which might be differentiated primarily by the logo, though he was highly critical of an easy tendency to become 'derivative' and to, 'just copy what everybody else does.' (RK: 56-56.2) In summary, it is clear that RK and BB have far richer views than those negatively characterised by UC and EF. However, it appears that the negative perceptions of the industrial designers are consistent with an emphasis that could arise from prominent metaphors of spatialisation and objectification that structure marketing discourse.

Fashion for the Wrong Reasons

AM and BB raised criticisms of industrial design with some common elements. AM asserted that industrial designers sometimes gave engineers unnecessary problems (AM: 23.1), and that industrial design was, 'very very heavily influenced by fashion,' sometimes, 'for the wrong reasons'. (AM: 111) He described difficulties which had to be painfully overcome, 'just to fulfil the whims ... of the industrial designers,' or because of what the designer 'found appealing', and 'wanted to see' (AM: 113, 140.3; 146.1; 146.3). BB also made a negative characterisation of designers in terms of fashion (BB: 59.1; 59.4), referring to 'the whims and desires of the designer', and an inappropriate 'art kind of.. statement' rather than 'fitness for purpose' (BB: 59.7; 61.3). While BB expanded on the differences between design and art (BB: 65.1), AM actually characterised industrial design as inherently 'an art form' (AM: 113.3), coming from 'a view from within'. He

related how decisions were sometimes biased by, 'what the designer would like to see, rather than concern for functionality (AM: 120; 122). He later described a reluctance to compromise in relation to a quality of 'uniqueness' and the 'personal signature' of the designer which could become a 'prima donna attitude' in more extreme cases (AM: 154.1-156.1). AM's identification of industrial design *with* art was not shared by any of the informants with industrial design training (including BB), though all these informants did make reference to art in their discussion of design. The negative themes of a personal statement, and whims and desires in relation to fashion however, were certainly shared by the AM and BB interviews.

Somewhat similar themes were touched upon by the industrial designers in their discourses. EF was highly critical of 'aggressive, individual-based' design processes and 'prima donna' attitudes (EF: 119, 121, 125.1; 248). One of UC's descriptive terms for the negative pole of his spectrum of industrial designers was 'pretentious', though this was linked more to producing, 'obvious stuff, that they think they're being really clever about,' than to individual assertiveness (UC: 75-77; 81). The trial interview mentioned previously, which was also with an industrial designer, produced a negative characterisation of industrial designers as 'needing to assert their creative status', summed up by the descriptive phrase, 'me me me'.

These extracts demonstrate an element of commonality in what is being evaluated negatively, particularly around the general notion of a 'prima donna' attitude. However, divergence arises around the term 'fashion', which UC treats, albeit tangentially, as part of the generally *positive* theme of moving with change and not being stuck in the past or set in one's ways (49.2; 55.3, 63.1; 139.1). Nothing corresponding to AM's 'view from within' was found explicitly in UC or EF's discourses; however, as mentioned earlier, it seemed in both cases that the essential understanding they described in their work involved judgements made by the individual in a rather self-contained way. EF's themes of 'overview' and 'deep understanding' involved processes of filtering, and an individual's grasp of subtle aspects of quality, while UC's theme of the 'weightless balance' was based

on a self-evident, internalised judgement of what was 'right' and what was 'compromised'. By comparison, AM's theme of the network of requirements and 'influences', or the marketing themes of understanding the field of competition and 'getting inside the head' of the customer appear more externally directed.

There is an issue at the heart of these two sets of criticisms, 'object blindness,' and 'fashion for the wrong reasons'. Both industrial design and marketing are described by various informants as focused on the user, yet the means by which this is accomplished seem to be quite different. 'Getting inside the head of the user,' and other metaphors in the marketing discourse, tend to objectify the market and user needs, as discussed above. The industrial designers' discourses portray a different understanding of the designer's relationship to the user. When UC described marketing as 're-active', and only able to, 'ask people about things that already exist,' this was in contrast to industrial design's 'pro-active' nature, which involved 'pushing', 'experimenting' and 'exploring'. It also involved making 'pure', 'cultural' observations in which an attempt was made to transcend preconceptions and stereotypes, and to avoid immediately going with the obvious. EF described one area of industrial design practice as dealing with, 'big pictures of issues,' 'sophisticated language issues,' 'how things will be in the future,' and things that are, 'well and truly off the screen now.' (EF: 31.2-31.3) Later, in relating a narrative example to illustrate market research's lack of understanding, EF described how a product's development was cancelled because of their failure to notice a 'cultural difference' relating to colour preference which was apparent to the designers (EF: 238.2-239). In the first trial interview, the informant described industrial design as 'having a finger on the pulse' of the culture, and acting as a sort of 'cultural antenna'.

These descriptions from industrial designers share a common reference to a cultural perception that is subtle, non-obvious, and anticipatory in nature, which was not evident in the marketing descriptions of 'understanding' the market. BB and RK both recognise a need for a certain tension between new designs and current 'market expectations': BB describes an 'edge' (BB: 61-61.1), and RK describes a need to be 'innovative, without

being too wacky' (RK: 106.3). Substantially different assumptions about how one comes to have knowledge of the user are embodied in BB's 'field representation', versus UC's 'cultural observation'.

Negative Characterisations of Engineering

Since there was only one informant from a purely engineering background, comparisons of 'insider' themes cannot be made. However, as a researcher whose primary background is in engineering, there are instances in which I believe AM's themes can be usefully compared to negative characterisations made by the others.

Two commonly recurring criticisms of 'typical' engineering were raised by the non-engineering informants: that engineers tended to focus on technology and technical aspects to the exclusion of user and commercial aspects, and that they sometimes failed to consider alternatives beyond those most familiar and conventional in their experience. Negative characterisations of engineers by the non-engineering informants described them as wanting to 'make life easier for themselves', being 'minimum-risk driven', thinking narrowly rather than laterally, 'closing down' solutions, and being 'set in their ways'. AM's discourse with respect to other engineers contains negative evaluations of similar themes. He places these in opposition to his positive descriptions of a 'free and open process' involving lateral thinking, and the story of his own personal broadening as an engineer. However, the central theme of AM's discussion of 'process' adds a dimension to the negative characterisations made by the others, through its expression in terms of duty and commitment. AM placed himself within a complex web of influences and requirements, and described a sense of personal obligation to ensure predictable and trouble-free manufacturing over the life of the manufacturing operation. Behaviour understandable within the context of these beliefs could appear overly conservative, unadventurous, or timid from other points of view. However, a deeper understanding of what is involved for AM can be gained through his experience in terms of broken commitments, unfulfilled duties, and months or years of 'pain'.

AM does not raise anything corresponding to 'failure to take user needs into consideration' in his negative characterisations of fellow engineers, though he does allow for the importance of human factors and marketing inputs in his descriptions of process. His discourse did make a distinction between an internal, technical domain of function and performance, and external aspects of a product -- with a clear priority on the former in the areas that ultimately mattered to a company's survival. Dougherty, in her larger sample, found that technical people tended to see both user needs and market characteristics directly in terms of the technological capabilities they were developing and, 'as such, rather obvious' (Dougherty, 1992, pp. 188-189).

The aspect of AM's discourse which adds a new facet to this picture was in his theme of floating vertically between levels of detail and overview -- specifically his image of the need sometimes to, 'get buried inside.. down a particular niche.' (AM: 16.1) Though the tape reflects a more active agreement by the interviewer to this point, the metaphor of being 'buried inside' one's work was not followed up because it was not noticed as remarkable at the time. It was later, in concentrating on metaphorical language, that I recognised this phrase as a powerful metaphor, resonant with my own professional experience. In my experience, the phrases 'getting buried', or 'burrowing into' a problem or a phenomenon, are used to describe a state of prolonged immersion and acute attention to minute details or inconsistencies. It is this type of focused attention that produces dramatic and productive insights. I believe this is an example of a metaphor that describes an important aspect of practice in a disciplinary tradition, which is conventionalised within that tradition. The metaphor 'being buried' could be interpreted in many ways, including being overwhelmed by a large amount of work, or taking blind refuge from external reality (as an ostrich, burying its head in the sand). I believe the complex meaning of this metaphor provides an insider's perspective on a mode of acting that appears narrow and overly focused from the perspectives of others. [75]

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[75]This appears to be the sort of behaviour that is caricatured in some of the stereotyped engineer humour in Appendix I. Of the themes developed by other informants, my experience of 'being buried' in a problem has most in common with UC's themes of

Observations About the Use of Examples

Finally, I would like to note some aspects of similarity in the examples and themes cited by informants, which raises interesting questions about how certain narrative examples may be communicated between co-workers, or circulate more freely as myths within a broader community.

Every informant employed the example of the Sony Walkman at some point in their interview, to support an important positive theme in their discourse. UC and EF used the example of the Walkman in very similar ways, to support their assertions of the untrustworthiness of market research information:

234.1. (EF:) The classic example was the Sony Walkman. The marketing people and the market research showed that the product would fail, it would not sell. [(-)N]

234.2. And I think that was.. fifteen years ago -- the launch of the Sony Walkman -- and they've sold many millions, and they have developed and launched a new Sony Walkman product every three weeks, continuously for those fifteen years. And it is a.. late twentieth-century icon and copied by everyone. [P]

234.3. I believe that the reasons for the market research problems come from the people doing the research have no **understanding** of what they're doing: what product they're researching, why they're researching it. .. [N]

163.1. (UC:) I mean, 'cause there are quite a few.. one of the.. the classic.. marketing-doesn't-work examples is the.. the Walkman. ...

163.2. Mr. Sony was basically advised not to do it -- it would never sell; and we all know what happened (chuckling).

AM used the Walkman as an example of a 'vision of the future' -- to support the positive themes he applied to management and marketing:

32. AM: I think these people and marketing, they're looking for quantities, volumes.. what target markets they're looking for.. what sectors, what niches they're trying to find. And, can they develop products which other competitors haven't got. [-]

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observation. Though this was not explored in the current work, building bridges between themes in this way is one of the activities I would like to undertake in group fieldwork in the proposed PhD programme.

32.1. That's pretty obvious, but... I always cite the example of the Sony Walkman.. before the Sony Walkman, that product didn't exist -- there was no market for the Sony Walkman until it was developed. It's a classic example of good management and good marketing, just to develop a product.. which opened up a new market, and we're seeing that continually now. [p]

RK used the Walkman to illustrate his point about the importance of individual passion and flair in producing personality in products; he subsequently used Sony when he described the need for a balance between 'wacky' and 'good old, standard' products:

54.5. (RK:) If you look at a Sony product.. there's quite obviously this.. **thread running through** it which is a **cultural** thing they've built up over many years -- they've got it in their culture -- and I suspect it probably comes from one or two **individuals** who were there right in the **beginning** and laid the law down.. this is what works and this is what doesn't work.. and set a cultural tone for **challenging** the status quo, **exploring** new ideas, not just doing what everybody else does, being **adventurous**.. and a management system that will fund things like that. [P]

54.6. That's why they hit a few home runs now and then. But even when they're not hitting a home run.. you go and buy a Walkman, or this is a Sony (indicating my tape recorder), there are things in it which make it look nicer than one that doesn't have the brand. It may just psychologically be the Sony logo. [P]

56.1. But, I mean, I think there's always going to be this balance between innovation and funkiness, and doing good old standard products. Like not every Sony product is weird and wacky. [r]

56.2. There's a lot of Sony TV's out there which are kind of bland and the Sony logo they've got £10 on them. You could replace the badge with Phillips or Goldstar and it would be the same product. [(n)p]

BB used the Walkman to illustrate how the personality of a product reflects on the corporation producing it, as part of its corporate image:

81. BB: Yes. Because, if you buy a telephone, and you buy a hi-fi system from the same manufacturer, it needs to have some sort of visual.. **link**.. which is more than just the badge. [p]

81.1. That is important, obviously, but.. **product character**. The product, it must start.. you know, Sony Walkman, the **character** of the product, it **reflects** the whole organisation, it is.. [P]

The different informants have each invoked 'the same' product as a sort of myth, each choosing to highlight different aspects to support their varied points of view. The 'Walkman Myth', in its different versions, provides an example which is salient for each informant, but viewed through the different frames of their disciplines and experiences. Because of its commonality, it could serve as a means for participants in a group to begin comparing and exploring their different points of view.

A greater degree of correspondence was noted between the examples offered by UC and AM. In addition to the Walkman, both informants cited Xerox Corporation's development of an icon-based computer interface, and made similar references to the use of metallic components used on the exterior of a product.

92.1. (AM:) You know, on the other hand I have seen examples of.. the **indoctrination stifling creativity**, such that a company could have had a fantastic product, but never developed it. [N]

92.2. I mean I cite <'example as going like'> Xerox and Apple.. Xerox developed, you know, PARC's.. the perfect working environment on a computer, and said 'no, it's not going to work'. [n]

93. *I: Why do you think?*

94. AM: I think you would find that people at this level.. management, or a marketing level, firstly didn't **understand** the potential, and secondly didn't want to invest the money. They could see it was probably going to cost money to invest, although when you look at what Apple developed, it wasn't that much compared to what Xerox had spent. [n]

204. AM: Uhm.. things, mechanical things.. uh, well, I have an Aiwa personal audio cassette player, which I believe is very.. I don't believe it cost any more to manufacture than possibly a Sony one, or anything else. But it's just that they put.. the feel of the product.. they put a lot of metallic components on the **cladding**, which makes it feel like it's very sturdily built -- [P]

204.1. now I don't believe it is.. I mean, looking at it and **analysing** it, it's no **better built** than the Sony one, which uses plastic components. But, it just gives that **external** feel of quality. [p]

161. UC: Aw they're way off -- they're just, you know.. just **interested** in the bottom line, which.. yeah, is important -- we all live in the real world, but.. there are some things.. worth doing that aren't... or it's worth doing some things **better** for slightly less return, just for the sake of doing them. [N/P]

161.1. I think a lot of engineers would agree with that.. (I: Engineers would probably agree but marketing people wouldn't?) Marketing absolutely not, as far as I know. -- unless, they could demonstrate some sort of marketing survey that, you know, if you made this thing out of metal, instead of.. plastic sprayed with metallic paint, you'd sell more.. unless they had actual demographics or something, they probably wouldn't go for it. [P/N]

165. UC: Oooh, another really good one is Rank Xerox -- Xerox PARC - Palo Alto Research Centre, and their.. icon-based computer system which they never ever used, and Apple stole basically -- well they didn't steal, they said 'if you don't use this we're going to use this', basically. [n]

165.1. Anyway.. it'll never sell, never sell (sarcastic, mocking) [N]

Though they were employees of the same firm, UC had only been with the firm for approximately one year, and said he had only worked with AM 'off and on, for about a month'. Though the two had positive opinions of each other, their educational backgrounds and experience are quite different. Are these correspondences coincidental? Are they based on a common, perhaps recent experience? Are they part of the currency of 'shop talk' that circulates in the work environment?

A final interesting episode involved UC's idea of 'observation', and the prominent theme of a 'child-like' attitude. Approximately six months after the actual interview took place, during the preparation of this thesis, an advertisement for UC's employer appeared in a design magazine, prominently featuring a baby with examples of the firm's work swirling around its head. (A copy of the advertisement is found in Appendix VII.) The advertisement presented a child-like way of looking at things as a positive advantage of the firm's work. Again, interesting questions arise: was the metaphor of a 'child-like' attitude part of the organisation's culture, adopted and incorporated by UC in his discourse? Was it a theme in general use among a community of designers? Was it brought by UC to the organisation, and later incorporated in the advert?

It was possible to follow up with UC and enquire about his use of the Xerox example, and the idea of child-like observation. He did not recall having discussed either the Xerox

computer interface or a product with metallic external components with AM. Though he was unsure, he thought he had encountered the Xerox story in a book about the MIT media lab he had read several years earlier. The idea of a child-like attitude to observation was not something he identified particularly strongly with his employment at ConsultCo; he thought he had first encountered it during his first degree course, and he definitely remembered it from a presentation by a visiting lecturer at the RCA.

Beyond these observations, the current study did not gather any data to provide answers to questions raised by the informants' use of specific examples. It does suggest a study of how stories and themes like these circulate within a community of practitioners as an aspect for further work.

CHAPTER 8.

REVIEW AND CONCLUSIONS

Goals and Results

A broad goal of the current project has been to explore the potential utility of metaphorical language in the promotion of inter-disciplinary collaboration in product development, based on insights about the general significance of metaphor as a process in conceptualisation and understanding. The emphasis of the MPhil work described in this paper has been on the identification and development of a method to explore the utility of this theoretical position, through text-based analysis of individual interviews. The goal of this work has been to demonstrate that such an analysis can produce insights into areas of taken-for-granted, discipline-specific knowledge which may be involved in inter-disciplinary conflict.

The hypothesis developed after the review of literature, described above, was that friction between members of different disciplinary groups is related to the use of specialised, unshared abstract concepts that are understood metaphorically. The informants involved in the study were not members of an actual group engaged in collaborative work, so direct conclusions cannot be drawn about tensions that might arise between them. However, themes from each informant's discourse were compared with negative 'typical' characterisations of disciplinary groups made by other informants, to determine whether a plausible relationship to disciplinary conflict existed. A further goal was to show that the metaphorical nature of the themes involved provides a richer understanding of differences in belief, beyond the simple awareness that conflict in a certain area exists. Though not demonstrated in the current work, it is hoped that such a richer understanding can provide a basis for constructive action to reconcile divergences. The success with which the project has met these various goals, including what has been learned about the method and directions for further work, will now be discussed.

The hypothesis that was adopted suggests that significantly different organising features should be evident in the discourse of different informants, attributable to metaphorical structuring of their ways of thinking about work. Elements of interpretative repertoires, consistent with Potter and Wetherell's (1987) description, were identified in each informant's discourse, and found to be organised by themes which were metaphorical in nature. These themes were found to structure important aspects of the ways informants thought about their work, made positive and negative distinctions within their own disciplinary groups, and characterised their frustrations with 'typical' behaviours of members of other disciplinary groups.

Significant correspondences were found between the themes appearing in insider descriptions, and the characterisations of a group made by outsiders. Negative typical behaviours identified from the outside were often recognisably similar to negative 'types' or attributes identified by insiders, such as the prima donna designer, the overly rigid engineer, and the marketer focused exclusively on market share. However, insider descriptions were made from within a coherent framework that allowed other behaviours -- which might be negatively interpreted according from stereotypes from the outside -- to be understood in terms of taken-for-granted or positively evaluated themes. Examples include AM's references to commitment and pain, UC's ideas of child-like and cultural observation, and BB's or RK's description of product definition and modes of differentiation within a market.

In several cases, aspects of apparent divergence are consistent with the findings of other investigators, arrived at by different methods. Dougherty (1992) identified incompatible aspects of departmental 'thought worlds' which are also evident in the discourses of the informants in this project. These include tendencies of technical people to focus on the product as a concrete entity with certain capabilities, and of marketing planners to regard products as abstract opportunities. Phillips (1994) identified different time scales and attitudes toward change in her 'industry mindsets', as well as differences in how what is real, true, and correct are determined. Cooper and Press

(1995) have discussed how the knowledge of existing products and competition held by marketing professionals requires translation to be of use in designers' more intuitive processes, which focus on lifestyle, emotional, cognitive, and futures issues.

Consistency between the findings of these researchers and those obtained in this study tends to validate the method's ability to identify significant areas of divergent belief between disciplines. However the results of this study also illustrate that a deeper understanding of the beliefs involved can be gained through attention to the metaphorical themes which structure them. Though this study did not undertake the interactive and group exploration of themes necessary to fully exploit this potential, I believe the results have shown a plausible basis upon which something like Schon's (1993) frame restructuring could be carried out in further work.

Critique and Observations on Method

Discourse analysis does not constitute a single, prescribed approach, and continual development of the method employed in this project was necessary. The substantial variation that occurred in the conduct of the interviews is a methodological flaw in some ways, but also provides opportunities to assess in retrospect which aspects seem to have worked better than others. The following discussion will begin with a critique of the study, with observations on what has been learned and how future work might be improved.

Informant Selection and Conduct of Interviews

A number of structural criticisms of the fieldwork programme can be made, first with regard to informant selection. The number of informants was small, and their selection was based on access through personal contacts rather than an overall strategy to gain a 'representative' sample. The result was that the informants as a group were neither all co-workers nor completely unknown to each other. The fact that only a single

engineering informant was included meant that no comparison of 'insider' views for that group could be made. Other disciplinary groups beyond those represented in this study have relevance, including manufacturing, research or technology, field sales, and upper level management.[76] Even with a broader range of informants, however, questions could be raised about the extent to which they were representative of a larger group. Though four of the five informants in this study did identify themselves as members of a particular disciplinary group, most put effort into differentiating their own complex individual backgrounds. It was particularly the case with the marketing informants that their backgrounds were mixed, and they themselves felt this altered their points of view compared to colleagues with 'straight' marketing backgrounds. Finally, the fact that all informants were male meant that no gender-related differences in points of view or discourse could be observed. All of these shortcomings must be taken into consideration and addressed in subsequent work. However, the emphasis in this work was on the development of a method, not on making claims about the generalisability of the attitudes and beliefs found to be involved in this particular case. I believe the interviews conducted did provide an adequately rich and varied set of texts for this purpose.

Aspects of the conduct of the interviews also reveal shortcomings. There was substantial variation in the way the interviews were conducted, both in terms of length and the coverage of topics. The script, which was developed over the course of the two trial interviews and refined in the first three field interviews, still required approximately two hours and could not be followed in the fourth and fifth interviews due to time limitations. However, as Potter and Wetherell (1992) describe, techniques of discourse analysis can be applied to a wide variety of spoken and written texts, so inconsistencies between interviews did not prevent their being used. The BB interview contained a number of lengthy narrative examples which served to make the informant's approach to his work clear, in relation to the way he perceived other less effective approaches. The RK interview, however, seemed to 'lose its way' at times, dwelling on

[76]These groups were included in some informants' typologies, and have also been recognised in prior work (Dougherty, 1992; Cooper and Press, 1995).

peripheral subjects, and leaving the sense that the available time did not produce as much useful material as possible. For future work, it will be necessary to balance openness with a certain amount of structure to ensure a basic level of coverage, ideally within a one-hour interview.

In retrospective consideration of the interviews conducted, some approaches seem associated with a more 'densely' useful text than others. The EF interview dealt extensively with how he perceived other groups, but seemed to lack the specific descriptions of his own immediate experience of doing successful (or unsuccessful) work, which enriched the UC, AM, and BB interviews. Both the generalised typology and specific experience approaches to elicitation produced useful results; for example, AM's 'network of influences' theme was most apparent in his descriptions of the role of engineers relative to various other groups, while EF's description of a 'deep understanding of quality' and the story of D. J. DuPree emerged as specific experiences in response to feeling words. In general, the most interesting responses seemed to be those in which the informant discussed their experience of the process of working, their criteria for recognising good and bad work, and the things they personally found exciting or exhilarating. In future work, the time required for interviews should be shortened by moving more quickly through the initial group typology elicitation; it is also probable that the 'typical' descriptions and specific experiences portions can be combined, rather than treated as two distinct portions of the interview. Finally, the interviewer must focus more on concise follow-up questions directed toward work process, success, and satisfaction, to avoid less-productive digressions.

Processes of Analysis

Regarding the analysis process, several observations can be made that can inform future work. As the method developed, it became clear that each way of looking at the content of the interviews, by narratives and oppositions, by explicit content categories, and by categories of repertoire elements, provided complementary views that aided the

recognition of themes. Narratives, however, were considered only in general terms as to their subjects and the purposes they appeared intended to serve in discourse. Closer attention to the content and structure of each narrative would be possible through forms of narrative analysis that were not pursued to their fullest (Reissman, 1993; Boland & Tenkasi, 1995; Bruner, 1990).

The sorting of statements into categories became the main activity of later stages of the analysis. In this process, the frequency of occurrence of certain words was a factor. However, focusing on frequent occurrence without careful attention to context and meaning in each case introduced unrelated usages which muddled and obscured themes, rather than making them more apparent. Since one of the criteria adopted for the significance of a metaphorical theme was the number and variety of expressions motivated by it, attention must be paid to frequency of occurrence. However, a mechanical approach to content analysis must be avoided.

The most important conclusions to be drawn from this study concern the recognition and interpretation of metaphorical aspects of language in this type of analysis. As Lakoff and colleagues point out, the fact that a great deal of metaphorical language becomes conventionalised in its use means that its metaphorical nature can be easily missed. Recognition of discipline-specific and taken-for-granted metaphorical language presents a sort of conundrum. On one hand, the fresh eye of an outsider helps to call attention to it, precisely because the insider is accustomed to its use as natural and unremarkable. On the other hand, insider's knowledge is necessary to elaborate on the detailed meaning of a particular expression once identified, before its significance can be judged. An important conclusion I have reached is that a high level of attention must be devoted to *both* activities. My relative 'outsider' status with respect to marketing meant that the metaphorical nature of much of the language leapt out as obvious, while my ability to interpret and evaluate what was meant was more limited. I am more accustomed to engineering and design vocabulary, and I found that metaphorical aspects of it emerged more slowly -- though I felt more confident in exploring connections and relationships

and I believe the themes are more highly resolved. An example is AM's use of the metaphor of being 'buried down in' a project, which was not used extensively but which resonated strongly with my own experience of engineering work.

The identification of a metaphorical expression as an instance of a particular metaphor is something Lakoff seems to take as unproblematic.[77] My experience in this project suggests that this is not the case, and that misinterpretation, or *inadequate* or *incomplete* interpretation of metaphorical language can play a large role in problems of meaning. In the example above, 'buried down in' could plausibly be interpreted in several ways besides the one I chose, with substantially different connotations (as discussed in the previous chapter). However, the most compelling example of this phenomenon occurred outside the fieldwork for this project, during a staff tutorial. Three individuals participating in a discussion were surprised to find they had all interpreted a seemingly conventional metaphor in significantly different ways. This situation would not have come to light if attention had not been specifically directed toward the discussion of metaphorical language.[78] While consideration of context in discourse analysis makes such dramatically different interpretations much less likely, identification of the metaphor motivating a particular expression should not be taken as unproblematic in future work.

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[77]For example, see Lakoff & Turner's (1989, p. 128) assertion that 'an old flame', and 'fiery youth' are expressions of different metaphors, LOVE IS FIRE and LIFE IS FIRE. The distinctions involved do not seem nearly as clear cut as Lakoff and Turner assert.

[78]My supervisor had described some of my choices as 'retreat' on previous occasions, which I had interpreted as 'running away' in the context of battle. Having resolved to become more conscious of the use of metaphorical language, I decided to point out my feeling that this was an unfair characterisation. When I did, however, my supervisor replied in surprise that she had meant 'retreat' in the sense of dancing, as in taking a step away rather than toward a partner. The connotations are quite different, introducing notions of a natural forward and backward rhythm, rather than an accusation of cowardice. At this point, the third person present interjected that she had assumed *neither* of those meanings for the word 'retreat', but instead had thought the reference was to taking refuge in a withdrawn and isolated place, 'like a hermit in the woods'.

Conclusion

To conclude, I believe the current project has largely met its goals in the development of a method for identifying divergent and unshared aspects of metaphorical structuring in the ways disciplinary professionals conceptualise about their work. This identification was accomplished through open interviews centring on perceptions of inter-disciplinary friction, and informants' beliefs about essential aspects of their work. These interviews elicited both generalised (stereotypical) descriptions and specific, strongly-felt past experiences to generate texts that were subsequently subjected to discourse analysis. This analysis considered thematic content, elements of interpretative repertoires, and the use of narratives in discerning underlying metaphorical themes. It is believed that exploration and discussion of these themes may be employed in future work to facilitate collaboration in multidisciplinary product development teams.

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