Communication Technologies at Work:
Organisational Cultures and Employee Narratives

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Acknowledgements

Declaration

I confirm that this thesis is entirely my own work and has not been submitted for a degree at any other university. The thesis has been prepared in accordance with the University of Warwick's guidelines on the presentation of a research thesis.

Abstract

This thesis provides an extensive analysis of new communication technologies (NCTs), which includes email technology, the Internet, intranets, NetMeeting, video-conferencing and audio-conferencing, within an organisational context. These technologies have become ubiquitous in organisational life and work. The implementation, integration and application of NCTs in this setting have both innovative possibilities and negative consequences. Consequently, we need to understand the implications of these technologies on organisational cultures and structures. This is achieved throughout this thesis by focusing upon the context of technology implementation, the transformation of communication and information lines through and within the organisation, and the changing social networks and interactions.

'Communication Technologies at Work' will explain and critically explore the effects of NCTs whilst developing an understanding of the implications for its employment in the work and the training settings of an organisation. It is based upon the ethnographic study of a hi-tech organisation and draws upon the narratives of the organisational members collected through in-depth interviewing. Further data was collected utilising observational and survey methods. The research methodology of this study is distinctive because NCTs were used as methodological tools for carrying out the observations and distributing the surveys.

Although a traditional methodological stance was adopted the study will further develop this tradition. It will analyse the relationship between NCTs and organisational cultural responses, by studying and interpreting the personal narratives of organisational employees. This study offers an original understanding of NCTs through the narratives of the organisational members and this forms the basis for its substantive contribution to existing research in this subject area. The importance of the narrated experiences of organisational employees negotiating the introduction of NCTs will be emphasised throughout and will be used to create the framework for the analysis.

This thesis will conclude that organisational cultures have been 'technologised' through the application of NCTs. This is characterised by 'the ethos of technology enthusiasts' and 'the ethos of technology sceptics'. These positive and sceptical subcultures are embedded in the dominant organisational culture. Furthermore, this study will demonstrate that organisational communication and information flows have been altered, extended and interrupted with the advent of NCTs in the work setting. Finally, the discussion of the role of these technologies in the work and training settings of the case study organisation suggest that the consequences of their implementation and use vary in these different contexts.

Abbreviations and Acronyms

CBT	Computer-Based Training
cc	carbon copies or copies
CD-ROM	Compact Disc-Read Only Material
CommCo	pseudonym for main case study organisation
CMC	Computer-Mediated Communication
ICT	Information and Communication Technology
IP	Internet Protocol
IT	Information Technology
LAN	Local Area Network
MIS	Management Information Systems
MoCo	pseudonym for first case study organisation
NCTs	New Communication Technologies
Oftel	Office of Telecommunications (UK)
SPSS	Statistical Package for the Social Sciences
WAN	Wide Area Network
WAP	Wireless Application Protocol
WWW	World Wide Web

Chapter 1 – Introduction

The increasing consumption of new communication technologies (NCTs) in the public and private spheres has increased the need for detailed research into the issues surrounding these technologies. Whilst there is much literature on the efficiency, innovation and applications of NCTs, social and cultural issues have been to a large extent neglected. NCTs are a pervasive feature of contemporary work processes, affecting every part of everyday work. The implementation (or the introduction) of NCTs has revolutionised the workplace enabling new and innovative ways of communicating, storing, processing and presenting information. This revolution in information management has prompted shifts in workplace organisation. On the one hand, transformations in organisational cultures, structures and forms are in part believed to have been influenced by the implementation and application of NCTs. On the other hand, NCTs are also mediated through these organisational elements.

This thesis is a reflective and critical analysis of the implementation, integration and application of NCTs within a private sector organisation. It is from this analysis that the significance of NCTs within this organisational context is developed. The conclusions of this thesis will enhance our understanding of the operation and employment of NCTs within an organisational context, by making

a substantive contribution to contemporary research and by supporting, challenging and developing existing analyses. A distinctive feature of this case study is its effective employment of the narratives of the organisational members to produce an interpretative understanding of organisational cultures and technology, and the relationship between technology and culture. The attention given to the narratives of organisational members in this thesis centres on their interpretations and understandings of NCTs within a workplace context. This thesis is, also, adding to the body of literature on the ethnographic study of NCTs in the work setting and, importantly, offers a detailed ethnographic study of NCTs in a training setting.

The research for this study was carried out in a private sector, hi-tech organisation that employs NCTs extensively in administration and co-ordination, and seeks to create an interactive exchange of information and ideas. It is not the objective of this thesis to recognise and reiterate the virtues and capabilities of communication technologies as this is covered in other texts. Instead, the main objectives are to explore the rationales behind the implementation and application of NCTs in this enterprise, to explain the effects of technology on employees at all levels of the organisation, and to discuss their influences on organisational cultures, structures and forms.

The central concerns of this study are to examine how and to what extent NCTs have altered or interrupted the flow of communication through and within the organisation; to assess whether these changes have implications for the organisational culture, hierarchical structure and social relations of the

organisation; and to establish the different benefits and problems arising from the use of these technologies in training and work settings. The final concern is to create an understanding of the patterns and forms of access to, and participation in, the new technologies. Overall, it is the intention of this research to assess whether and/or in what ways these new forms of technological applications are advantageous to individuals, the department and the organisation. The conclusions drawn from these concerns allow for broader generalisations about the relationship between NCTs and cultural narratives, and for new strategies to be offered in the employment and application of these technologies.

This study explores the effects of the implementation and application of NCTs within organisations as indicators of changes in the organisational culture, and the formal and informal organisational structures. The integration, implementation and application of NCTs by the organisation and the organisational members will be considered throughout the study. Therefore, this study is concerned with how the implementation of new electronic communication technologies has affected organisational cultures, by investigating their role in sustaining and changing key cultural elements, such as communication, information flows, and social relations. In addressing these issues an understanding of NCTs in the case study organisation will be developed both through an examination of the effects of NCTs on the organisation and a study of the ways in which management and non-management level employees integrate and apply NCTs in the work setting and the training setting. The analysis of the employee narratives on the application of NCTs in the training and work settings focuses upon the advantageous and disadvantageous

consequences of technology, the understandings of organisational communication flows and the changes in social relations. An interpretation of these narratives provides a basis for an understanding of the changes in organisational cultures, structures and forms.

It is important to note that in this thesis 'narrative' is defined, and is therefore used, in a limited way as compared to other writers in organisational studies who argue that narratives are characterised by stories (see for example Boje 1991; Czarniawska 1997; Czarniawska-Joerges 1998; Fineman and Gabriel 1996; Gabriel 1991; Gabriel, et al. 2000; Watson 2000b). 'Narrative' is predominantly defined as a set of sequential events similar to a story containing both a plot and characters (cf. Czarniawska-Joerges 1995; Czarniawska-Joerges 1998; Gabriel 1998; Toolan 1988; Watson 2001). However, in this thesis 'narrative' has been used to define the brief employee accounts of events and activities surrounding the integration, implementation and application of NCTs within the two settings. This definition of 'narrative' is consistent with the view that "not all narratives are stories" (Gabriel 1998: 86). The employees' narratives used and interpreted in this thesis contain 'factual and symbolic material' (cf. Gabriel 1998) and are only fragments of the accounts recorded in the field. Narratives in this specific sense are argued to be part of the organisation's sense-making process and are fundamental to our understandings of NCTs in the work and training settings of the case study organisation. However, this usage remains distinct from the focus on more extended plot and character sequences employed in much of the literature on organisational narratives.

Throughout the study, I have challenged the assumption that technology implementation and application is an independent force in organisational transformations. Thus, I am not suggesting that technology is an independent driving force behind organisational transformations, but that it plays a significant role in those changes. Technology implementation and application can not only be a catalyst for changes but may also be used to encourage change, both of which have implications for decisions about technology and its future place in organisations. Technology and organisations are argued to be mutually interdependent. Firstly, it will be shown that the implementation of NCTs has altered and interrupted the flow of information and communication through and within the organisation. Furthermore, it will be concluded that an organisational culture may become 'technologised', whereby cultural elements are mediated by the integration of NCTs. In this context, an organisational culture is characterised by two different ethoses that represent positive and negative, or sceptical, attitudes and sentiments toward technologies in the organisation. This was found when comparing and analysing the training and work settings in the case study organisation.

Finally, NCTs are shown to be socially embedded in organisations and help toward the construction of a network-structured organisation. The discussion of the application and implementation of NCTs within the case study organisation concludes that these technologies lead to significant changes in organisational structures and cultures but these changes do not necessarily conform to the common model of a network-structured organisation. Symon (2000) argues that the implementation and application of information and communication

technologies goes through a filtering process of social norms, attitudes and values and one possible outcome of this process is a network organisation. I also argue that cultural elements influence technology implementation and application but do not ultimately create or lead to a network-structured organisation. However, I claim that organisational cultures will incorporate individuals who hold positive and/or sceptical assumptions about NCTs, which may hinder the effective application of technology in the workplace. These positive and sceptical ideas and attitudes toward NCTs are embedded in the organisational cultures and have significant effects for effective training, communication and information flows, and work productivity.

Another important theme is that the implementation, integration and application of NCTs does not have uniform consequences or outcomes, and that creating a cohesive setting is dependent upon the context in which the technology is implemented and used. Individuals from different occupational groupings and various hierarchical levels do not have the same reactions to technology implementation and application in similar contexts. Overall, a more negative response to technology was found in the training setting compared to the work setting even though the two settings constitute part of the same organisation.

In order to reach these conclusions, I analysed discourses about new electronic communication technologies at different levels; management rationales and employee understandings articulated in organisational cultures. The different levels of this multi-level analysis provided critical insights into the implementation, integration and application of NCTs, and formed the basis for

the structure of the thesis, especially in the sequence of chapters discussing my substantive findings and analysis. This structure is indicated in the summary of the focus of each of the remaining chapters outlined below.

Chapter 2, 'Redefining Organisations, Communication and Organisational Culture', highlights some of the major debates and competing perspectives on technology within organisational studies literature (see for example Buchanan 1986; Handy 1993; Handy 1995a; Handy 1995b; Handy 1996; Pettigrew 1999; Pettigrew 1979; Scarbrough and Corbett 1992; Scarbrough and Swan 2001), sociological literature (see for example McLaughlin, et al. 1999; Turner 1986; Zuboff 1988), literature on the social studies of technology (see for example Orlikowski and Gash 1994; Orlikowski and Hofman 1997; Orlikowski, et al. 1995; Pinch and Bijker 1984) and management literature (see for example McLoughlin 1999; Morgan 1997; Peters and Waterman 1995; Pugh and Hickson 1996; Schein 1985; Schein 1992; Schein 1996). This literature review analyses the relationship between technology and organisations. In order to create a foundation for the thesis, four areas are focused upon: the study of technology and technological change; the consumption and implementation of NCTs in the work setting; the NCT-organisational relationship (which includes an examination of the literature on organisational cultures and organisational structures); and the redefining of communication lines, networks and social relations through NCTs.

Chapter 3 introduces the case study organisation, CommCo (pseudonym), and the organisational members who agreed to be research participants. The primary

function of this chapter is to provide a historical and contemporary account of key social, economic and technological features of the case study organisation. In this chapter, the case study strategy is defined and reviewed, and the rationale for using CommCo as the study organisation is explained. The systems of communication in place, the forms and overall application of technology and the hierarchical structure within the organisation are detailed. The final section of this chapter introduces the research sites and participants. Through a combination of tables and commentary the research sample is defined in terms of age, gender, organisational position and new communication technology skill level.

Chapter 4, 'The Methodology', is a reflective account of the research process. It describes the methodology employed in this study and clarifies the decisions made concerning the research design. The account of the research process and its progression is interwoven with the methodological debates present in the current literature, and particularly addresses issues of ethics, validity and reliability. The process of gaining access and 'getting on' within the case study organisation is discussed, adding to, and developing the analysis of, previously defined practices of 'getting in'. The methodological designs and decisions are discussed and the survey, observation and interview methods utilised are defined. I used NCTs myself as the most appropriate methodological tools for conducting my survey research and observations. This aspect of my methodology is therefore, both innovative and ideally suited to the task in hand. This discussion leads to a review of the effects of the researcher on the research findings, and an examination of how the data was analysed and interpreted. To summarise this chapter, I reflect upon my experiences of the research process as a whole.

Chapter 5 initially identifies the analytical framework of this and the next two chapters. The organisational and management rationales for technology implementation are then outlined. An analysis of the narratives of senior and middle management is used throughout this chapter to examine the management of work processes through technology, the management of information through a technological culture, and finally the management of information through organisational structure. This chapter begins to explore the character and extent of integrative and coordinative work practices, the possibilities for management surveillance and the control of communication, the reorganisation of social interactions and networking, and the patterns of intra-organisational and inter-organisational communication. This provides a basis for understanding the flow of information and communication through and within the organisation using the concepts of power, control and access.

Chapter 6 examines the implementation, integration and application of NCTs in the training and work settings at the case study organisation through the narratives of the non-management level organisational members and through my own observations. This examination underpins an analysis of the use and significance of NCTs in an organisational setting and highlights employee responses to technology in the work and the training contexts of the study organisation. The specification of the use of NCTs in these contexts creates a comprehension of their capabilities and functions in order to draw attention to the consistencies and inconsistencies in their application. A discussion of the experiences, interpretations and personal narratives of the organisation's

employees helps to identify the advantages and disadvantages associated with the new technologies. The impact of NCTs in the work setting is further investigated through the study of information and communication flows, social relations, organisational hierarchies and work processes. My interpretations of the outcomes of technological implementation, the functionality of technology and technological consequences are summarised to draw the chapter's findings together. The extent of internalisation of NCTs by organisational members identified in this chapter provides a basis for the conceptualisation of organisational cultures explored in chapter 7.

Chapter 7 examines the changes in organisational culture and especially the technologisation of culture resulting from the use of NCTs. In this chapter two contrasting ethoses, representing contradictory interpretations of technology, are elaborated. Initially, organisational cultures and their relationship to technology are explored. Then CommCo's culture is defined. The 'ethos of technology enthusiasts' and the 'ethos of technology sceptics' are characterised and examined and lead into a discussion of the effects of technologisation on organisational cultures. Transformations in organisational cultures are defined in terms of technologised communication and information lines, technologised structures of communication and information, and technologised social interactions and networks.

Finally, chapter 8 discusses the main patterns and themes apparent in the qualitative data and relates them to the research objectives and questions. The role of NCTs in transforming organisational cultures, structures and forms is

summarised with particular reference to the network-structured organisation. This leads into an analysis of the role of NCTs in the interruption and alteration of the flow of communication through and within the organisation. Finally, the different ethoses that are sustained in the case study organisation are highlighted. This analysis explores the transformed organisational cultures, structures and forms that accompany the use of NCTs at CommCo. Thus, this chapter also provides a reflective account of the complete research process, which seeks to specify the scope and limitations of the findings, and proposes future research agendas.

Chapter 2 – Redefining Organisations, Communication and Organisational Culture

The aim of this chapter is to be a foundation for the research as it draws together, through a process of critical analysis, the literature relevant to the thesis objectives. This review draws upon diverse sources of literature and research on information and communication technologies, management, and organisational cultures and structures.

In this literature review the social implications of technology and technology change are initially examined through a consideration of technological determinism, actor-network theory and the social construction of technology. This initial review concludes that technology is embedded in wider organisational changes and is not an autonomous factor in these transformations. Following this section the relationship between NCTs and organisations is explored. This section covers a substantial proportion of the literature addressing the concerns of the thesis and this is reflected in the depth of this review. The NCT-organisational relationship is analysed through an examination of: organisational cultures and their study using ethnographic methods; organisational structures and restructuring with particular reference to power relations, hierarchies and control; and the relationship between technology and

organisational structure. Finally, the recent literature on the redefinition of communication lines, social relations and networks will be reviewed particularly utilising consultancy and management studies literature.

In this thesis, the term 'new communication technologies' (NCTs) is used to encompass email, Internet, intranet, NetMeeting, video-conferencing and audio-conferencing technologies. Within the literature varied terms and acronyms for these have been utilised to signal the advancement and development of communication and computer-based technology. 'Information and communication technologies' (ICTs) have been used interchangeably with NCTs in the literature and this review, as both terms include the same technologies. There is, nonetheless, a preference for the term 'NCTs' in this thesis because it signals the relative novelty of these technologies. The term 'technology' is used as a concept to define the implementation and application of manufacturing and production line machinery in addition to computer-based technologies. In this sense, technology is complex, interdependent, allows and enables continuous redesign, and represents 'mechanical functionality and performance' (Sproull and Goodman 1990) and it is, therefore, an all-encompassing term.

The Study of Technology and Technological Change

Technology has played a central role in the transformations of work. These transformations have been characterised by shifts in societal organisation such as industrialisation and modernisation, and the restructuring of the labour market.

The objective of this section of the review is to summarise key themes in the social study of technology and these themes are to provide a point of reference in the wider debate for the more detailed discussion of the literature directly relevant to the thesis topic. Thus this section of the literature review places this study within a wider theoretical context. The recent study of technology and technological change can be characterised in terms of three perspectives: technological determinism, the social construction of technology and actor-network theory. As already suggested by McLoughlin and Clark (1994: 37),

> "These perspectives offer contrasting views on the extent to which the organizational outcomes of technological change are chosen and negotiated by organizational actors or determined by wider market, technical and historical forces. They also provide contradictory views of the effects of the new computing and information technologies at work".

Technological determinism provides a theory of social change resulting from the development of technology. The technology-organisational relationship is defined by technology driving institutional change. For instance, technology is said to require new skills and knowledge so organisations and organisational members have to adapt (Scarbrough and Corbett 1992). Technology is determinant so social and organisational changes are both a requirement and a product of technological change. Blauner (1964) and Woodward (1965) are consider to be technological determinists by some (for example Scarbrough and Corbett 1992). They studied the various consequences of technology in terms of the changes in work roles and organisational structures. The critics of these authors have emphasised that specific technologies were actually compatible

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with different forms of work organisation and organisational structure. There are now few advocates of a simple technological determinism, and many of those labelled in this way emphasised economic constraints, in the form of product markets, and technical requirements. It is in this sense that they represent a combination of technical and economic determinism.

In the 1970s and 1980s many commentators on the implications of technical change focused their criticisms on economic determinism rather than technological determinism, especially in the debate surrounding Braverman's (1974) discussion of the imperative of capitalist management to deskill workers. While Braverman (1974) did not treat technology as an autonomous determinant of work organisation, he did argue that technology would be used to further the requirements of capitalist management, and as a consequence would have uniform effects. Thus, technology could be seen to be impacting on organisations and work, centralising the control of work to management and centralising knowledge (Braverman 1974). Critics argue that both the reasons for technical innovations and the social implications of such innovations were more complex and negotiated than Braverman (1974) allowed (see McLoughlin and Clark 1994).

The critics of both technical and economic determinism have emphasised that the content and characteristics of technology are not homogenous and the effects of technology cannot be seen to be independent of other factors. Consequently these forms of determinism are criticised particularly for focusing only upon technological and economic imperatives and determinants. Social

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constructionists offer an alternative perspective on technology, which accounts for the heterogeneous consequences of technology, technology developments and innovations (cf. Bijker and Law 1992; Grint and Woolgar 1997; Pinch and Bijker 1984). This perspective is defined by an emphasis on the social processes involved in the negotiated social construction of technology, which provides a basis for analysing the heterogeneous nature of technology implementations, applications and innovations.

The social construction of technology is founded upon the belief that both the constitution of technical features and the implications of those features arise from active micro-social processes of interaction and negotiation among social actors with varied understandings. This approach to understanding technology and technological innovations argues that technological, social and cultural factors are all elements that have to be considered and negotiated (Clark, et al. 1988; MacKenzie and Wajcman 1985; McLoughlin and Clark 1994; Pfeffer 1982; Wilkinson 1983; Williams and Edge 1999). Thus technology and technological change are the outcomes of a process of 'complex social interactions' (Markus and Robey 1988). In particular it is argued that a given technology has a variety of different applications, which are socially constructed by the users (Rachel and Woolgar 1995). The critics of social constructionism have sought to return to some of the themes of the technical determinists by emphasising that particular technologies may have distinctive effects. For instance, particular technologies may not be compatible with some ways of organising work relations or organisational structures.

Nevertheless it has been documented that the process of technology implementation and application is mediated by the different interpretations and understandings of technology and its uses. Users have assumptions, expectations and beliefs about technology, which Orlikowski and Gash (1994) characterise in terms of 'technological frames'. Technological frames inform, and are informed by, congruent and incongruent ideas and assumptions toward technology found in the organisational culture. Organisational thinking and action became constrained as these frames become established and integral to the dominant culture (McLoughlin 1999), but the constraints arise from established processes of social definition. This idea of frames will be employed in this study to create a conceptual framework of analysis for chapters 5, 6 and 7.

Actor-network theory is regarded as a distinctive strand of the social construction of technology perspective. This theory addresses some of the concerns of the critics of social constructionist by accounting for the distinctive characteristics and functions of different technologies (Grint 1998). It does this by focusing upon the role of a network of agents in processes of technological development and change. Technologies are also defined as actors within such networks. Thus the distinctive contribution of actor-network theory is founded upon the belief that technology is "capable of intentional actions in the same way as human agents" (McLoughlin 1999: 94). From this vantage point social, economic and technical frames are not used to create an understanding of technology or technological change (cf. Callon 1993). However, these elements are shaped by, bound by and constituted through the creation of a network. Human actors maintain network behaviour and assumptions, whilst the enrolment of new actors

ensures the continuance of those behaviours. The interactions between the human actors and technology through the network are constantly being transformed through shifting relationships and objectives (McLoughlin 1999). This perspective helps to provide an understanding of the methods through which technology is built, implemented, applied and interpreted, in which precursor technologies as well as human actors play a central role. The broader tradition of social constructionism, rather than actor-network theory, provides the theoretical point of departure for the research and analysis in this thesis. However, this thesis also seeks to build upon this insight regarding the ways in which specific technologies contribute to processes of social negotiation and construction, while endorsing Grint's (1998: 141) caveat that technology may best be conceptualised as an 'element' rather than an actor in this context.

The Consumption and Implementation of NCTs in the Work Setting

"...new technologies have become an intrinsic component of our working lives. They are infiltrating every facet of our lives and adopting an increasing organic quality as they become, literally, part of us, rather than something 'out-there', as they have been throughout human history" (Forster 2000: 258).

This quote is used to introduce this section of the literature review as it conveys the idea that NCTs are pervasive and progressively more significant in both the public and private spheres of society. Initially this section of the literature review

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will introduce the various NCTs examined in this thesis. Then, I will proceed to review the ideas surrounding the consumption and implementation of these NCTs. For the purposes of this thesis 'consumption' is defined as the acquisition and possession, and 'implementation' characterises the introduction of technology into a particular setting. Although the consumption and implementation of these technologies in the private sphere will be mentioned, the review will mainly focus upon their implementation in the organisational context. Golding (2000) believes that technologies can be categorised into those that are altering and extending existing social, economic and organisational processes, and those that facilitate new activities. These categories are employed to assist in the comprehension of the consumption and implementation of NCTs. As many authors, such as Burris (1998: 142) have explained there are "variable patterns of implementation and application" of NCTs and therefore the analysis in this thesis must address this resulting complexity.

Email and Internet technology enable users "from all backgrounds to communicate directly and instantaneously, not only on the one-to-one basis common to traditional forms of communications but also one-to-many and many-to-many, simultaneously" (Forster 2000: 256). Thus, the implementation of the Internet is believed to be beneficial to society as it enables wider access to information and knowledge and is widely employed for this reason. Within organisations the implementation of the Internet is similarly regarded as beneficial as organisational members have access to more information. This technology also supports organisational intranets and the sharing and transmission of information via this network (Sprout 1995). Email also "allows

the free flow of communication and dissemination of information at the touch of a button" (Corbett 1997: 27). However, it should also be noted that such information could be controlled and manipulated, so that the flow and direction of organisational information and the type of information transmitted may be more selective. Some commentators suggest that an advantage of the application of email is that it can liberate users from their social constraints, such as age and gender (Dawson, et al. 1998). This may suggest a reason why email technology is widely accepted and utilised within the private and public spheres of society. Within the domain of work, email also has the potential for coalition building (Zuboff 1988). However, alongside the vast amount of literature espousing the virtues of email technology, there is a growing concern for its lack of intimacy and for the way in which selective access may result in the marginalisation of some workers (see Kiesler 1986; Markus 1994b). Similar issues have been raised in the study of video-conferencing technologies (see Dawson, et al. 1998; Sellen 1995).

Conferencing technologies, such as NetMeeting, video-conferencing and audio-conferencing, have similar functions to email, Internet and intranet technologies but they all have varying applications. Video-conferencing, email and Internet technologies are used for formal and informal interactions, and the transmission of, and search for, both pertinent and non-essential information. Video-conferencing technologies have a wider application as they can address the needs of the learning community (for example the body of students) (see Agre 1999; Webb 1999). In comparison NetMeeting, intranet and audio-conferencing technologies have a formalised implementation because they are, for the most

part, specifically utilised within organisations for the purpose of undertaking work. The implementation of NetMeeting represents a definite shift in the development of NCTs because it combines many of the capabilities and functions of the other NCTs examined. NetMeeting is expressly aimed at organisational work. It has visual and audio capabilities but, also, allows remote users to see and transmit information. The consumption and application of NetMeeting in the private sphere is limited and it is predominately employed by those with webcams.

Both the capabilities and functions of the technology and the context into which NCTs are integrated influence the ways in which users apply these technologies. The interpretation of these technologies is constantly changing as technological capabilities advance and technologies converge. As a consequence, technology users are reinventing the application of NCTs. However, in both the public and private spheres the consumption of technology is not as ubiquitous as was first predicted. Technology consumption and implementation seems to be dependent on the requirements of users, which suggests that there are other factors beyond the sheer availability of the technology that influence technology implementation (Dutton 1996). Within an organisational context the implementation and application of NCTs are constrained by additional factors such as organisational culture, structure, management rationales and the willingness of organisational members to proactively accept the technologies. This means that their use is closely connected with existing organisational arrangements and subsequent organisational changes.

Within both organisational contexts and the private sphere it can be argued that NCTs enable an interactive exchange of information and ideas between geographically and culturally diverse individuals and groups. On this basis the NCTs that are the focus of research in this thesis can be seen as a potent force that expands and develops human capabilities (Sproull and Goodman 1990). In the private sphere, ICTs are believed to have enabled, and perhaps created, 'an information society' (see Bell 1980; Castells 1996; Lyon 1988; Martin 1988; Miles 1996; Webster 1995). It is also suggested that such an information society represents a distinctive phase in the development and progression of society (cf. Archer 1995; Kumar 1995). From this perspective the information society is constantly evolving as technology advances, as information and communication technologies converge and as technology becomes more cost effective (Miles 1996).

The creation of such an information society has evoked debates as to whether technology is democratic or not. On the one hand, there is literature to support the conjecture that technology has an equalising or democratising affect (Dawson, et al. 1998; Forster 2000; Sproull and Kiesler 1991; Wellman, et al. 1996) or at least the potential to be democratic (McKie 1996). On the other hand, the differentiated consumption of ICTs has created a divided society where some have access to information, services and knowledge and others do not have the means by which to participate in the information society or access the same information. According to some writers, this divide has created a new economy and, subsequently, new classes that are based upon access to information or lack of it, that are defined as the 'information rich' and the 'information poor'

respectively (Haywood 1995; Lyon 1988). Recent research into the social exclusion of individuals from information and knowledge has prompted inventive methods to encourage the use of ICTs by those excluded (see Liff, et al. 2000a; Liff, et al. 2000b). However, the effects of the Internet on addressing social exclusion and inequality will depend upon its social organisation in both the public and private spheres (DiMaggio, et al. 2001).

Within an organisational context "...information technology is a critical enabler of the re-creation (redefinition) of the organization" (Morton 1996a: 158). This suggests that all elements of an organisation may be influenced or transformed by technology implementation, integration and application. Increases in the speed of communication, reduction in the costs of communication, the rise in communication bandwidth, and the expanded connectivity and integration of communication and computing technologies are all features of NCTs which are seen to have affected organisations (Fulk and DeSanctis 1995). The implementation and application of NCTs in the workplace has enabled and promoted both work-related interactions and non-work related interactions (Burris 1998; Wellman, et al. 1996). Technology is, therefore, understood to promote and help the coordination of work (Davidow and Malone 1992).

In many instances technology has been implemented because it is envisaged that it will improve work processes, reduce overheads, and increase efficiency and productivity (cf. Galliers, et al. 1996; Harris and al. 1989; Strassman 1985; Thompson 1989). Although Symon (2000) provides a valuable reminder that innovative working practices are not inevitably linked to the implementation of

ICTs, there is much evidence to prove that working practices have altered. The transformation of work practices has been coupled with changing communication and interaction within organisational contexts. As such, NCTs can be seen as tools designed and applied to promote the sharing of information and communication (Orlikowski, et al. 1995).

However, some academic analysts (as well as sceptical individuals within the organisational context) believe that NCTs have also been implemented to undermine existing work practices and skills. On the one hand, the positive potential of technologies may not be realised, if there is a lack of support, financial and/or technical, for their implementation in organisations. Furthermore, individuals with little knowledge and skills to install, develop and utilise technology, perhaps as a result of a lack of training, may also be barriers to the implementation of new technologies at work (MacKenzie and Wajcman 1985; McLoughlin and Clark 1994). On the other hand, technologies can be implemented and used for surveillance purposes within the workplace (cf. Mason, et al. 2000; McKinlay and Taylor 1996; Sewell 1998; Sewell and Wilkinson 1992; Zuboff 1988). This suggests that different priorities are given to the application of NCTs which influences where organisational resources are directed and how different groups within an organisation experience and understand the potential of technology.

This review of the literature has highlighted questions as to whether and how NCTs are embedded in the social fabric of organisations, what role do actors play in the integration of NCTs in organisations and how does technology come to be

valued within the organisational context. More importantly this section has identified that there is a mutual interaction of technical innovation and social arrangements. The implementation and application of ICTs may not enable or produce innovative working practices but merely replace the old technologies in place (McLoughlin 1999). This statement highlights a further issue that needs to be considered when exploring the application of NCTs within the case study organisation. A key conclusion of much of the literature reviewed is that NCTs have multiple potentials within an organisational context. An important potential identified is the possibilities for organisational coordination, but this may not be realised in practice because of a lack of resources or resistance. In order for the full potential of NCTS to be developed innovative ways of working and organising work need to be adopted. Furthermore in order for organisational agents to adopt these innovative working practices new and different organisational cultures, structures and forms need to be created and recreated. This suggests that further research on the transformation of organisational work cultures and structures need to explore and analyse the dynamic and complex relationship between technology and organisations, which is highlighted in this review. In this thesis these issues are addressed by studying the actual use and implementation of NCTs within a specific organisational context. This provides the basis for an analysis of the varied ways in which managers and other employees in that organisation experience and act in relation to these NCTs. This analysis is developed in chapters 5 to 7, and the implications of the research findings are related to debates within the recent literature throughout these chapters.

The NCT-Organisational Relationship

The implementation, integration and application of NCTs have influenced organisational cultural and structural transformations. These transformations are often understood in terms of shifts from Fordist to post-Fordist work organisation, from bureaucratic to post-bureaucratic organisational forms, and from hierarchical to flatter structures, though the extent of these changes remains contentious. NCTs can overcome spatial and temporal constraints, giving organisations implementing and applying these technologies the option to participate more effectively in a competitive, global market. The following section discusses the literature surrounding organisational structures and cultures as a foundation to the study of NCTs at work. Many writers have emphasised that organisations are not static but that their cultures and structures are evolving (Dale 1994; Schein 1984; Turner 1986; Wilson and Rosenfeld 1990; Wright 1994). By defining organisational culture and the factors affecting organisational culture, an understanding of the role of technology and its affects can be developed.

Organisational Culture

Organisations are not only political systems but also cultural systems, which both influence, and are created by, organisational members and their decisions (Walsham 1993). For instance, organisational cultures are internalised by individual workers and transmitted in socialisation, interaction and

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communication, though <u>how far</u> organisational cultures are internalised is debated in this section. This discussion acts as a foundation for the analytical case-study chapters, and particularly chapter 7 in which the importance of understanding how communication and social interactions are 'technologised' is emphasised.

Cultures are composed of symbols, ideologies, languages, beliefs, rituals and myths and are considered to be the 'expressive components' of organisational life compared to the 'tangible' characteristics of structure and technology (Pettigrew 1979). Schein (1981) constructed a model of culture to differentiate between patterns of belief, patterns of behaviour (including communication) and the assumptions that govern these patterns of belief and behaviour. This model was utilised and adapted by Sathe (1985), and elements have been employed in this study to assist in understanding how cultural changes have been influenced by technological implementation and application.

Two different definitions of culture provide a point of departure:

"Culture is the set of important assumptions (often unstated) that members of a community share in common" (Sathe 1985: 10), and

"Organizational culture is the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration..." (Schein 1984: 3).

The former definition provides a general all encompassing concept of culture and one that is accepted by many writers (Brown 1995; Buch and Wetzel 2001; Deal and Kennedy 1988; Geertz 1973; Handy 1993; Ouchi and Wilkins 1988; Pheysey 1993; Schein 1991; Smircich 1983c). The latter definition creates a specific understanding of culture in organisations. It is this definition that defines culture as progressive, responding to, and influencing changes. However, both definitions of culture agree that culture is shared and acts as a binding force, an emphasis that is comparable to Martin's (1992) conceptualisation of the 'integrative culture'.

The study of organisational culture from this perspective is well documented (Deal and Kennedy 1988; Deal and Kennedy 2001; Frost, et al. 1991; Linstead and Grafton-Small 1992; Martin 1992; Martin and Siehl 1983; Pettigrew 1979; Pondy, et al. 1983; Sathe 1983; Sathe 1985; Schein 1992; Smircich 1983a). In this tradition one influential definition of organisational cultures focuses on the corporate philosophy that defines the methods whereby employees should execute their duties and behave in order to meet organisational and managerial expectations (Schein 1992). This is said to encapsulate the dominant organisational culture with its established ways of thinking, which is transmitted to new members through various processes of socialisation (cf. Sathe 1985; Schein 1984). This approach emphasises that the dominant organisational culture is widely shared and that it is characterised by beliefs and values that are placed above others. The shared ideas, assumptions, values and norms that form an organisation's culture are "developed over time through the shared and accumulated experiences of system members" (Rosen 1991: 5). In this view

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organisational culture, defined by its shared values and beliefs, encourages the comprehensive understanding of the organisation's guiding principles. There are two types of values involved here, the unconscious 'assumptions' that are common knowledge, and the overt and conscious values that are explicitly articulated (Linstead and Grafton-Small 1992; Martin 1992; Schein 1984).

Other commentators have argued, in contrast, that the dominant organisational culture does not inevitably define a homogeneous group, and the shared values and beliefs of that culture do not always exist without contestation. Incongruent assumptions and beliefs exist, as there is not always an unquestioning adherence to and acceptance of the dominant organisational culture. For example, organisational members may be selective or sceptical regarding which organisational values to accept, forming countercultures or subcultures. There is much literature that is critical of the assumption that organisational culture is homogeneous and consensual, which highlights alternatives to the 'shared culture' theory (Jermier, et al. 1994; Kunda 1992; Martin 1992; Martin and Siehl 1983; Willmott 1993). The concepts of 'counterculture' and 'subculture' have often been used to define groups that are distinct from the dominant organisational culture. These cultures reinterpret and often challenge the values and beliefs of the dominant culture in distinctive ways (Sathe 1985). Martin and Siehl (1983) defined three forms of organisational culture: an enhancing subculture, an orthogonal subculture and a counterculture. The enhancing subculture represents the dominant organisational culture in a more intense form and represents organisational members that agree with the principal culture and values. Ideas and beliefs that are compatible with the dominant organisational

culture, but incorporate distinctive themes and concerns have been conceptualised as an orthogonal subculture. This subculture is a much more subtle force and it is, therefore, difficult to make explicit, as the values held do not conflict with the official culture. For Martin and Siehl (1983) the orthogonal subculture is the median between the enhancing subculture and counterculture. Finally, counterculture defines those beliefs and incongruent values that are in tension with the dominant organisational culture. The concepts of the orthogonal subculture and the counterculture support the arguments that culture is constructed of heterogeneous beliefs, values and assumptions.

Martin (1992) revisited these varied theoretical approaches to organisational culture and conceptualised them in terms of three major traditions, those conceptualising culture as integrative, those treating culture as differentiated and those regarding culture as fragmented. 'Differentiated' and 'fragmented' subcultures differ in significant ways but both offer accounts which address the varied levels of belief and incongruent assumptions which may exist in an organisation and can lead to the development of subcultures or countercultures (Buch and Wetzel 2001; Jermier, et al. 1994; Martin and Siehl 1983; McLaughlin, et al. 1999; Morgan 1997; Schein 1992).

All these theories agree that culture is a subtle permeating force throughout an organisation and that it will have varying levels of impact on the employees and employers. However, several managerial writers consider culture as integrative and suggest that if culture is a feature an organisation 'has' it can, therefore, be employed as a management tool (Wilkins 1983; Wright 1994) and subsequently

culture can be manipulated to make actors more industrious and competitive (Sathe 1983; Willmott 1993). For example, it is believed that by installing an ethos of 'total quality' or 'excellence' the working environment or the hierarchical structure of the organisation can be transformed (Hofstede 1991; Peters and Waterman 1995; Schein 1984). Thus, organisational cultures can be controlled, manipulated and can also act as mechanisms of control. In particular it is argued that culture may serve as a control mechanism influencing the behaviour of organisational members (Martin and Siehl 1983; Ray 1985; Watson 1994).

Recent research into organisational cultures has been focused and biased towards these managerial perspectives (see Martin 1992). From a managerial perspective, recent interest in organisational cultures is a response to increasing global market competition, economic transformations and the popularity of successful Japanese organisational cultures. Comprehending organisational cultures has been a central feature of much of the management literature, as many believe that this understanding and consequently the manipulation of culture can explain, predict and increase organisational effectiveness and productivity (Deal and Kennedy 1988; Hauser 1998; Hofstede 1991; Peters and Waterman 1995; Pool 2000; Wilkins and Ouchi 1983). For instance Wilkins (1983: 24) claims that, "organisations can become more productive...if management understand and coordinate the diverse assumptions that underlie an organisation's culture".

In this tradition of research cultural changes are not simply the product of manipulation as several other factors are seen to affect and bring about changes

in organisational cultures (cf. Handy 1993). Organisations and their environments are believed to be the interdependent outcomes of managerial actions, institutional influences and extra-institutional changes (Lewin, et al. 1999). It is important to note that extra-institutional changes are also associated with technological advances and developments (Buchanan 1986; Fulk and DeSanctis 1995). All of these factors need to be taken into consideration when studying processes of organisational change and transformation.

These discussions focus upon the construction of strong organisational cultures but an integrationist perspective has examined their interaction with internal institutional influences and wider environmental changes. It is therefore important to consider how writers who give more attention to the ambiguity or contestation that surrounds dominant organisational cultures have addressed these issues. These writers emphasise the significance of the different sub-cultures or counter cultures within organisations. Writers within this more critical tradition emphasise the possible divergence between the complex and contested lived cultures of organisations and efforts to construct and manipulate strong integrative cultures (Thompson and McHugh 2002; Willmott 1993). It is suggesting that contestation will continue to be a characteristic of organisational life in the form of subcultures and countercultures.

These arguments suggest that variations in the experiences and orientations of different organisational participants must be considered in the study of NCTs and organisational change. Firstly, it is important to analyse, document and explore the implications of dominant organisational and managerial objectives and

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understandings of the role of NCTs. Secondly, an exploration of the extent to which employees may internalise these objectives and understandings regarding NCTs will also be necessary. This study will also include the ways in which organisational members articulate sub-cultural or counter-cultural perspectives that are divergent from the dominant organisational culture. In the substantive analytical chapters of the thesis, the conceptions of congruent and incongruent frames (see Orlikowski and Gash 1994) will provide a critical resource for addressing these issues.

The Ethnographic Study of Organisational Cultures

The implementation and application of NCTs, one factor influencing organisational cultural change, will be understood in this thesis through the employment of an ethnographic study of an organisation. It is therefore appropriate to review some of the ethnographic research within the literature review, while the substance of my research methodology will be discussed in chapter 4.

There have been many ethnographic studies of the workplace setting a precedent for this research thesis (see Beynon 1984; Casey 1995; Cockburn 1983; Hughes, et al. 2002; Kondo 1990; Kunda 1992; Maanen 1979a; Maanen 1991; Nichols and Armstrong 1976; Nichols and Beynon 1977; Pollert 1981). The ethnographic study of organisational culture is important as it goes beyond defining the formal structure and relationships of the organisation to include the interpretative and subjective sentiments of members of an organisation (see Salaman 1979). In

order to understand organisational life the organisation's social realities have to be deconstructed by the organisational ethnographer (Rosen 1991). Thus, to learn the rules of organisational life and to interact with the organisational members an organisation ethnographer must enter the organisational setting "to understand how and why they [organisational members] construct their social world as it is and to explain it to others" (Rosen 1991: 5).

Ethnographic studies of organisations are undertaken by applying qualitative research methods. Qualitative research methods have long been advocated as appropriate for the study and exploration of organisational cultures and symbolism (Jeffcut 1994; Maanen 1979a; Maanen 1979b; Martin 1992; Ouchi and Wilkins 1988; Smircich 1983a; Smircich 1983b; Smircich 1983c; Smircich and Calás 1987; Trice and Beyer 1984; Turner 1986; Turner 1988). Ethnography describes the method of direct observation of individuals or groups, the analysis and the written description of those observations (see chapter 4 for a detailed examination of the literature, and the ethnographic methods and analysis utilised in this study). The research for this thesis is undertaken in the form of fieldwork in a specific organisation and employs the principals of organisational ethnography to examine the narratives of the organisational members. These narratives are used to document the meanings and behaviours that take place in the organisational setting (see also Maanen 1979a; Rosen 1991; Watson 2000a).

As noted above, a major debate in the study of culture concerns the acceptance of shared meanings by organisational members (Ouchi and Wilkins 1988). It is suggested that there is not always unquestioning adherence to, and acceptance of,

organisational cultures. For example, employees may, as a form of resistance, be selective or sceptical about which organisational values to acknowledge and/or internalise (Willmott 1993). Individual employees that are sceptical or question the organisation's culture may be defined as deviant for not complying with the cultural norms and values, but this highlights the possibilities for 'unofficial culture', 'countercultures' or 'subcultures' (Blau 1974; Cohen 1997; Martin and Siehl 1983; Watson 1994; Willmott 1993).

Organisational ethnography is founded upon anthropological practices (see Chanlat 1994; Czarniawska-Joerges 1998; Escobar 1995; Hassard and Parker 1994; Smircich 1983a; Wright 1994). Information and communication technologies have also been studied using anthropological methods (see Escobar 1994; Hirsch and Morley 1991; Wilson and Peterson 2002). A review of the anthropological and managerial literature suggests that an important distinction in the study of organisational cultures is that between informal structures and formal structures. These categories will be initially employed to analyse and categorise the fieldwork observations and notes.

Organisational cultures are, firstly, characterised by the 'formal structure of the organisation', which is "the formal configuration of roles and procedures...[and]...the patterned regularities and processes of interaction" that these entail (Ranson, et al. 1980: 2). Wright (1994) argues that formal customs and routines formulate the practices of an organisation, and it is these features that maintain a complex organisational division of labour. Organisational cultures can be further construed in terms of the study of an organisation's

'informal structure', which is defined by the values, beliefs, behaviour and relationships found in the setting that are not subsumed within the formal structure (Ranson, et al. 1980; Trice and Beyer 1993). This category is based on the conjecture that participants in specific organisational settings share a culture that goes beyond or even diverges from the formal organisational structure and its cultural referents. Communication and interaction are to some degree dependent upon this informal network of social relations and culture.

Finally, a distinctive feature of 'anthropological' research is its effective employment of personal narratives to produce an interpretative understanding of culture. Wilkins (1983) believes that organisational narratives, from managers and employees, can be used to construct a researcher's interpretative account of an organisation's cultures. Further study of organisational cultures from the vantage point of anthropological and ethnographic epistemologies could reveal whether collaborative work practices are enabled by NCTs and produce more effective organisations. In particular such research could explore the extent to which new organisational cultures are founded upon electronic connections and resultant forms of team working (see also Carnall 1995; Hastings 1993).

The Technology-Organisational Culture Relationship

"...the specification, selection, implementation and consumption of technology...[is]...a process of on-going, intertwined organisational and technological change" (McLaughlin, et al. 1999: 197).

The relationship between technology and organisational culture is a dynamic one. This relationship is based upon the premise that work processes can be understood in terms of the restructuring of the economy and culture across time and space. Technology implementation and application within an organisation "...destabilises identities, knowledge and skills, organisational cultures, and routines and relationships" (McLaughlin, et al. 1999: 208). It is suggested that new technologies and technological innovations are not only producing social change (Webster 1995), but are promoting 'a qualitative shift in social conditions' while also being a necessity for organisations to progress (McLaughlin, et al. 1999). External imperatives are not the only forces driving techno-organisational changes (Knights and Murray 1994; McLaughlin, et al. 1999; McLoughlin and Harris 1997). There are also internal imperatives, which can be observed, embedded in organisational structures and cultures.

Techno-organisational change can be explored utilising two elements of culture, organising practices and organising narratives (McLaughlin, et al. 1999). These features both influence and are in turn influenced by technical change. This recursive feature means that technology can be comprehended firstly in terms of its implementation via existing practices and narratives, but also in terms of its involvement in changing such practices and narratives (McLaughlin, et al. 1999). Techno-organisational change can be analysed by studying how technology has changed work and also how it has been integrated into existing work practices. These changes are addressed and analysed in chapter 7 by focusing upon transformations in communication patterns, information lines, social interactions and networks. It can be argued that techno-organisational change highlights the

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tensions created by technology implementation, as changes in work processes and practices may be incongruent to the needs and expectations of organisational members.

Different perceptions of the culture-technology relationship have influenced our knowledge of the dynamic relationship between technology and organisational culture. For instance, it is suggested that information and communication technologies challenge the existing cultures of organisations (Schein 1992). Handy (1993) predicted that technology would be seen not as machines, but as tools extending the capacities of individuals. This partly defines the 'technologisation of cultures'. The very manner in which technology has been analysed in this study evidences that this shift in thinking and behaving has taken place.

Finally, the technology-organisational culture relationship can be defined through the 'technologisation of culture'. Cultural elements are part of the creation and recreation of a 'technological reality' (cf. Mackay 1995). By taking on the role of a participant observer within the case study organisation, the characteristics of the culture became evident (cf. Morgan 1997). Whilst focusing upon the application of NCTs, patterns of communication, the flow of information through and within the organisation, and patterns of social interaction were explored. These elements of culture were seen to have been 'technologised' as a direct and indirect result of the implementation of new technologies.

Organisational Structures

The structuring and restructuring of organisations will now be explored through an examination of the argument that there has been a shift from bureaucratic to post-bureaucratic organisational structures and forms, marking a distinctive form of organisational transformation linked to technology implementations. These shifts are not inevitable or simply the product of technology implementation, but are the result of a combination of different factors (see Symon 2000). Similarly to organisational cultures, organisational structures have been transformed through the electronic networks enabled by the implementation and application of NCTs (Dawson, et al. 1998; Symon 2000). For instance, as organisational boundaries are crossed to connect teams, departments and divisions, it is suggested that technology implementation and application is altering the formal structures of organisations (Coghlan 1998). This case highlights the need for a review of the literature on changing organisational structures to gain an understanding of the possible affects of new communication technology implementation and application.

Organisational structures are socially created through interaction and relationships between organisational members, and through organisational rules that create mechanisms of control and facilitate coordinative and cohesive working practices (Dawson 1996; Smircich and Calás 1987). These structural elements produce and sustain organisational hierarchies and power relations, which are discussed in the next section. On the one hand, organisational structures can be redefined by environmental factors (see Burns and Stalker

1961), competitive market structures (Handy 1993; Miles and Snow 1986), organisational performance (Salaman 1979) and organisational size (Handy 1993; Pugh, et al. 1969). On the other hand, technological change and technology implementation may also influence organisational structures (Burkhardt and Brass 1990; Morton 1996b; Palmer 1998; Thach and Woodman 1994). An examination of the relationship between the organisation and the organisational actors, who are creating and recreating the organisation, can highlight the transformation of organisational structures and forms. For instance, the applications of electronic communication technologies by organisational actors have been perceived as enabling new organisational forms (Davidow and Malone 1992; Drucker 1988; Miles and Snow 1986; Sproull and Kiesler 1991). It is these structures and forms that have the potential to facilitate innovative work processes (Cross, et al. 2002; Malone, et al. 1999) and 'new ways of organising work' (Symon 2000). The potential transformation of organisational structures and the resultant effects on the organisation of work are discussed following the section on power relations and hierarchies.

Technology Effects on Power Relations, Hierarchies and Control

Information and communication technologies help to deconstruct the boundaries of traditional organisational structures (Coghlan 1998), and this effects the power relations and hierarchies of the organisation. It is these elements that in part help to form, maintain and transform an organisation's structure. Whether these changes in organisational hierarchies and power relations are a direct consequence of technology implementation and application is still debated (see

Kling 1996), but it is evident that new forms of control and coordination can be achieved through the effective application of NCTs. Such control and coordination represent fundamental elements of the new organisational structures and forms. Established organisational structures facilitate control over organisational members and work processes through hierarchy. Changing organisational structures highlight the necessity for new forms of control and monitoring, which may be achieved through the coordination of information via a network. Through this understanding an individual's position of power can be defined by their access to information and to the network as this shows their ability to perhaps manipulate and control information.

Initially, it was believed that the implementation of computer-based systems in organisations centralised organisational power (cf. Bloomfield and Coombs 1992; Burris 1998; Simpson, et al. 1987). However, the developments and applications of technology have created a decentralisation of power. The implementation and application of ICTs has been used to decentralise organisational power through the 'informating' of workers (Zuboff 1988) and through enabling work by small autonomous units (Bloomfield and Coombs 1992; Simpson, et al. 1987). Power can also be defined in terms of technology ownership and access to technology (Bloomfield and Coombs 1992; Youngs 1997). At the same time NCTs extend the possibilities of management control (Child 1984) and surveillance (Bloomfield, et al. 1994). Increased coordinative and collaborative working practices reduce the negative effects of control as organisational members are mutually responsible for their workloads and are reliant on each other. Therefore, coordination and control can be considered as

interdependent, and can both be facilitated by NCTs (Fulk and DeSanctis 1995). Individuals and teams are, then, responsible for controlling their own work and this represents the way in which computerisation decentralises power (Kling 1996). However, superiors have the power to monitor and control work through financial control and target setting and thus coordination, control and hierarchy interact.

In organisations, the relations and interactions of organisational members challenge an individual's position of power (Clegg 1989) and those in power sustain their position by reinforcing the structure of the organisation (Pfeffer 1981). As organisational structures are flattening it has become more difficult to identify an individual's power status by their hierarchical position (cf. Victor and Stephens 1994). Consequently, it can be argued that the implementation of technology in an organisation alters the 'locus of power' (Thach and Woodman 1994), as information and knowledge become new sources of power. Although those with financial control and the ability to set targets hold more power in organisations, those who have the relevant information, knowledge and skills also hold power in new organisational structures and forms (Burris 1998). On the one hand it is claimed that computerisation of the workplace has facilitated the reduction of vertical hierarchical levels in new organisational forms (Burris 1998; Wellman, et al. 1996; Zuboff 1988). Conversely, it is suggested that the reduction in, or flattening of, hierarchical levels in organisations is a process of delayering and is not a consequence of computerization but can be associated with cultural and political changes (Kling 1996). New forms of organising in

these non-hierarchical organisations, however, indicate changes in organisational control mechanisms.

However, forms of organisational control embodied in existing or new forms of organisational hierarchies, and power relations also provide the possibilities to control access to communication and information, and thus control participation. Simpson et al. (1987) suggest that those who have control of the flow of information are able to increase their position of power within an organisation. Intra-organisational communication via email technology can easily be manipulated as a result of technical expertise. Technical expertise can, thereby, displace and challenge existing forms of power but often become integrated into existing power structures. Individuals or groups of organisational members can easily be marginalised from email communication when they are excluded from mailing lists, or when they have limited or no access to email technology. Exclusion may also be the consequence of poor technical skills and knowledge. There are some organisational and management mechanisms to control who has access to email technology, who can send and read emails and whether these communication and information channels may be monitored and by whom (see Culnan and Markus 1987). These control and participation mechanisms can also be applied to video-conferencing and audio-conferencing technologies (cf. Culnan and Markus 1987; Dustdar and Hofstede 1999; Sellen 1995). However, the implications for organisational members remain controversial. Thus, the implementation and application of these specific communication technologies in a specific organisation and their implications for patterns of monitoring, control, coordination and participation are analysed in this thesis.

Models of post-bureaucratic structures are based upon 'connectivity' and 'individuality' and provide the most radical and optimistic perspective on the relationship between NCTs and organisational structures (Symon 2000). It is argued that in these organisational structures power and status are gained through knowledge and information acquisition, and by communication and interaction. As the implementation, integration and application of communication technologies support new ways of working (see Symon 2000) then new organisation structures and forms need to be created to adapt to, and be supportive of, these changes. Handy (1993) suggests the possibility that the future structures of organisations and the organisation of work do not have to be founded upon hierarchies. It is proposed that tasks can be effectively controlled, performed and completed in a variety of non-hierarchical organisational structures, such as team working (Handy 1993). In this view the 'communication revolution' (cf. Handy 1993) has in part contributed to the restructuring of organisations. This suggests that organisations should be analysed as frameworks of communication and information, and as frameworks of collaboration, and it is on this basis that the relationship between NCTs, innovative working practices and new organisational forms can be explored.

To summarise the nature of power, control and authority in organisations has altered through processes of centralisation and decentralisation, and through increased expectations of worker autonomy (cf. Bloomfield and Coombs 1992; Burris 1998; Simpson, et al. 1987). New versions of control mechanisms, hierarchies and power relations are fundamental structural elements of the new

post-bureaucratic organisational structures and forms. These changes are discussed further in the following section.

The Structuring and Restructuring of Organisations

"New organisational forms are emerging based around the use of information and communication technologies..." (Dawson, et al. 1998: 1).

Organisational structures are, like organisational cultures, comprised of different elements, which can influence, change and maintain structures. Structure is understood in terms of the configuration of activities in an organisation that are enduring (Ranson, et al. 1980). Work processes, communication and information lines (Weick 1987), hierarchies and power relations constitute the tangible and intangible elements of structure. It is important to note that these elements are interrelated and can be interdependent. Traditional organisational structures have been designed according to time and geographical constraints but with the advent of NCTs these constructs have changed (cf. Fulk and DeSanctis 1995). Organisations are constantly changing to be more flexible and responsive to their environments (Davidow and Malone 1992; Hughes, et al. 2000) and to improve their performance (cf. Pettigrew 1999). It is these economic, technological and social transformations that are promoting new organisational structures and forms and promoting networking and team working processes (Barker 1999; Orlikowski, et al. 1995).

Flattening hierarchies and downsizing are often part of organisational restructuring, (Fulk and DeSanctis 1995; Handy 1995a; Handy 1996; Kanter 1992; Morton 1991; Murray and Willmott 1997; Senge 1990; Victor and Stephens 1994; Wellman, et al. 1996; Zuboff 1988). Casey (1999: 21) argues that, "multiskilled, information-integrated workplaces require fewer levels of organisational hierarchy and formalisation to manage employees". These forms of organisational restructuring may encourage new collaborative work processes but are also sources of conflict and resistance as organisational members' roles and responsibilities are transformed. Collaborative working processes have been enabled by the implementation and application of NCTs. It is these working practices that have been adopted in post-industrial (Burris 1993) and post-bureaucratic organisations (Heckscher 1994). The discussion of the post-bureaucratic organisation details the shift from traditional bureaucratic organisation to post-bureaucratic or post-industrial forms. Two illustrations of post-bureaucratic organisations are the network-structured organisation (see Lea, et al. 1995; Miles and Snow 1986; Nohria and Ghoshal 1997; Sproull and Kiesler 1991) and the virtual organisation (see Davidow and Malone 1992; DeSanctis and Monge 1999; Drucker 1988; Hiltz 1984; Hughes, et al. 2000; Sotto 1997), as they both facilitate employee mobility and flexibility (Dawson, et al. 1998). These forms have been created by the implementation and application of ICTs, and exemplify the new organisational structures enabled by these technologies (Sproull and Kiesler 1991; Zack and McKenney 1995).

The bureaucratic organisational form was, according to Weber (1947), the most dominant form of institution in modern society. This organisational form was

believed to be an efficient form of coordination and control (Weber 1947). Bureaucratic organisations are formed through defined rules and procedures, and formal roles and relationships. It is these organisational forms that thrive in stable environments (Heckscher 1994), and changing organisational forms may be seen as a response to constantly changing markets and market pressures in modern society (Fulk and DeSanctis 1995; Jackson 1999b; Lewin, et al. 1999). Changing organisational forms are enabled by technological advances and converging technologies (Fulk and DeSanctis 1995; Lewin, et al. 1999; McLoughlin 1999) and the new storing, presenting and processing capabilities of technology (Dustdar and Angelides 1997).

New organisational forms can be seen as progressive developments of traditional bureaucratic organisational structures and forms. The long-term shift from bureaucratic to post-bureaucratic organisation has been part of the evolutionary development of organisations (Heckscher 1994). New organisational forms are in part structured for innovativeness and efficiency (Hauser 1998), collaboration (Pettigrew 1999), and participation and team working (Barker 1999). It should be noted that decisions made by a team or the individual have to be complementary to the organisation and are to some extent dictated by organisational cultures (Wilson and Rosenfeld 1990), organisational structure and power relations. Thus, team working and subsequent working practices have to be examined within the structural and cultural contexts of the organisation. In these newer types of organisations decision-making is through influence and trust, features which have been discussed in reference to both networked and virtual organisations (Handy 1995b; Hauser 1998; Heckscher 1994). Post-bureaucratic organisations

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are based upon the sharing of information and open boundaries (Heckscher 1994; Hughes, et al. 2000), thereby suggesting that these new organisational forms are fluid and flexible (cf. Orlikowski, et al. 1995).

The network-structured organisation is founded upon electronic connections created by computer-mediated communication technologies (Bush and Frohman 1991; Dawson, et al. 1998; Lea, et al. 1995; Morton 1996a; Nohria and Eccles 1994; Nohria and Ghoshal 1997; Snow, et al. 1992). The networked organisation can in part represent the successful implementation, integration and application of communication technologies in the workplace, which has facilitated and extended organisational communication flows. In turn new ways of working such as collaborative working processes and virtual team working are made possible by network-structured organisations (Sproull and Kiesler 1991). Thach and Woodman (1994) suggest that the network-structured organisation allows for the easy flow of communication, particularly lateral information and communication flows.

The boundaries of this form of organisation can also be blurred as the organisation's network extends to other organisations (cf. Thach and Woodman 1994), increasing both inter-organisational and intra-organisational channels of information and communication. The workforces of networked organisations are regarded as knowledge workers where their flexibility and autonomy are enhanced by the implementation and application of ICTs (Zuboff 1988). Organisational work is now understood in terms of the ways in which ICTs support innovative work processes, networking and team working. However,

Symon (2000: 404) suggests that the networked organisation may not be "a radical new form of organisation...[or]...a complete transformation in the way we work..." but may simply be a new way of perceiving and understanding organisational work. The extent and character of such new ways of working in the case study organisation will therefore by examined, especially in chapter 6.

Organisations that are geographically dispersed are enabled by ICTs (Davidow and Malone 1992; Hiltz 1994; Sproull and Kiesler 1991) and a distinctive application of NCTs is represented by the virtual organisation. Virtual organisations are formed by geographically distributed individuals who are electronically linked and laterally connected (DeSanctis and Monge 1999). This type of organisation represents the application ICTs to form a collective unit of people that work together often at different locations, as there is not a shared physical organisation or workspace. The virtual organisation emphasises the decentralisation of some forms of control, which consequently empowers organisational members (Hughes, et al. 2000; Wilson 1999). Greater empowerment of the workforce is produced through 'virtual team working' (see Dawson, et al. 1998; Jackson 1999a; Merrick 1996a; Symon 2000; Warkentin and Beranek 1999). Such team working, as a central feature of virtual organisation working, alters organisational hierarchical working patterns, creating collaborative working patterns (Hughes, et al. 2000). This represents a move away from bureaucratic work organisation (Davidow and Malone 1992).

Much of the literature of the late 1990s on the future of organisational structures focuses upon the notion of virtual working in virtual offices and virtual

organisations (Davenport and Pearlson 1998; Davidow and Malone 1992; Dawson, et al. 1998; Maternaghan 1997; Sotto 1997). It is believed that these working practices are addressing the "more flexible and adaptive business structures" that are becoming prominent in organisational settings (Jackson 1999b: 1). Virtual working exemplifies organisational flexibility, permeable boundaries within and between organisations, the use of ICTs for electronic commerce and continuous individual and organisational innovation (Jackson 1999a). This may in part reflect the optimistic management perspectives on virtual work domains.

A virtual organisation's structure is said to be 'reconfigurable' as it has permeable boundaries (DeSanctis and Monge 1999). It is created and maintained by technology, and is based on the principles of networking, while material files or 'hardcopies' are replaced by electronic files (Nohria and Berkley 1994; Palmer 1998). However, there is some debate as to whether the 'paperless' office actually exists, as organisational members still print off communications and documents (cf. Strassman 1985). The virtual organisation can be described as 'a coordination-intense structure' so there is a heavy dependence on computers, and a reliance on computer networks to communicate (Hughes, et al. 2000; Wilson 1999). As a result, computer-mediated communication has increased in this organisational structure and form (DeSanctis and Monge 1999; Nohria and Berkley 1994). The improvement of communication and coordination in these structures is a dominant theme in virtual organisational literature (see DeSanctis and Monge 1999; Fritz, et al. 1998; Igbaria 1998; Warkentin and Beranek 1999). However, the increase in organisational communication is not simply a positive

feature of this form of organisation because it has been found that it creates a sense of 'information overload' (cf. Dawson, et al. 1998; Rice and Steinfield 1994) for some organisational members.

Post-bureaucratic, networked and virtual organisational forms represent types of structures which are believed to enable organisations to be more responsive to market changes and technological developments (Casey 1999). These forms of organisation and organisational structure do not necessarily guarantee collaboration between organisational members. However, collaborative working practices may be achieved through a combination of structural and cultural elements that are enabled by the implementation and application of NCTs. The mechanisms that promote collaboration, decision-making and discipline in these new organisational structures are still to an extent being 'invented' (Heckscher 1994). In particular Heckscher (1994) believes that the process of decision-making has to be legitimatised through collaboration and consensus. Therefore, compliance can no longer rely upon organisational hierarchy and structure because they are continually transforming in order to adapt to the implementation and application of NCTs. In order to comprehend new organisational structures and forms, the capabilities and functions of the NCTs that are implemented and applied need to be understood, as it is these properties that enable organisational change (Zack and McKenney 1995). In the case study organisation NCTs have enabled new structures of working, and extended information and communication networks, both of which have in part transformed the organisational culture and structure.

The Technology-Organisational Structure Relationship

The treatment of technology within organisational analysis is largely concerned with the relationship between technology and organisational structure (Bloomfield, et al. 1994). There are three ways in which to analyse the relationship between technology and organisational structure: firstly structure can influence technology implementation and application, secondly technology can influence structure and thirdly actors are active in changing the technology-structure relationship. The discussion that follows analyses the technology-structure relationship from these vantage points.

Organisational structures can influence technology implementation and application (cf. Preece 1995; Thomas 1994). The organisational hierarchies in existence may dictate who receives what technology and when, or whether an individual has access to a particular technology, a feature discussed earlier in reference to organisational hierarchies and power relations. When organisational structure and hierarchy influence technology implementation in this way, barriers to employee participation may be created and sentiments of resentment are likely to result. The implementation of technology is believed by some writers to be influenced by organisational politics (Knights and Murray 1994; McLoughlin 1999; Silverstone and Mansell 1996; Thomas 1994). McLoughlin (1999) argues that technology implementation and application is 'strongly orientated' to an organisation's economic and political goals. It is these goals that link technology to broader structural contexts.

However, there is more evidence to suggest that information and communication technology implementation has more influence on organisational structure and forms than vice versa. This is supported by the argument that organisational structures need to change in order for the integration and application of ICTs to be successful (Morton 1996a). As to whether this actually occurs or whether structural changes are inevitable is still contested (Symon 2000). Changes in the lower levels of the organisation may not necessarily result in major transformations to the power configurations at the higher levels of the organisation.

Actor network theory takes into account that organisational agents both at managerial and non-managerial level interact with NCTs in ways that impact upon and influence organisational structures in a variety of ways. By applying NCTs to the implementation of electronic networks, organisational agents have been able to transform organisational structures. The creation of 'technology infrastructures' has been enabled through the transformational effects of the interconnectedness enabled by technology (Cross, et al. 2002; Galliers and Baets 1998; Turner 1998). A technology infrastructure is defined by "an interconnected work environment" (Turner 1998: 250), which not only includes the internal organisational environment but also the external environment. In effect, NCTs are the platform used by organisational agents to transform their organisation's structure via the constitution of an effective networked communication process. This suggests that NCTs have a transformatory effect only when they are deemed a tool in the hands of the organisational agents. Therefore, technology cannot actually 'do' anything unless users apply it.

Conversely specific technologies can only 'do' specific things, so action cannot make them do just anything.

NCTs are not only facilitating new structures of working, such as the sharing of knowledge, skills and resources, but in so doing are supporting organisational structural transformations (Dawson, et al. 1998; Hughes, et al. 2000). It is suggested that organisational structural changes are being managed around horizontal communications that are believed to be indicators of new organisational forms (cf. Pettigrew 1999). The relationships between organisational structure and NCTs, and the influences of these technologies on organisational forms have to some extent been researched (see DeSanctis and Poole 1994; Yates 1989; Yates and Orlikowski 1992). Thach and Woodman (1994) suggest that the implementation of NCTs makes existing and traditional organisational structures ineffective and redundant and, thereby, support the view that new organisational structures and forms will take their place. In their view these new organisational structures incorporate technology and its advantageous capabilities. Through the analysis of new organisational structures and forms, organisations may be equated to structures of communication and information, as structures of collaboration and as structures of surveillance. This analysis of organisational structure addresses Thach and Woodman's (1994) prescription that with the implementation of NCTs in organisations there must be a focus on communication flows and lines, and less importance should be given to structure.

Organisational restructuring creates new roles and opportunities, enabling flexible working and the blurring of organisational boundaries (Casey 1999;

Victor and Stephens 1994). Victor and Stephens (1994) note that the flexible workplace is not always widely accepted because work tasks are no longer specified as predictable. Employee uneasiness is also created because traditional skills and knowledge constantly need to be updated with advancing technology. This uneasiness may also be the result of the increased possibilities of management surveillance. Also, the utilisation of technology is dependent on how users interpret the technology and their broader patterns of work (Orlikowski, et al. 1995). It is these interpretations that support the congruent and incongruent understandings of communication technology applications and implementations. The contradictory and complementary interpretations of NCTs need to be examined when producing an account of an organisation's culture. As highlighted earlier in the discussion, management and non-management perceptions of the implementation and application of NCTs can be contradictory, and may be shaped by organisational structural and cultural elements.

As previously discussed organisational cultures are changing and adapting to integrate ICTs. It is evident from the review of the literature that organisational structures are also being transformed to adapt to the capabilities of ICTs. These structural transformations are not fundamentally new but are different from bureaucratic organisational structures and represent how structural frameworks can be changed and are flexible in nature as, for instance, in the shifts for specific team working projects. These innovative organisational structures embody and encompass the changing work practices produced by the implementation, integration and application of NCTs. The implementation and application of NCTs has facilitated organisational transformations and thereby enabled

autonomous and flexible working practices, increasing electronic communication

links and promoting the electronic transmission of information (Symon 2000).

Redefining Communication, Networks and Social Relations through NCTs

Much of the literature reviewed discusses the effects of the implementation,

integration and application of NCTs on the public spheres, and the technology-

enabled changes in organisations and work practices. For instance, it has been

argued that cultural and structural elements have influenced and facilitated the

transformation of certain cultural and structural elements. The impact and effects

of NCTs depend on the settings and social circumstances in which the electronic

e-media are embedded (Fulk, et al. 1990; Poole and DeSanctis 1992). To define

the parameters of this research thesis the effects of NCTs within an

organisational context are identified in terms of transformations in

communication, networks and social relations. These represent interdependent

and fundamental elements of an organisation's culture, structure and form. This

discussion also aims to introduce the literature and findings on the relationship

between NCTs and communication, networks and social relations as they will be

examined and extended further by the research study.

The 'new channels of communication' are enabled by the implementation and

application of NCTs (Zack and McKenney 1995). As a result organisational

members and functions are becoming connected by inter-organisational and

intra-organisational communications, so organisational relationships and

boundaries are becoming more fluid and permeable (Morton 1996a). These transformations call for the redefinition of communication, networks and social relations as each element is altered as a result of the changes. The existing literature and findings regarding these elements will now be considered.

The Redefinition of Communication

The scope and character of communication has changed in important ways where it has been enabled and supported by the implementation and application of NCTs. The means and methods of communication have been transformed, as there is no need for face-to-face physical proximity. Communication can, therefore, be said to be geographically independent. It is important to note that paradoxically some argue that electronically mediated communication and interaction cannot replace face-to-face interaction, especially in a networked organisation (Nohria and Eccles 1994; Nohria and Ghoshal 1997). However, Wellman et al. (1996) and Zuboff (1988) have suggested that, a more democratic workplace can be promoted by the lack of face-to-face interaction and the anonymous nature of computer-mediated communication (CMC). The real time element of communication has also been radically transformed, as information and communication can be transmitted and exchanged almost instantaneously. Fundamentally communication can now take place via a computer which impacts on how and where information can be transmitted, and impacts on social relations.

Computer-mediated communication is an important transformation within an organisation, as it is believed that this method of communication can increase the range, capacity and speed of organisational communication (cf. Culnan and Markus 1987; Hiltz 1984; Nohria and Ghoshal 1997; Rice and Steinfield 1994; Sproull and Kiesler 1986; Sproull and Kiesler 1991). Some research assumes a technological imperative in predicting and explaining the organisational impacts of CMC (cf. Markus and Robey 1988). It is, however, important not to assume that once implemented NCTs will always change communication and processes in the desired and predicted manner (Zack and McKenney 1995). Other social influences also have an impact on the technology applications that generate computer-mediated communication and computer-supported cooperative work (cf. Fulk 1993; Fulk, et al. 1990; Rice and Aydin 1991; Tidwell and Walther 2002; Zack and McKenney 1995). Organisational culture is often ignored as an influence on CMC (Zack and McKenney 1995) and in some instances social influences on technology are ignored (cf. Kling 1991). However, it can be understood that computer-mediated communication will be influenced by the task, technology, or functional structure of the group or organisation (Sproull and Kiesler 1991). These differing emphases can be resolved by focusing upon an individual's perception on the employment of NCTs and how this is influenced by culture and task.

Ineffective and poor organisational communication, although not the only factor, can result in a disconnected and divergent culture with detached workers. For instance, Walther (1996) concluded in his study that computer-mediated communication, particularly communication via email, reduces group solidarity

and the interpersonal nature of copresent communication and interaction. Conversely, communication technologies enable lateral communication to take place across organisational boundaries (Hinds and Kiesler 1995), which rebuilds a connected, and cohesive organisational context. Effective communication is also vital for new management structures (Carnall 1995).

The implementation and application of NCTs in an organisational context is believed by some to increase the potential for communication (Hinds and Kiesler 1995). For instance, Hinds and Kiesler (1995) argued that, organisations should be structured to support both lateral and diagonal communication. Inter-organisational communication is also promoted by high levels of networking in organisations (Nohria and Ghoshal 1997). As a result inter-organisational and intra-organisational communication expand existing organisational networks, so organisational hierarchies do not restrict communication lines as hierarchical protocols have been reduced. These networked structures of communication and information enable structures of collaboration, and a focus on such patterns of collaboration provides a further way in which to analyse new organisational structures and forms.

Organisational Networks

Organisational networks are formed by the flow of information and communication through and within an organisation, which can be defined by inter-organisational and intra-organisational communication. Technology can be implemented to support a communication network structure or applied to

generate a communication network. Traditionally organisational networks were based upon vertical communication and it was their function to transmit communication from senior and middle management to employees below middle management, which included work schedules, arrangement for meetings, orders and procedures. However within post-bureaucratic structures, organisational networks carry vast amounts of information and documents as well as formal and informal communications. Therefore, "the process of work flow coordination is increasingly becoming more of an electronic task than a physical one" (Fulk and DeSanctis 1995: 340).

The rise in networking has become an important characteristic of organisational work enabled by ICTs (Castells 1996; Murray and Willmott 1997; Wellman, et al. 1996). These social and work networks are important as they not only promote, but also enable, the possibilities for coordination and collaboration between organisational members. For instance, organisational networks generated by communication and information lines increase opportunities for collaboration, information sharing and exchange (Casey 1999). Of course in any organisation interpersonal networks act as conduits for information exchange without which organisational coordination would be ineffective (Nohria and Ghoshal 1997). However, Nelson (2001) states that creating connectedness in work settings is hindered as relationships are formed in and through hierarchical structures, and by 'humanizing' the hierarchy more connections can be created. 'Humanizing' the hierarchy is based upon the idea that electronic networks should be founded upon face-to-face interactions (Nelson 2001). Thus, a network or hierarchy will be established through personal connections and not remote

individuals. Much of the literature suggests that the implementation and application of NCTs has the opposite effect and individuals become dehumanised and isolated (cf. Lupton and Noble 1997). The humanisation of hierarchy is addressed in this thesis as it has implications for the application of NCTs in the workplace.

Networking also promotes knowledge management and innovation (Cross, et al. 2002; Cross, et al. 2001; Swan, et al. 1999), which would have been hindered by bureaucratic vertical communication (Bush and Frohman 1991). Within a post-bureaucratic organisational form the employment of company intranets supports both vertical and lateral communication. As lateral communication increases, knowledge and information have become sources of power (Burris 1998) especially as more organisational members become 'informated' (cf. Thach and Woodman 1994; Zuboff 1988). The implementation of email technology has expanded communication and networks, which is believed for the most part to be beneficial to organisational work. For instance Forster (2000: 256) states that, "information networks...will increase exponentially the number of commercial relationships we are exposed to" and, thus, highlights one possible advantage to the expansion of organisational networks. Computer-mediated communication and the functional change in organisational networks have consequently changed the nature of social relations, and the character of these processes and communication structures will be explored in this thesis.

The Changing Nature of Social Relations

NCTs have problematised the definition of interaction, social ties, experience and reality (Cerulo 1998). Social interactions and networks are less constricted by time and distance. They are being maintained and sustained by the implementation, application and integration of NCTs in public and private spheres. For instance, information and communication technologies transform existing social relations by disrupting the time and space of interaction (Boden and Molotch 1998; MacKenzie and Wajcman 1985; Martin 1978). It can be argued that the implementation and application of NCTs has resulted in the creation of a new form of disembodied 'cultural network' and that this has become the principal means of communicating in some organisations (cf. Deal and Kennedy 1988). The changing nature of social relations as cultural elements are explored further in chapters 5 and 6.

Power, authority and hierarchies influence the types and forms of social relations within an organisation and are important as they illustrate how ideas and plans are expanded in the organisation. These organisational elements have been affected by the implementation, integration and application of NCTs because communication and information lines and networks have been redefined by these technologies. The social relations and social structure represent patterns of interaction: who communicates with whom about what (Jablin, et al. 1987).

Computer-mediated communication enables new forms of interaction in the work setting (Rice and Steinfield 1994). These new forms of interaction at work are

enabled by technological mediated communication, increased communication and information flows and extended organisational networks. The computerisation of the workplace, besides its advantageous productivity capabilities, has promoted social networking (Burris 1998; Wellman, et al. 1996). Computerisation of the workplace has also increased expectations of employees to interact even though some relationships may be transitory, such as teams that can be created and disbanded at any time (Victor and Stephens 1994). Therefore, these changes are suggesting that social interaction between employers, employees and customers need to be researched and redefined.

It is, therefore, evident that communication within an organisational context has altered, but there is still the question as to whether these changes enable the closer integration of departments within an organisation, between different sites (nationally and internationally) simply because of easy and increased communication. The expansion of organisational networks also does not necessarily lead to collaboration and connectivity between organisational members. Limited research on the changing nature of social relations also leads to questions about the effects NCTs have. The effect of NCTs within an organisational setting, also, raises questions as to the interplay between communication, networks and social relations. The focus on these elements will highlight the inadequacies and disadvantages of NCTs as well as their advantageous capabilities.

Chapter 3 – Setting the Scene: CommCo

The primary research in this thesis consists of an in-depth case study of new communication technologies (NCTs) in a range of important settings within CommCo, a telecommunications organisation. To analyse and create a comprehensive understanding of the application of NCTs within CommCo, the training and working settings were studied. By comparing and contrasting the working and training settings the aim is to form an understanding of the context in which cultural and structural changes have taken place. This research was in part an evaluation of the implementation of NCTs within the organisation by utilising descriptive accounts to explore the technology-user interface, and associated cultural and structural changes.

The primary focus of the study was the e-skilling programme, which in turn gave access to the work settings either directly or through firsthand accounts from the delegates. This gave me an in-depth insight into the different social relations and cultures within the organisation, and the applications of NCTs. A research focus on the e-skilling programme also allowed me to study a crucial context for the development of skills and knowledge surrounding NCTs at CommCo.

It is the intention of this chapter to set the scene, providing background information of the research strategy employed and the organisation under study. Initially the case study strategy employed will be defined in order to explicate the fundamental framework of the study. The principal section of this chapter is the descriptive account of the organisation under study, CommCo. It is within this section that CommCo is introduced in terms of its market position, its historical and industrial context, and its technological progression. Detailing the system of communication in place, the forms and overall application of technology and the hierarchical structure of the organisation can form an essential picture of the organisation. Thereby, this will clarify the particular characteristics that made CommCo an ideal case to study the application of NCTs. Finally, the sampling techniques utilised are discussed and this serves as an introduction to the research participants, the types of occupation and tasks within the organisation, and the specific research sites within the organisation.

It is important to note that all the facts and figures depicted in this chapter have been obtained either from the research participants, the organisation, via company profiles on the Internet or through newspaper articles. However, to maintain the anonymity of the company and its employees the figures have been approximated. The Internet sites that provided information have been referenced but their web addresses have been omitted. The newspaper articles cited have also had their titles and issue dates omitted.

The Case Study Strategy

Several writers have utilised the case study research strategy to investigate organisations, management, industrial relations and technological applications (Barker 1993; Beynon 1984; Bresnen 1988; Carnall 1995; Dalton 1959; Galliers and Baets 1998; Hartman 1987; Kitay and Callus 1998; Knights and Murray 1994; Thomas 1994; Whitfield and Strauss 1998; Yin 1993). The case study method is a research strategy employing a multitude of methods to study social phenomena and consequently to provide understandings and explanatory accounts of such phenomenon (Kitay and Callus 1998; Stake 1994; Yin 1993). The research strategy was selected to create a holistic understanding of the application of NCTs within an organisation while encouraging the production of theory and ideas.

Practically, carrying out a case study requires substantial commitment from both the researcher and the case study organisation, as the researcher often needs to be within a site for an extended period of time and requires access to employees and departments. These requirements need considerable organisation, especially on the part of the research site, which is time consuming and often the cause of concern during access negotiations with a potential research site (Kitay and Callus 1998). However, the main advantage of utilising this research strategy is that the findings may be placed in the wider context of social relations and cultural themes within the organisation (Kitay and Callus 1998).

The case study of the e-skilling course and related work settings can be seen as a microcosm of the use of information and communication technologies across CommCo. It is argued that in this sense the case study enables direct generalisation about the application of information and communication technologies across the various settings, which is highlighted by the personal narratives of CommCo employees. These narratives draw upon employee experiences of NCTs within their training and working settings. The training setting is a context embedded within the wider organisational context and culture. Therefore by focusing upon the training setting as a distinctive context of technology application, the wider CommCo processes could be focused upon. This focus illuminated the management rationales for information flows through a technological culture and the organisational structure. On this basis, the social practices associated with NCTs can be reconstructed in the terms of the organisational culture and structure.

Within this case study, data was gathered through observation and interaction. The survey method, in the form of questionnaires and in-depth interviews, was utilised to gain an understanding of the management philosophies, the views of non-management employees, and the organisational structure and culture. This combination of methods arguably created a holistic understanding of CommCo (cf. Jorgensen 1989). A holistic understanding creates a comprehension of the wider social and cultural processes, management rationales and the impact of NCTs on organisational structures and cultures.

The Case of CommCo

The telecommunications industry is a rapidly evolving industry as technology is constantly progressing, and consumer demands and expectations are increasing. This has been reflected in the complex cultural and structural changes occurring within the CommCo organisation over the last two decades. These changes are a result of the privatisation of the communications industry, deregulation, and technological advances within the industry and the broader context of work.

The 1981 British Telecommunications Act separated the telecommunications activities of the nationalised industry from the postal services who had held responsibility from 1912 (Vickers and Yarrow 1988). The 1984 Telecommunications Act was aimed at ending any monopoly of the UK telecommunications systems. A regulatory body, known as the Office of Telecommunications (Oftel), was set up to govern the industry. This deregulation and re-regulation was indicative of the 1990s, as several regulatory bodies were formed to control the information and communication sphere (Melody 1996). It was believed that privatisation of telecommunications would improve services, increase efficiency and result in high profits (Ferner and Colling 1993). Nationalised organisations operate as 'state-controlled monopolies' (Trauth and Pitt 1992) and thereby industrial relations and the bureaucratisation of work were directly controlled, influenced and regulated (Ferner and Colling 1993). After privatisation direct political control ended and organisations began to operate within a shareholder climate (Ferner and Terry 1997), which consequently affected industrial relations.

In the early 1980s a new telecommunication organisation entered the market ending the monopoly created by a state owned telecommunication organisation. It was not until the 1990s that a truly open and competitive market was created when licenses were granted for additional companies to operate fixed line networks (Ferner and Terry 1997; Vickers and Yarrow 1988). The combination of the shareholder climate and increased competition in the market meant that cost cutting practices were developed, and employee numbers were reduced in many national organisations. Ferner and Colling (1997) highlight the concerns of trade unions who believed that devolution removed bargaining to line managers and away from key central departments where they were most effective. The result was experienced as weakening trade unions positions.

CommCo is a major competitor in the telecommunications industry. The changing industrial climate altered the organisational culture of CommCo to create a customer-orientated focus. In order to address customer needs the organisational structure changed to divisionally controlled self-managed teams, which laid the foundation for the major structural changes that took place in 1998 (CommCo 1998) and 2000 (CommCo 2000c). Over a ten-year period CommCo dramatically reduced the number of employees by approximately 40% (CommCo 2000a; Dixon 1990) despite an increase in the number of UK telephone lines (CommCo 2000b). The reduction in the employee numbers changed the composition and skill level of the workforce. This in turn created a climate in which work was subcontracted out to ex-CommCo employees (cf. MacKenzie 2000). During these organisational transformations it was argued that CommCo was operating various industrial relations strategies. CommCo management was

attempting to reconcile conventional industrial relations strategies with new assertive tactics, which resulted in problematical relations (1999; Ferner and Colling 1991; Ferner and Colling 1993; Goodhart 1994; Summers 1990).

With increased local market competition and regulation CommCo began to diversify from its core activities by entering the mobile telephone market (Ferner and Colling 1993; Vickers and Yarrow 1988), and entering the global market (Ferner and Terry 1997). As a result of globalisation, diversification and employment fluctuations there have been unstable industrial relations at CommCo. For example, these changes and consequential volatile industrial relations led to two major strikes by the telecommunications technicians and managerial staff. Organisational restructuring in the late 1990s and early in 2000 created further industrial relation concerns, as many of the subsidiaries failed to recognise the National Communications Union.

The worldwide deregulation of the telecommunications industry opened the market up to competition. As a consequence, CommCo expanded from a national to a worldwide organisation, which was achieved by acquiring interests in Europe, Asia and the Americas (cf. CommCo 1999). Although Europe has only recently been deregulated, CommCo is in the processes of creating a European network. CommCo has also created associations with organisations in the emerging markets in Eastern Europe. In Asia and the Pacific stakeholder positions have been acquired in several countries' telecommunication companies (cf. CommCo 1999). Similar alliances and stakeholder positions have been achieved in the Americas (cf. CommCo 1999). Although these ventures had

created a substantive interest and a stable position in the global communications market, recently this strategy has become more problematical for the organisation. For instance, it is argued that each stakeholder position is weak and is reflected in depressed share prices (Crane 2001). The joint venture, initiated in the late 1990s, between CommCo and another large international organisation was dissolved due to a lack of interest by potential large business customers (Roberts and Waters 2001).

The current telecommunication industry operates within a competitive environment that is focused upon new technological developments. The convergence of information and communications technologies has opened the market up to direct competition between mobile phone providers, net-based services and cable provision companies. These companies are able to provide customers with a fixed line, cable television and unlimited Internet access as a complete package. Many telecommunication companies invested a vast amount of money into licenses for third generation mobile phones, which have to date failed to become popular. This technological development exemplifies the convergence of information and communication technologies as it is a mobile phone incorporating WAP technology, and under joint ventures allows users to connect to an Internet service provider to download and view World Wide Web pages, and to send and receive emails.

New technological developments, shifts in market structures and new regulatory approaches prompted further strategic organisational restructuring in 2000. CommCo undertook a radical innovative restructuring of its activities to

consolidate the changes that took place in the late 1990s. Business and residential customer operations were aggregated and separated from the network company, as specified by the particular marketplaces each addressed. Four self-contained global businesses were created by sector, to focus their efforts and to address the growing needs of the Internet, e-commerce businesses, global networks and next generation services. As a result, there are two major and four minor divisions making up the CommCo Group. A Chairman, a president emeritus, two executive directors and a board of nine non-executive directors head the CommCo group. A chief executive and several directors head the major divisions separating the customer enterprises and the network company, each responsible for a particular area of the market. Directly below the directors are the managers, then the project managers and their teams. Each division has its own hierarchical structure enabling it to be relatively autonomous. CommCo is, therefore, constructed of 'autonomous divisional units' (cf. Carnall 1995). Although each division is responsible for its own technology implementations, the same software is used to ensure compatibility throughout the organisation. This also facilitates the coordination of work and cohesiveness. In comparison to the two major divisions a chief executive and several presidents control the four minor divisions of the CommCo Group. Therefore, the company is seen to be organised within a 'divisional structure' (Carnall 1995) separating its market focus from the product focus.

The divisional structure of the organisation ensures that each of the divisions is relatively autonomous controlling their own finances and human resource requirements. This structure allows the divisions to set their own targets and to

control their own expansion and development in response to market and economy changes. As these divisions are autonomous, pressure is released from the board and thus "...allows accountability to be 'pushed' down the organisation" (Carnall 1995: 19), all of which has consequences for the organisational employees. However, the divisions are not as autonomous as Carnall (1995) would lead us to believe. For instance, recently the board has been held accountable for dropping share prices, employment instabilities and poor labour relations. The divisional structure has also limited employee mobility as they are trained in the specific skills pertinent to that division ensuring that they are bound to that particular division.

As a consequence of an intensified and competitive market place, many organisations have changed structurally to flatter and more horizontal structures (Casey 1995; Makridakis 1995). These structural changes have created management positions, although employees are often undertaking the same tasks. According to Shore and Tetrick (1994), this flatter structure has produced a sense of achievement and promotion, distracting employees from the fact that this organisational structure creates fewer opportunities for upward mobility and this is an important part of the psychological contract. However, it is questionable as to whether this structure will empower the managers as the same patterns of senior management control may be maintained through its culture.

For employees with a long history in CommCo there seems to be employment stability. There are plenty of opportunities for employee development through training programmes, enhancing individual knowledge and skills, as represented

by the company's Investor's in People Award. However, ironically even with more training and skill accumulation opportunities, the flatter structure has reduced employee mobility in the company. Employees wishing to change jobs find there are no positions available and those wishing to move up the corporate ladder can only hope to lead a team project. It was evident from my own research that those now leading and managing team projects are under immense pressure as their workloads have increased, creating what some felt was a less than effective use of employees. For instance, during the interviews project managers often stated that they had several projects underway at any one time. Projects appear to be set up on an ad hoc basis and consequently rushed through. Often data for these projects were collated and compiled with little time to verify or substantiate outcomes. Communication technologies are heavily relied upon to distribute data and exchange ideas and this placed more pressure on employees to work faster, while it frequently replaced the need for geographical local teams and face-to-face contact.

Although CommCo has been proactive in restructuring and addressing market changes, it has been slow in implementing NCTs. The process of technological development within the organisation has been gradual until recently, when there has been a rapid expansion in the communication technologies as awareness of their applications has increased. Technologically the organisation has developed from large mainframe computers with fixed terminal use. Progression from this system led to widespread use of keyboards and the development of the skills associated with them. Personal computers were installed allowing access to mainframe resources. CommCo employees now have access to the Internet but

also the company intranet that holds current data and client information. This informational resource could also be accessed at home if an employee wished and had computing facilities at home. At present each employee has his or her own email address and in most instances has a personal computer at work. It is the eventual aim to ensure that all employees have their own computer, a development that is particularly pertinent to those in the mobile workforce. For example, laptops with wireless access to the CommCo intranet would enable members of the mobile workforce to work more independently.

In addition to the office and mobile workforce, there are a small percentage of employees who work from home who have similar computing facilities to those who work in the office. This form of work represents the 'geographical decentralisation' of work (Burris 1998). Those employees utilising ICTs to work remotely from the office and employers are defined as 'teleworkers' (cf. Igbaria 1998; Jackson 1999a). 'Telecommuting' has also been used to convey work that is undertaken remotely from the organisation using technology (see McCloskey and Igbaria 1998; Warkentin and Beranek 1999). It is predicted that 'telework', as a form of working, will become more widespread (cf. Kling 1996; Wellman, et al. 1996) and some are optimistic about the future possibilities for this work (see Stanworth 1998). However, although 'telework' or 'telecommuting' is a popular concept in CommCo few workers are given the opportunity to work from home. Hereinafter CommCo employees working from home will be known as 'teleworkers'.

Additional NCTs employed in the company include NetMeeting, video-conferencing and audio-conferencing, and more recently web conferencing. NetMeeting and audio-conferencing is widely used throughout the company, enabling teams who are geographically dispersed to work together. This technology, and this method of meeting and communicating, seemed to be quite popular. However video-conferencing, although available at several sites, does not appear to be used extensively by those in middle management positions. Recently web conferencing has also been introduced, which allows people across the globe to view documents and hold meetings. In the training setting email, video-conferencing, audio-conferencing and NetMeeting have been utilised in a move away from the traditional CD-ROM distance learning courses.

Within this context of restructuring and technological changes CommCo has had several concerns to address to remain competitive within this climate. Primarily CommCo has sought to meet and predict the current and future needs of its customers. The research and development division is aimed at maintaining and improving CommCo's position as a forerunner in telecommunication technological developments. In order to achieve this CommCo has had to maintain a workforce with current communications knowledge and skills, but it has also had to envisage the development and expansion of these employee attributes to sustain its position in the market. It is, therefore, the company philosophy to invest in the workforce by developing their skills and capabilities through training initiatives. However, the organisation and outcomes of such training are not straightforward. For example, it is evident from the e-skilling

course that some of the training provision appears rather ad hoc and consequently the outcomes remain uneven.

Additionally, privatisation and deregulation created an environment in which new skills were not only a necessity for the engineers, but also for the clerical and managerial employees, so extensive training programmes were implemented for these groups in the 1990s. This was also arguably addressing the skills shortage within the organisation created by the recruitment freeze in the early 1990s (Ferner and Terry 1997) and an attempt to produce a higher calibre of internally trained employees (Trauth and Pitt 1992). In alignment with this culture of employee training and development several training resources were developed to encourage life-long learning and to give employees the opportunity to obtain relevant qualifications in 2000 and 2001.

In recent times CommCo's share prices have been depressed (Malkani 2001), and the other mobile networks have been more popular than the CommCo mobile network (Roberts 2001). Earlier shopping sprees of buying into the European market have created a huge debt and left CommCo vulnerable to a take-over (Cane 2000). The acquisition of third generation mobile phone licences has added to this debt and is unlikely to be recoverable in the near future. However, even after dismantling, restructuring and downsizing activities CommCo is still a large organisation and plays an influential role in the telecommunications industry.

CommCo as a Case Study

After reviewing the economic, historical, structural and technological contexts of the organisation and the market position of CommCo within the telecommunications industry it is possible to clarify the reasons for choosing CommCo as a case study for this research thesis by reference to my research objectives. The initial aim of the research was to undertake an in-depth study of a private sector organisation, which employs new technologies extensively in design, administration and coordination, and seeks to create an interactive exchange of information and ideas. As CommCo sites are geographically dispersed, email, video-conferencing and audio-conferencing are employed in everyday working activities for the majority of the employees. Additionally, intranets allow employees access to up-to-date information and create a national database of shared data.

To pursue the research objectives defined in the introduction the major unit of analysis in this case study is defined as a single organisation. The minor units of analysis were; the local and wide area networks; the information flow within the organisation; the process of e-skilling the workforce; and the applications of NCTs. The empirical focus of the study was on the skill and knowledge development of a sample of delegates attending an e-skilling course promoted, organised and run by a subsidiary of the company. This focus created a foundation on which to negotiate access to the organisation and to develop themes around which to collect data. This process of collecting data entailed

spending time with employees, observing the work environments and partaking in a twelve-week e-skilling course, all of which will be discussed in chapter 4.

The telecommunications sector was chosen because it is an industry at the forefront of developing information and communication technology utilising these technologies in their day-to-day business operations. CommCo was selected from this sector as a company, known from my own experience, that has a development ahead of and in line with other telecommunication companies and controls a substantial portion of the market. Gaining entry to CommCo was aided by a focal point access to the company at director level. A further advantage of CommCo was that it is a national company with several sites across the country and is structurally composed of many departments working interdependently but operating within the same culture. A pivotal requirement was that the company would allow free access to these departments and this was successfully agreed during the initial discussions. The positive response from CommCo was also promoted by the company's own needs to undertake a study of the NCTs recently introduced into the training setting within the organisation. These NCTs were being utilised by the employees as part of their everyday working practices and in their various respective locations. My focal point contact, therefore, proved to coincide with the company's own needs for an evaluation of the NCTs implemented within the organisation.

It was originally my intention to study the implementation and employment of NCTs within a work setting but this was extended to include the analysis of the training setting at CommCo. During negotiations an opportunity to follow an e-

skilling course was offered as it gave access to a large number of CommCo employees distributed nationally and who held diverse roles within the company. By following the e-skilling course the development of new communication technology skills and knowledge could be observed. As a consequence CommCo wanted an evaluation of the e-skilling course as there had been opposition to its structure and management. It was hoped that I would be able to identify the problems supposedly created by the use of NCTs in the training setting. Thereby, as the needs of the organisation were addressed, observational access to the work and training settings at CommCo, and the employees who were found in the settings, was granted and my original objectives advanced. Access to the work situation was an extension of access to the training setting and thereby allowed me to observe the use and applications of NCTs in various work settings (for example technical, administrative and managerial settings).

The e-skilling course was implemented in January 2000 to address the concern of management that the workforce's knowledge of NCTs was rapidly becoming out dated. To address these training needs, twelve classrooms across Great Britain were converted into e-classrooms by installing NetMeeting software and tools (for example an electronic whiteboard that could be networked), and audio-conferencing and video-conferencing technology. The classrooms already contained computer screens and terminals which laptops could be plugged into. By geographically dispersing the e-classrooms employees from across the country would not have to travel far in order to attend the training course.

The e-skilling course was time tabled for a period of twelve weeks. Each twelve-week period was named a tranche and consisted of training approximately 350 delegates. Every delegate was assigned to an e-classroom, which was near to where they were based, and had to attend that e-classroom on the same day each week. It was at the end of the second tranche that I began negotiating access to CommCo. The organisers of the course received many complaints about the structuring and management of the course so it was decided that there would be a break before tranche 3 while they began to address the problems encountered. I joined tranche 3 but the numbers had dramatically decreased as the inadequacies of the course had been discussed across the company, reportedly dissuading people from enrolling. There were only 256 delegates registered on the course for tranche 3.

The primary intention of the e-skilling course was to up-date the employees' knowledge of Internet protocols, LAN and WAN technology and Routing basics. There was an underlying assumption by the management that this course would also implicitly develop the new communication technology skills of the employees. The delegates on the course had to download the course material from the server on to a laptop, provided in week one of the course, and review the material on the laptop. This required the delegates to have knowledge and experience of utilising a computer, accessing the server, and downloading and saving the material on to a computer's hard drive. Although a trainer was present at the e-classrooms during the first week of the course to assist accessing and downloading material from the server, any further communication with them had to be via email. The course mentors made weekly contact with the delegates via

the video-conferencing units present in each e-classroom. In weeks four, eight and 12 of the e-skilling course a video-conferenced seminar was held linking up three or four of the e-classrooms (which varied on each seminar day). During one of three video-conferenced seminars a tutor was present and for the other two occasions the tutor taught from a different site. At the end of these three seminars online assessments had to be completed. Therefore, the e-skilling course was teaching the fundamental knowledge of NCTs but the delegates were also engaged in skill accumulation and improvement.

The overall aim of the course was to ensure that all employees within one division of the organisation, approximately 11000, have a fundamental knowledge of IP technology that can be extended on consecutive courses to achieve higher skill and knowledge levels. Extensions of the e-skilling course are designed to be more practical than the preliminary theoretical course. Ultimately a small number of employees would be trained in a specific set of skills and knowledge, which is scarce in the communications industry. At present these positions are contracted out, as there is nobody competent at that level. This is of great cost to CommCo so it is the objective to train an elite few to this level and have in-house operatives (see figure on the following page).

The Different Skill Levels to be Achieved Following the e-Skilling Course

EXPERT

SKILLED
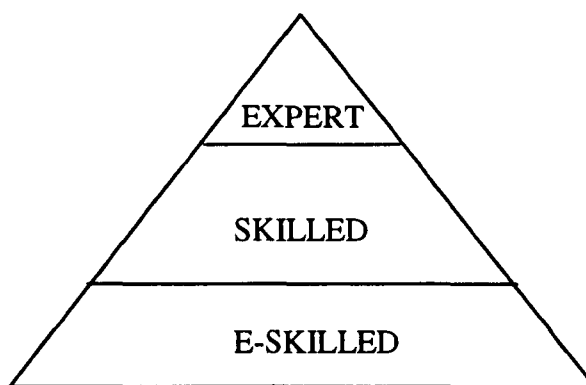
E-SKILLED

At the end of tranche 3 the course structure and instruction methods dramatically altered as the e-skilling managers tried to address the criticisms of earlier delegates. The e-skilling course was changed from a twelve to a six-week period in which the delegates were expected to attend the e-classroom four days a week. In addition to this change no video-conferenced seminars were given. The only contact the delegates had was with the e-mentors via the video-conferencing units. Due to the dramatic changes on the course tranche 4 was surveyed as this allowed the initial findings from tranche 3 to be used as a benchmark for tranche 4 and the effects of changing the application of NCTs could be assessed. The findings constructed a detailed picture of the changes in the course structure and provided the basis for judging whether this new strategy had increased the positive benefits and appeal of computer-based distance learning.

The Sites

The twelve e-classrooms were located in Glasgow, Edinburgh, Newcastle, Leeds, Manchester, Birmingham, Stafford, Milton Keynes, Bristol, Brentwood, Stockley Park and Croydon. As the e-classrooms were located across the country four sites in which to conduct fieldwork were chosen. The delegates attending the Birmingham, Bristol, Stafford and Milton Keynes e-classrooms on the Tuesday and Wednesday were surveyed. These four sites were chosen due to their geographical proximity to my location, which ensured that I could travel to any if permitted.

Initially, it had been planned to visit the four sites during the twelve-week period of the course and study two of those e-classrooms in-depth. Due to unforeseeable circumstances it was only possible to observe and participate at two e-classrooms. The trainer at Bristol did not give permission to attend the e-classroom and the Birmingham trainer could not be contacted. A meeting was arranged with the trainer at Stafford to meet the delegates but he failed to attend. A course mentor, whom I had previously met, sanctioned my presence at Stafford. Stafford not only gave me access to an e-classroom but to the working environments at CommCo and the course mentors. Permission to attend Milton Keynes was relatively easy in comparison to the other three sites. After a meeting with the trainer I was introduced to the delegates at Milton Keynes and permission was obtained.

My observations at Stafford and Milton Keynes e-classrooms were undertaken on a Tuesday and Wednesday respectively over a twelve-week period. Stafford was specifically designed to be a training and conference centre with hotel and restaurant facilities on site. The e-skilling mentors were present at this site and acted as the central point for course composition, course registration, queries and collation of assessment results. This was a much older complex compared to Milton Keynes and the training areas are located in three interconnected austere buildings. In comparison to Stafford, Milton Keynes is a modern building that had been specifically designed to be a training centre and is equipped with modern technological facilities and amenities. The four sites, Edinburgh, Newcastle, Stockley Park and Brentwood, indirectly observed via the video-conferencing unit, were all similar in their set up to Stafford and Milton Keynes. From the furnishings, Milton Keynes was the newest classroom but still suffered many of the inadequacies experienced at the other sites. The room layouts at the six sites observed had similar table layouts, identical technological capabilities and could hold 10-16 trainees.

The Sampling Method and the Participants

By following the e-skilling programme I was given access to approximately 260 members of the workforce from all levels of the organisation with varying communication technology skills. The main problem was creating a sample that would to some extent be representative of the 260-delegate population on tranche 3. From the information gathered during the first survey a picture of who

was attending the course, their gender, age, position within CommCo (see appendices 1, 2 and 3) and their skill competency were recorded (see appendix 4). This information shows that the research participants are predominately male, which is representative of delegate population and broadly typical of the organisation's population. Although it may be argued that the research findings are inherently biased to male understandings I do not believe it is applicable in this instance. For example, the female organisational members expressed similar experiences and understandings of NCTs to the male organisational members surveyed. This might suggest that the research findings are biased towards male understandings of NCTs in both the training and work settings. After surveying and interviewing some of the few female delegates who did participate in the e-skilling courses no significant differences between the understandings of men and women were noted. This suggests that both men and women in this specific milieu shared similar interpretations and perspectives regarding NCTs. However, this may be a reflection of the integration of these women into a male dominated milieu and would need further study in other organisations to discover whether this was unique to the CommCo setting. In this sense the narratives articulated by the CommCo employee's were not differentiated by gender.

To create a sample of respondents to interview a purposive sampling technique was employed, as is typical in qualitative research (cf. Morton-Williams 1985). This sampling strategy entailed selecting a group of people with particular characteristics and computer skill levels to gain a general understanding of the different e-learning experiences and responses to communication technology applications. After several failed attempts to arrange interviews with the selected

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delegates, convenience sampling (cf. Fink 1995b) had to be applied in order to achieve a good-sized interview sample. Interviews were arranged at the specific e-classrooms, as this was convenient for both parties. On arrival at the e-classrooms I took the opportunity to ask other delegates if I could interview them and this often received a positive response. In these circumstances only one delegate refused an interview as he had a prior appointment and felt that he could not dedicate enough time to the interview for it to be worthwhile. Therefore, this sample composition epitomised convenience sampling, "…groups of individuals that…[are]…ready and available" (Fink 1995b: 18). The main disadvantage with this type of sampling is that the sample may be unrepresentative of the target population, which in turn creates unknown biases in the findings. However, the pursuit of purposive sampling did ensure a reasonable range of informants. Thus, the interview sample was reasonably representative of the delegate population as a whole as it included participants from all levels of the hierarchy with varying NCTs competencies and knowledge. In addition, trainers, mentors and senior managers were interviewed in their respective work settings.

The surveys were not only used to identify potential interviewees, but the survey responses enabled me to identify key characteristics of the delegate population and subsequently build a picture of certain occupational groupings. This data also helped to identify the characteristics of the employees who wanted to partake in the e-skilling course and those employees whose skills needed to be updated and had therefore been nominated to participate. The composition of the participants in the e-classrooms surveyed during tranches 3 and 4, defining them by location, gender, age and organisational position within CommCo is detailed in appendix

1. This data emphasises the similar composition of each tranche and shows that the dominance of male delegates was the norm. A break down of the organisational positions of the delegates responding to the surveys is shown in appendices 2 and 3. By defining the respondents in this manner a picture of the occupational classifications, the gender and age groups of the employees and their location is gained. Although it is unknown whether the respondent population is illustrative of the organisational population as a whole, the comparison of tranche 3 and tranche 4 respondents clearly shows the characteristics of the delegate population and the possible organisational population. The disaggregated data of appendix 1 shows that the compositions of the two tranches were very similar: the tranches were dominated by men aged between 41-50 from a technical position in CommCo (see appendices 2 and 3).

The surveys distributed also asked the delegates to classify their skill level in using computers and new communication technologies. The collated responses are shown in appendix 4 and are again characterised by tranche to confirm that the skills level of those participating on the e-learning course at different times was the same. It was also important to determine the skill level of each tranche as new communication technologies were not as fundamental to the learning process in tranche 4 as in tranche 3. It was believed that any difference in delegate perceptions of their skill levels may have been affected by the role of the NCT in the training setting. It is clearly evident that the majority of the delegates attending the e-skilling course at different times considered themselves to be at a 'competent' proficiency level for many of the generic computer skills. The delegates of tranche 3 and 4 were more likely to say that they had basic knowledge of, or had not used, the video-conferencing technology. By defining

the NCT skill levels it could be determined whether an individual's lack of competence in using a particular technology was a factor influencing their understanding and employment of that technology. The differences in proficiency levels for each new communication technology skill are analysed further in chapter 6.

Chapter 4 – The Methodology

"No doubt about it, one of the maddening though constructive truths of becoming a qualitative researcher is one must learn by doing" (Ely, et al. 1991: 15).

"I conclude that computers in the field will lead not only to improvement in conventional field methodology but will make some radical changes (and one hopes, improvements) in the fieldwork process" (Fischer 1995: 110-111).

The research conducted was an examination of the interactions and rationales that surround organisational practices of new communication technologies (NCTs). As the study is emphasising the importance of comprehending the subject's own interpretations of the communications, social relations and networks within the organisational context, the interpretive research paradigm was adopted. In addition, my understanding of the social world dictates the adoption of a qualitative method of enquiry. Subsequently, inductive methods compatible with the interpretative paradigm rather than deductive research methods have been exploited.

The methodology employed took advantage of the epistemology of the interpretive paradigm that recognises that humans are conscious beings with feelings, thoughts and meanings (Rabinow and Sullivan 1987). Interpretive methodology is based upon the premise that inductive rather than deductive research methods should be used. The epistemological nature of the interpretive research paradigm dictates an adherence to naturalistic methods. Ontologically, the interpretive research paradigm is interested in how internal and subjective experiences are linked to the external and objective social world.

This chapter is a reflective account of the experiences of the research process and its continual development over the period of the research. It discusses and links the issues encountered during the research and relates these to arguments and examples from the literature on the research process. The thoughts and reflections documented in this chapter are taken from my fieldnotes and are, thereby, representations of my emotions and thoughts at that time. It is through this discussion that the methodological and research design decisions will be clarified. The account is divided into six sections that will discuss the debates surrounding the themes and issues encountered during the study: gaining access, getting on, methodological designs and decisions, research design problems, the interpretation and analysis of data and a reflection on the research process. Gaining access and getting on are based upon my experiences at two research sites. MoCo (pseudonym), the first research site accessed, represents an unsuccessful approach to 'getting in' and 'getting on'. A different approach was utilised to access CommCo and illustrates a successful method of gaining entry to a research site. The methods and analysis of data reviewed highlights the

research process utilised at CommCo. The section that focuses on methodological decisions will introduce into the discussion the advantages and disadvantages of using NCTs to undertake established methods of investigation, as this is a new methodological direction which social scientists need to consider. This discussion will also highlight the potential data collection uses of NCTs in social research and the practicalities of such usage, which have been neglected in methodological discussions. It will be evident from my fieldwork decisions and my reflective account of the research process that my methodology was predominantly shaped by my fieldwork experiences.

As this study is focused upon one case ethical issues are more salient as there is a greater risk of identifying the organisation and the participants in any published material. The nature of the case study and the methodology are intrinsically constrained by ethical considerations. Any morally ethical researcher will be particularly conscious of the risks involved for the organisation and the participants involved in the study and will undertake certain measures to secure their anonymity, privacy and continued well being. In accordance with the British Sociological Association code of ethics (BSA 1992a; BSA 1992b), confidentiality and anonymity were guaranteed to all the research participants. One measure taken to ensure compliance with this code of ethics was the use of pseudonyms throughout the thesis to ensure that the anonymity of the research organisation and participants was protected. This measure was agreed during the initial negotiations to gain access.

Throughout the research process the researcher must be conscious of all methodological and design decisions and the implications they will have for the validity and reliability of the data (Altheide and Johnson 1994; May 1997). Therefore each section of this chapter addresses issues of ethics, validity and reliability, as they are pertinent issues surrounding the credibility of the data.

'Getting In': The Successes and Failures of Opportunism and Tactics

The difficulty of gaining access to powerful individuals, groups and institutions is stated by many writers (Bell 1978; Clark and Ford 1970; Encel 1978; Hornsby-Smith 1993; Marshall and Rossman 1995; May 1997). At the beginning of the research process gaining access into the field is a pivotal point for any researcher (Bailey 1996; Burgess 1984; Edwards and Talbot 1994; Johnson 1975). Gaining entry is precariously balanced upon the interpretation and comprehension of the research where there is the genuine possibility of misunderstanding (Walmsley 1993). 'Getting in' and 'getting on' in the field has been described as a prerequisite influencing the validity and reliability of the data collected as each element of the research process is interdependent (Burgess, et al. 1994; Kitay and Callus 1998). This interdependence epitomises the centrality of gaining entry to the entire research process.

Cassell (1988) and Hornsby-Smith (1993) suggest that there are two types of access, physical and social, which need to be accomplished to gain comprehensive entry. Physical access is entering the research site and actually

'getting in'. Whereas social access is the acceptance of the members of the research site which allows the researcher to 'get on' with the study. However, both forms of access are influenced by who the researcher is, and who they represent (Peace 1993). 'Getting in' and 'getting on' can be considered difficult procedures, in this instance, as they are an attempt to satisfy the needs of myself, the researcher, and the conditions of the individual and the organisation.

The most significant challenge encountered during the research process was gaining access to an organisation to carry out the fieldwork. Many letters of introduction to private sector organisations did not yield any positive responses. Research literature highlights that significant problems are more likely to transpire whilst gaining access to large bureaucratic organisations (cf. Bell 1978; Blau 1969; Crompton and Jones 1988; Encel 1978; Hornsby-Smith 1993; Marshall and Rossman 1995; May 1997). However, detailed and honest explanations of the issues surrounding access are often omitted from research literature although it is a widely discussed issue in methods literature. Thus, there was little documented advice to which I could refer. When several attempts at access failed the research design and questions were modified to address pertinent issues within the specific organisation targeted (cf. Burgess 1984). It is invariably argued that flexibility can be an advantage for researchers as it allows them to adapt their methods and questions in alignment with new data (May 1997).

Access to the first research site, MoCo, was aided by a personal acquaintance, and the problems arising from this are discussed later. This access was

jeopardised, and renegotiated, as the initial research proposal was considered by the organisation to be time consuming and not beneficial to their technological processes. It is easily argued that many organisations would not welcome a researcher into their organisation to examine their application of NCTs for fear of criticism. Alternatively, it might have been the case that access was difficult because of the level at which contact was initially made, namely middle management rather than senior management. Access to the second research site, the site of my detailed research, was accomplished in a very different manner to that at MoCo. While the initial contact at MoCo was a personal acquaintance who was an employee of the company, the initial contact at CommCo was a colleague who was not employed by the organisation. This contrast in methods of entry and access outcomes led me to reflect further on the process of gaining access to case study organisations.

It is assumed that gaining access is a pragmatic or technical operation (Johnson 1975). However, two different approaches to gaining access were employed to gain physical and social access to the two organisations: these are labelled the opportunistic approach and the tactical approach. These two approaches to gaining access are distinctly different but represent varying levels of emphasis on opportunism. By moderating opportunism the tactical approach represents a more calculated assessment of gaining entry and the value of that entry. It should be noted that the opportunism represented in these approaches does not necessarily equate either to the subsequent use of friendships or links with senior organisational members. In this instance the tactical approach and use of senior gatekeepers was more successful than the opportunistic approach and the use of

friendships. My experiences of gaining access have allowed me to question the uncritical adoption of thoroughgoing opportunism because there are often implicit compromises involved in such an approach. Therefore, I would argue for a continuing and explicit tactical assessment of the opportunities and limitations of alternative access routes.

The Opportunistic Approach

Initially the opportunistic approach, a seemingly successful and well-documented method of gaining access, was used in an attempt to access various organisations. The opportunistic method of 'getting in' is founded upon the idea of exploiting all opportunities available to you as a researcher in order to gain access and in some cases entails utilising personal contacts (cf. Buchanan, et al. 1988; Cassell 1988; Hoffman 1980) and institutional reputation (Peace 1993). This approach often describes access as "...a game of chance, not of skill" (Buchanan, et al. 1988: 56). However, contrary to Hoffman (1980) and her ingenuous views of utilising social ties to gain access, my own experiences demonstrate that this is not always an advantageous action. It raises the question as to whether knowing your gatekeeper personally helps or hinders your research and your opportunities of 'getting on'. As discussed later, knowing the gatekeeper hindered the research opportunities within a potential research site as she held all the power.

By utilising the opportunistic approach, access to MoCo was fortuitously negotiated. An opportunity to access MoCo arose very unexpectedly through a personal acquaintance who acted as a gatekeeper. There were initial problems of

gaining access to MoCo as there seemed to be little interest in the research proposal put forward. In many situations if the organisation or institution feels that there is no reward or payoff in assisting the study access is not sanctioned (Buchanan, et al. 1988; Delany 1960; Hornsby-Smith 1993; Peace 1993). For instance, reciprocity, a characteristic of 'getting in' and 'getting on', prescribes that individuals, gatekeepers and organisations feel they are gaining from allowing the researcher to enter and scrutinise their environment (Bailey 1996; Delany 1960; Haas and Shaffir 1980; Lindlof 1995; Peace 1993; Wolcott 1995). The research proposal at MoCo did not get approval until it reached a departmental meeting in the Management Information Systems department (MIS). This lack of interest highlighted that perhaps many of the previous letters of introduction to other organisations were disregarded as they were sent to the Human Resources department. After receiving approval, interview and observational dates were arranged through the initial gatekeeper as the MIS department deemed the research as too time consuming for their schedule.

Although this discussion addresses issues of 'getting in', it also introduces the contentious issues linked to utilising personal acquaintances to gain entry into the field. It can be argued that the gatekeeper played a pivotal role in gaining access but she also played a significant role in controlling access to information and to possible research participants (cf. Taylor and Bodgan 1984). For example, my gatekeeper was unwilling to discuss organisational issues with me as she could easily be linked to the research. At MoCo, interviews and observational days were all pre-arranged with specific allocated times by the gatekeeper. This rigid timetable did not allow for impromptu interviews or allow me to move around

the organisation, which would have created a more extensive picture of the organisation. Although this situation may have arisen at any potential research site, many of the problems encountered were caused by the fact that the gatekeeper was a friend.

As my gatekeeper was a friend, I was able to be very open about my research and explain details about my research that I would not have been able to relate to a stranger. Also she came from a social science background and therefore understood many of the terms I used to explain my research propositions. These circumstances should have been beneficial to my research as they created an open honest atmosphere in which to negotiate. However, I ignored the actuality that this assistance was taking place within her work environment and different rules applied compared to the social environment in which we associated. Consequently, no negotiations took place as my gatekeeper believed that she understood my research proposal and proceeded to arrange the fieldwork. Perhaps if my gatekeeper had not been a friend it would have been easier to state that a rigid timetable did not suit my research objectives.

Upon reflection, adopting the opportunistic approach in this situation failed as only limited physical access was gained, and arguably not social access. It could also be argued that limited access was only gained because a 'down to earth' attitude was taken by myself as my gatekeeper was a friend; perhaps the nature of our relationship reduced the seriousness of the situation and created a lack of respect (cf. Argyris 1952b). Although initial introductions made via friends and relatives are generally more successful than 'cold' introductions, there are many

drawbacks to using a friend as a gatekeeper. For instance, within a business environment a friend as a gatekeeper creates an uneven balance of power which can leave the researcher feeling indebted and grateful for an opportunity whether useful or not.

After four months of negotiating entry to MoCo, only four weeks were given to carry out the research at the various organisational sites. The gatekeeper assembled a random sample of MoCo's employees, including people from all levels of the organisation. Nevertheless, it was only a sample of 14 and was focused around two departments within the company. The fieldwork carried out in MoCo, and the relationships, were delimited and defined by the gatekeeper (Bailey 1996). These limitations restricted my understanding of the application of NCTs within the company. As a result of the limited access achieved, MoCo was not used as part of the case study and is discussed here as an illustration of an unsuccessful access method relying heavily on opportunism and using friendships as a means of gaining entry.

The Tactical Approach

The second approach adopted diverted from the traditional ideas and advice of gaining access as it was carried out by strategically and tactically moderating the extent of opportunism. Lofland and Lofland (1995: 36) suggest that when a researcher is confronted with serious entry problems then it is more advantageous "...to be strategic". Similarly, Delaney (1960) and Hoffman (1980) suggest that 'good tactics' on the part of the researcher would assist entry to

potential research sites but failed to clarify what these involved. Also, Jorgensen (1989: 46) discusses gaining entrée using both overt strategies, dependant on "...the resourcefulness of the researcher", and covert tactics. By combining the suggestions of these researchers, my own experiences of gaining access and my intuition, I adopted an alternative approach, the tactical approach, which was successful in this instance.

The initial introduction to CommCo was made via a colleague who, it should be noted, was not an employee of this company. Preliminary contact with CommCo began at director level and therefore contradicted beliefs that starting negotiations at the top of a hierarchy causes many problems. In this instance it has been proven that provided the key person sponsors and supports the research proposal then this can be beneficial during the early stages of negotiation. At CommCo the access negotiations were with a gatekeeper who I did not know prior to the initial contact. This situation, compared to the MoCo negotiations, put me in a more equal power position, as it was not a personal acquaintance who felt obligated. Consequently, I had more confidence to say what I wanted to achieve as well as maintaining flexibility in relation to these objectives.

Primarily entry to this research site began at director level, which was a contentious beginning. It has been debated whether it is more advantageous for the researcher to gain entry into an organisation through trade unions members and officials (Argyris 1952b; Gullahorn and Strauss 1954), and middle management and employees (Bailey 1996; Dalton 1959; Nicholson 1976). Few writers advocate starting at the top of the management hierarchy (cf. Dean, et al.

1969a). Clearly, from the research opportunities offered at CommCo, gaining entry through the management hierarchy was not disadvantageous. Some writers have suggested that this can cause problems with research participants lower in the hierarchy as this may create unproductive and unconscious power relations (Bailey 1996; Dalton 1959; May 1997). In the case of CommCo, gaining entry at the top of the management hierarchy was more beneficial as I received substantial support and sponsorship (cf. Hammersley and Atkinson 1995; Hornsby-Smith 1993; Lindlof 1995) during the early stages of the fieldwork phase.

Secondly, as several different rationales of negotiating access were combined, entry to CommCo was granted with no significant problems. An unspecific proposal was submitted in order that the negotiations would not be constrained and a more flexible approach on my part could be adopted (cf. Goode 1999). Three months from the initial letter and proposal being sent the first face-to-face meeting was set up and permission to carry out the research was granted. During this first meeting, with three key members of CommCo, it was easy to judge their expectations of my research and in turn determine the organisation's goals and needs. One consequence was that these senior managers identified a topic of concern to the organisation that fell within the area of my own research agenda. Subsequently, this knowledge was utilised to alter the research proposal to address this issue and to ensure that the findings would be of interest to the organisation. This flexible attitude took into account problems of gaining entry which can be equated to "...a tension between the scientific goals of the researcher, on the one hand, and the organizational realities he [sic] studies..."

(Delany 1960: 451). Therefore, the potential rewards for the organisation of accommodating my research was accentuated and not limited by a detailed proposal.

Additionally, issues of informed consent (cf. Bailey 1996; Fontana and Frey 1994; Sieber 1992) were also addressed during these access negotiations. For instance, the organisation's management and the participants were apprised of all relevant information about the research and its objectives in a written proposal. This information was utilised as a starting point for negotiating access to the organisation. However, it may be argued that a researcher rarely divulges all to those in a potential research site primarily as it is often unclear to the researcher what specific factors they are studying (Hammersley and Atkinson 1995). Gaining informed consent would ideally create an open environment but realistically it is difficult to gain everyone's trust and to ensure that all understand the researcher's aims. By being honest and informing management and the employees of my research aims I was able to secure support from many (cf. Bryman 1988a). I was therefore able to access all levels of the hierarchy and consequently attained a holistic view of the organisation.

Finally, during the negotiations, and throughout the fieldwork phase, I emphasised that I wished to learn from the organisation and its employees. Hoffman (1980) and Goode (1999) argue that adopting the role of a learner is a form of deflection or deception but this is an ambiguous argument because the nature of research work is inherently linked to learning about a situation. For instance, a researcher enters a research site and utilises certain methods of

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investigation to make explicit the activities, processes and meanings occurring in that setting. Consequently, the researcher is there to learn about the environment, and would not be entering the site if they already understood the activities and processes transpiring.

The presentation of myself, my overall manner and others' perception of myself may have also contributed to securing access into CommCo (cf. Hammersley and Atkinson 1995; Johnson 1975; Peace 1993). It may be argued that entry was made easier into CommCo because I am a young female researcher who appears to be non-threatening (Lofland and Lofland 1995). To an outsider CommCo could be considered as a highly technical and masculine environment, which according to Lofland and Lofland (1995) would make my access even more contentious. However, when all the different rationales utilised by this tactical approach are reflected upon, my gender and age were insignificant as the method of initial contact had more of an influence on whether getting in was successful or not. In contrast to 'getting in' my gender and age may have played a more significant role in 'getting on' at the research site (Burgess 1984).

To summarise, gaining entry to CommCo was secured because the research proposal was negotiated to ensure that both the company and I would gain from my presence and my research findings (cf. Lindlof 1995; Lofland and Lofland 1995). This was achieved through constant communications, which built a rapport between myself and the official gatekeeper. In July 2000, my research proposal was formally presented to the board of directors to gain final approval and answer any queries concerning the research propositions. Therefore by

employing the tactical approach, such as planning my negotiations and addressing the needs, wants and concerns of the organisation, my proposal was made more appealing and access was successful. It is important to note that I still maintained my focus, and the opportunities available to me were pertinent to the research objectives.

The comparison of my experiences of negotiating access to two research sites serves to highlight the limitations of a purely opportunistic approach to access. It is suggested that such opportunism must be moderated by a clear tactical approach that will facilitate a more meaningful negotiation for effective access. In the case of MoCo, the opportunistic utilisation of an existing friendship, with a relatively junior management position, meant that there was limited access negotiation. Access to MoCo was constructed by the gatekeeper herself and was limited both by her position in the organisation and by her presumptions about what was required. In contrast at CommCo, a more explicit tactical approach to the access negotiations was employed. This approach to gaining access involved approaching senior management, a fuller consideration of the terms of access and fully understanding the gatekeeper's agenda. As a consequence this tactical approach proved to be much more effective in gaining meaningful access to a potential research site.

'Getting On': Passing on Information and Making Friends

'Getting on' in a research site is often as stressful as 'getting in' to that site if not more stressful. 'Getting on' in the field is dependent on continued access through

constant negotiation and re-negotiation (Bailey 1996; Brown, et al. 1976; Ely, et al. 1991; Haas and Shaffir 1980; May 1997; Peace 1993). In the research at CommCo, this was primarily a question of negotiating meaningful access to the training setting and then gaining acceptance from the participants. Relationships with the employees who were trainers, mentors and delegates on the course had to be encouraged and built upon to secure social access or I would not have been able to get enough data. According to some writers the presence of a researcher can be regarded as suspicious particularly when the study has been authorised by management (cf. Argyris 1952a; Dalton 1959; Kahn and Mann 1952) but in this case study organisation I had little experience of such suspicions. Organisational members were keen to talk about their experiences of using NCTs, both in the training and work settings, and the value and implications of such technologies appeared to be a concern of all organisational members. Nevertheless entry at all levels of the organisation had to be negotiated to assist the data collection (cf. Bailey 1996; Burgess, et al. 1994; Edwards and Talbot 1994). In CommCo entry was gained through negotiations with the mentors, trainers, tutors and delegates.

As evidenced by Argyris (1952) and as experienced by myself bad introductions hinder 'getting on' within a fieldwork site. At the early stages of the fieldwork phase, I assumed that information concerning my research had been disseminated to all levels as I had been informed that the presentation to the directors would ensure this. The trainers and mentors of the e-skilling course should have been 'key actors' (Bailey 1996). However, the details of my study were circulated to them during the first week of the course, which did not allow enough time to arrange meetings and vital introductions. Subsequently, the trainers were lost as

key actors because their roles were only pertinent to the e-skilling course during week one, after which they would not be associated with the continued execution of the course. I was unaware at the time of the importance of the gatekeeping positions the trainers held, as they were the delegates' first contacts on the course. It was not until further into the course that I realised the appropriateness of the trainers as gatekeepers (cf. Ely, et al. 1991).

Both the importance of a good introduction, plus the role of the trainers is confirmed when comparing the reception at two different training sites, Stafford and Milton Keynes. For instance, during week one I was in contact, via telephone and email, with the two trainers and was able to arrange introductions to both e-classrooms. The trainer responsible for Stafford, Craig Lawson (pseudonym), agreed to introduce me personally to the delegates, as he worked on site. Trevor Barton (pseudonym), the Milton Keynes trainer, obtained permission from the delegates with regard to my impending visit in week two and presented the aims of my study. It is obvious that in the majority of cases "...the researcher needs the gatekeeper's attention and approval far more than the gatekeeper needs the researcher" (Lindlof 1995: 107). Therefore, a polite and flexible demeanour was positively received and laid the foundations for constructive field relationships.

In week two of the course Stafford was visited first. The trainer failed to meet me at the e-classroom. I assumed that he had been detained and waited for him outside the classroom. After waiting 15 minutes I went into the classroom and introduced myself to the delegates who were extremely suspicious of my presence as they had not be informed of my visit. The mentor 'rang in' on the

video-conferencing screen for the morning 'check-in' and came down to meet me. After introductions, explanations and some interrogation by the mentor and the delegates I was allowed to distribute my first survey. I stayed an hour and a half in the e-classroom but felt very uncomfortable and unwelcome as I spent most of the time being ignored. This visit created a sense of uncertainty as to how I would be received by the other delegates. However, on reflection this bad experience and the suspicions of the delegates can be seen as understandable, and largely the result of the absence of the promised introduction. These feelings of uneasiness were also heightened by my own fears of rejection (cf. Ely, et al. 1991). Such fears are considered as normal, though, at the beginning of the fieldwork phase (Lindlof 1995; Wax 1971).

In contrast to Stafford, the inaugural visit to Milton Keynes was successful. I arrived at the e-classroom at the agreed time, the delegates were expecting me, and my presence was by no means a shock. The majority of the delegates were very welcoming and interested in my research. After distributing and gathering the completed surveys, I took the opportunity to secure permission to observe the video-conferenced lesson in week four. I was more confident about returning to this site as I thought the delegates would be candid with me. However, later it transpired that the Stafford delegates were actually more forthcoming with their experiences and thoughts on the e-skilling classroom. This showed that the initial suspicions had been overcome and may have been due to the small number of delegates attending Stafford as compared to the Milton Keynes e-classroom.

Additionally, 'getting on' at Milton Keynes e-classroom was successful due to a key actor (cf. Bailey 1996). Wayne Thompson (pseudonym), the oldest member of the class, was the first delegate at Milton Keynes to include me in conversations, which he started and often directed. Initially he had asked several questions about my study but had made me welcome in the e-classroom, acted as a guide and arguably 'adopted' me (cf. Bailey 1996). Perhaps it could be argued that he felt secure in his position in CommCo and thus felt comfortable talking to me. Alternatively, he may have understood my motives for attending and not viewed me as threatening. His position as a key actor, both in my research and in the social environment of the e-classroom, promoted informal conversations pertinent to my research aims. Therefore, 'getting on' at Milton Keynes was primarily due to the role of Wayne Thompson.

Another characteristic of 'getting on' is building up trust and rapport with the research participants, and in this sense the responses of the delegates and employees are critical factors in gaining access to information (Coffey 1999; Hammersley and Atkinson 1995; Johnson 1975; Lindlof 1995; Wax 1971). After the initial meeting with the delegates at Stafford I was concerned that I would not gain social access and that I would find it difficult to get enough data and be able to answer my research questions. There were six male delegates attending this e-classroom, five of whom attended every week. It was considerably easier to build a rapport with these five delegates as they were a cohesive group compared to the delegates at Milton Keynes. This group ate lunch together in the site's restaurant, a ritual that often disrupted the video-conferenced seminars but one that I was invited to participate in. They had exchanged email addresses and were in

contact with each other during the week to solve any problems they might have come across. All these factors created a relaxed atmosphere in which the delegates felt able to converse with me. These conversations frequently involved listening to moans about the course, as there was a general dislike for the manner in which the course was executed and particular concern about 'setting-up' problems on the video-conferenced seminar days. My presence was easily accepted and there seemed to be the hope that my study would provide feedback that would improve the delivery of the course for the next tranche.

Furthermore, it is important to consider the way in which the researcher is perceived and defined by the research participants during the process of establishing field relations (Johnson 1975; May 1997; Sieber 1992; Wax 1971). These perceptions are constructed using the researcher's ascribed characteristics, personal characteristics and presentation of self, and shape a researcher's social role within the environment under study. As previously mentioned my gender identity may not have been significant in helping to secure access to the organisation but was arguably significant to the process of 'getting on' at the research sites.

The two e-classrooms that I regularly attended were composed of male delegates so 'getting on' could be perceived as easier for a female researcher because they are thought to be less threatening. Although some would argue that a 'male-techie' environment might exclude women (see Cockburn 1983; Game and Pringle 1983; Wajcman 1991), this was not the case in CommCo's training setting. However, I do not believe that my gender identity was a serious issue

during any part of the fieldwork. Hoffman (1980) realised the strategic advantage of managing her identity when positive perceptions of her gave better access to information and yielded rich data. It was evident that my ascribed characteristics of gender and age were a concern when a mentor and a tutor considered the language spoken at a remote site as inappropriate in my presence (fieldnotes, 28/11/00). Although no action was taken at the time, the mentor made apologies later. However, my ascribed characteristics were also compatible with the adoption of the role of a learner, which aided the collection of data (cf. Lofland and Lofland 1995; Strauss and et al. 1969).

Parallel to the issues of ascribed characteristics are the debates related to the presentation of the self (Bogdan 1972; Coffey 1999; Lofland and Lofland 1995). In particular, Hammersley and Atkinson (1995) focus on the management of personal appearance as an important consideration in promoting field relations. On the first visit to the e-classrooms I was dressed in a trouser suit so as to appear confident and emphasise the importance of my study. However, to carry out the participant observation I dressed similarly to the delegates (cf. Fontana and Frey 1994) although smarter in nature in order to assert my identity as "an acceptable marginal member" (Hammersley and Atkinson 1995: 87). By not wearing a suit I fitted in with the delegates but remained appropriately dressed to speak to the mentors and tutors with whom I was in contact with during the video-conferenced seminar days. Furthermore, I adopted the demeanour of an interested learner in this context, and thus sought to present myself in a way that built upon this role as a way of 'getting on' at the research site (see Bogdan 1972).

Therefore, it is obvious that to 'get on' within a research site a researcher needs more than permission to carry out his or her research. Although my personal experiences of 'getting on' were shown to have been impeded by an initial bad introduction this problem was overcome and was not as significant as first thought. 'Getting on' in the two e-classrooms was the result of two different processes. At Milton Keynes field relations were assisted and promoted by a key actor who encouraged other delegates to discuss their experiences of the e-skilling course. Whereas 'getting on' at Stafford was easier due to the group dynamics and their social cohesiveness. Additionally it could be argued that I joined the e-skilling course at the start with all the delegates and had therefore become a regular and accepted presence, which was apparent during the later stages of the course. 'Getting on' within the research site was also a consequence of the successful negotiation of these field relationships and the management of my own identity and personal characteristics in this regard.

Finally, the ethical concerns of the research site and of its participants had to be constantly addressed whilst field relationships were being established. As the research was undertaken within a working organisation privacy and confidentiality were important issues for the organisation as well as the individual participants (Bryman 1988b; Fontana and Frey 1994; Sieber 1992). To avoid invasion of privacy and to maintain confidentiality discretion had to be exercised at all times. At the beginning of the research process it was often difficult to judge when I was being included in a conversation, and could join in, and when I was being excluded. In most cases I had to determine whether I could

be included from the general atmosphere of the conversation and the manner in which is was being conducted. George Krane (pseudonym), a delegate from Stafford, decided to speak in a lower tone of voice when he wished to discuss the e-skilling course with me (fieldnotes 3/10/00). Whereas Mike Drake (pseudonym), a delegate at Milton Keynes, used the cue "on the quiet..." when addressing me (fieldnotes 29/11/00). These two examples demonstrate, by the manner in which some participants chose to interact with me, that anonymity and confidentiality were at the forefront of the delegates' concerns.

Methodological Designs and Decisions

"Ethnographic research methods provide a richness of detail, a sensitivity of perceptions, and an opportunity to discover important new issues that cannot be achieved through *a priori* theorizing" (Friedman and McDaniel 1998: 113-114).

Many writers argue that qualitative methods of investigation are effective tools for the study of organisations (Chanlat 1994; Dalton 1959; Scott 1965; Whipp 1998; Whitfield and Strauss 1998); industrial relations and industrial politics (Watson 2000b; Whitfield and Strauss 1998); organisational cultures (Rosen 1991; Sathe 1985; Schein 1985; Trice and Beyer 1993); and new technologies (Ngwenyama, et al. 1999; Zuboff 1988). Therefore, utilising qualitative methods of enquiry can be regarded as being an appropriate way of knowing within this field of study.

The methodological design of this case study is founded upon ethnographic methods of enquiry. The ethnographic study of organisations is important as it goes beyond defining the formal structure of the organisation to include the interpretative and subjective sentiments of the organisational members. For instance, it is agreed that ethnography involves the researcher participating in the social environment under study to gain an in-depth understanding of that environment (Atkinson and Hammersley 1994; Fielding 1993; Hammersley and Atkinson 1995). Friedman and McDaniel (1998: 114-117) outline the fundamental elements of ethnography, all of which were taken into consideration when selecting and applying each of the research methods.

Participant observation, interviewing, and self-administered and emailed surveys were chosen as complementary techniques to obtain in-depth and qualitative data. It should be noted that the emailed survey has many of the characteristics of a postal survey but is different because there are more factors to take into consideration when planning, constructing and distributing this survey. The interviews documented the participants' experiences and perceptions of the application of NCTs within their work and training settings. The self-administered and emailed surveys documented similar data, but in a different manner that facilitated comparison with delegate characteristics and skills. This data emphasised the importance of the narrated experiences of organisational employees negotiating the introduction of NCTs within their organisation. The observational data complemented and enriched the words of the participants to create a more complete representation of the organisational application of NCTs

in the training setting. It is essential to highlight that the methodology was in part determined and negotiated by the type of access granted and, as with other fieldwork methods, the acceptance of the participants under study.

The methods employed emphasise the importance of comprehending the subject's own interpretations of the implementation of NCTs. These individual perceptions and experiences create an understanding of communication, social relations and networks within the organisational context. From the observational data, the technology-user interface became apparent and this supplemented the interview data. This adherence to naturalistic methods complemented the adoption of the interpretive research paradigm as it analyses how internal and subjective experiences are linked to the external and objective social world. These different methods are mutually reinforcing and illustrate a form of multiple methods (cf. Brannen 1992b; Burgess 1982) or triangulation (cf. Bailey 1996; Denzin 1989). This process of triangulation or between-methods approach substantiates the employment of various methods to study the same phenomenon (cf. Brannen 1992b). By utilising several methods it is not assumed that the data generated from each method will be treated independently (cf. Bryman 1988b; Hammersley and Atkinson 1995) but that they will be complimentary and will illuminate points of similarity creating a more comprehensive picture of NCTs in the case study organisation.

The Email and Self-Administered Survey

The survey method was chosen as it created a bank of information about the delegates attending the course and the dynamics of each group. The e-classrooms are widely dispersed across the country so it was impossible to visit the sites personally. By directly emailing the survey to the course delegates, a greater number of delegates at several e-classrooms could be included in the sample. The issues surrounding the method of sampling and how the sample was chosen were discussed in chapter 3. The fundamental aim of the self-administered survey was to create a plausible reason to meet the delegates at the two sites (cf. Dean, et al. 1969a) that I wished to observe. It was also my intention to gain, from both types of survey, an overall account of those delegates attending the e-skilling course, and to map the existing patterns of expertise. Therefore, the surveys elicited explanatory and descriptive data that allowed analysis of the process and changes (cf. Babbie 1990) of the e-skilling course. Although the survey method was an effective means of collecting data about the e-classrooms, several practicalities limited its employment particularly as the majority of the surveys were emailed. It was vital to ensure a high response rate and that the data produced was valid and reliable.

By utilising NCTs for this part of the data collection several factors had to be taken into consideration. Although it is highlighted that information technology is changing social research (Fischer 1995; Lee 1995) the practical implications of using these technologies, especially communication technologies, are rarely explored. Practical implications of using NCTs to assist data collection include

where the emails are sent to, the timing of distribution and whether the potential respondents are computer literate. These are issues neglected by researchers who advocate the use of electronic mail as a methodological tool (cf. Coomber 1997; Selwyn and Robson 1998; Sproull 1986; Thach 1995).

When surveys are emailed to a respondent's workplace, there are many factors to respect even though the research may be linked to their workplace. There are issues of surveillance to consider, an email from an unknown source may be disregarded, or one email in a backlog may be deemed unimportant and then deleted (Selwyn and Robson 1998). The time at which the surveys are emailed may also have an effect on how the survey is completed and whether it is completed or not. It can be argued that surveys sent on a Friday may be completed immediately as the respondent is winding down in time for the weekend and looking for an easy task to complete. Conversely it may be left for Monday morning and then forgotten, as many urgent things often need to be done on a Monday. With this in mind, it is understandable why Gillham (2000a) suggests ensuring that your survey arrives midweek, thus giving the respondent time to complete it. Finally, it has to be considered whether the potential respondents are computer literate. Emailed surveys were an effective method of distribution within CommCo as many employees have a private email address that is heavily relied upon and utilised for work communications. Thus, CommCo employees regularly access their emails and are computer literate. However, had my research not been carried out in an organisation centred on developing and applying NCTs this would have, then, been a pertinent issue to consider before distributing the survey via email.

Originally, the survey was distributed as an attachment on an email containing the letter of introduction. The response rate was poor, which was subsequently considered the result of delegate wariness of opening attachments from unknown sources. Accordingly, when reminder emails were sent out the survey was included in the main body of the email text. However, this method of distribution also created a problem as the survey format altered considerably, and was incomprehensible, when emailed in the original format as part of the email text. To compensate for changes that would occur during the survey distribution via the World Wide Web, and translation via various email packages, the format of the survey had to be careful planned. Many of the questions with tables allowing respondents to tick the appropriate box had to be altered, as this formatting did not translate correctly into many of the software packages.

Due to changes in the survey format the construction of some questions was altered and abbreviations were used to allow respondents to answer the questions quickly and easily (see appendices 9, 10 and 11). Therefore, the nature of the survey distribution dictated the formatting of the self-administered and the emailed survey although the content of each was similar. The first section of surveys one and two covered non-contentious issues to encourage the respondents to complete the survey and was aimed at eliciting general information about delegates' attributes and skills (cf. Babbie 1990). The open-ended questions eliciting opinions and requiring some thought were asked at the end of the survey to encourage responses (cf. Moser and Kalton 1993). It was

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expected that the combination of closed and open questions would yield a high response rate of completed surveys.

Many researchers have highlighted the importance of question construction when attempting to ensure that the data produced is reliable and valid (Gilbert 1993; Moser and Kalton 1993; Sanchez 1992). Both surveys (see appendices 6 to 11) utilised closed and open questions to produce quantitative and qualitative data, respectively, and to achieve an in-depth understanding of the social phenomena. A low response rate for surveys can partly be attributed to poor ordering and unclear phrasing of questions (Groves, et al. 1992). Therefore, question construction was carefully considered. For example, both surveys began with closed questions and finished with open-ended questions. In addition, terminology utilised by the mentors, trainers, managers and delegates was incorporated into the surveys to create the impression of a familiar narrative.

In September 2000, the first self-administered survey (see appendix 6) was delivered to tranche 3 delegates, attending Stafford and Milton Keynes e-classrooms, with a letter of introduction and a brief research proposal (see appendix 5) in order that I could introduce myself. These two sites were chosen due to their geographical proximity to Coventry and were easy to travel to and from in a day. The first surveys, which were hand-delivered and collected personally, had the highest response rate (see table 4.1), a fact discussed later in this section. The survey was also emailed to delegates attending two additional e-classrooms in Bristol and Birmingham (see appendix 7). An identical method of distribution was carried out for the second survey (see appendices 8 and 9) in

December 2000. Reminders for both surveys were emailed to those delegates who had not replied within four weeks. Due to the time scale involved and a few hostile responses to the first reminder no further reminders were sent out even though some writers recommended this practice (cf. Fink 1995a; Gillham 2000a).

Following an interview with a mentor it was mutually decided that the surveys should be distributed to tranche 4 delegates as the course structure had changed dramatically. This would allow the initial findings from tranche 3 to be used as a benchmark for tranche 4 data. In January 2001, survey 1, the letter of introduction and a brief research proposal were emailed to the delegates attending Stafford, Milton Keynes, Birmingham and Bristol e-classrooms as these four sites were surveyed during tranche 3. To incorporate a national spread of sites, the delegates enrolled at the Glasgow and Leeds e-classrooms were also included in the sample to be surveyed. Survey 2 was emailed to the delegates attending the six chosen e-classrooms at the end of February 2001. Although the overall response rates for each survey are comparable to tranche 3 and tranche 4, the response rates vary dramatically depending on the survey distribution and collection method (see table 4.1). Table 4.1 clearly shows that the surveys that were personally distributed and collected had higher response rates than the surveys that were emailed. As in other contexts, personal delivery and an explanation of the purpose of the survey elicits greater cooperation and participation (cf. Moser and Kalton 1993). At the same time the response rate of the emailed surveys remained quite high and certainly better than for many large-scale postal surveys

Table 4.1 Number of Surveys Distributed and Returned

Tranche	Survey	Sent		Returned	Response Rate	Overall Response Rate
3	1	hand delivered and returned on the same day	17	14	82%	
		emailed	45	11	24%	40%
		incorrect addresses	3	-	-	
	2	hand delivered to be returned by post by the delegates	13	6	46%	
		emailed	45	26	58%	55%
		incorrect addresses	3	-	-	
4	1	emailed	43	20	47%	47%
		incorrect addresses	0	-	-	
	2	emailed	43	21	49%	49%
		incorrect addresses	0	-	-	

(N.B. for response rates of individual classrooms and attendance days for surveys 1 and 2 see appendix 13)

Non-response rates are a central theme in the literature on survey methods and an important consideration when employing this method. Many writers agree that high non-response rates are a serious problem creating exaggerated, unrepresentative and unreliable survey data (Arber 1993; Denzin 1989; Donald 1960; Marsh 1988; Moser and Kalton 1993; O'Connell Davidson and Layder 1994; Oppenheim 1996). In contrast, Bradburn (1992) believes that some theorists do not consider non-response rates to be a substantial problem because there is an overconfidence in this method and an assumption that statistical adjustments can resolve the biases. Nevertheless, when considering the non-response rate the researcher has to consider the motivational factors affecting

participation and non-participation in the survey (Donald 1960). Survey participation is influenced by many psychological and social factors; such as degree of social cohesion, attributes of the survey and characteristics of survey respondent (Groves, et al. 1992: 477-486).

It is suggested that the degree of perceived importance of the questionnaire will affect an individual's participation (Arber 1993). Relative to perceived importance are the psychological factors of authority, social validation and inclination that influence participation (Groves, et al. 1992). In the letter of introduction to the delegates a mentor's name was included to emphasise the importance of the survey and the delegates' participation. The reminder letter stated who within the organisation was sponsoring my research as this name carried more weight than the mentor's. My sponsor's name was not utilised in the first letter as I did not want to appear as a 'management stooge'. Although this strategy cannot be proven to have increased the response rate, it may be considered an influential factor.

Moreover, it has been argued that the survey construction, format, length and content, as discussed previously, influence response rates (Denzin 1989; Donald 1960; Groves, et al. 1992; Moser and Kalton 1993; Oppenheim 1996). As the survey was addressing concerns about the structure, content and method of teaching on the e-skilling course it was hoped that this would be of interest to the delegates and result in a high response rate (cf. Arber 1993; Donald 1960; Moser and Kalton 1993). However, some respondents took the attitude that the course was not going to change in time for them and therefore was not worth discussing.

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Fortunately, many respondents appreciated the forum the survey created in which to put forward their opinions and experiences of the e-skilling course.

In summary to increase the response rates and the reliability of the data, survey construction and format needed to be carefully considered. Email was an effective method of distributing and collecting the surveys because it was easier for respondents to complete and return them. Utilising email also decreased the delivery and return waiting period. For example, completed surveys were in some instances returned within an hour thus speeding up the data collection phase of the fieldwork. The completed surveys could be stored on the computer to be easily retrieved and analysed later. There were complications associated with formatting and distributing the surveys but these were ultimately overcome. The findings from the completed surveys constructed a detailed picture of the changes in the course structure and allowed me to determine whether this new strategy had increased the positive benefits and appeal of computer-based distance learning.

Observing, Participating and 'Looking under the Rug'

Observational techniques were employed to directly observe the behaviour surrounding the utilisation of NCTs within the training setting. This intensive method of data collection not only focuses on observation but also listening and interacting with the people who occupy the environment under study (Ely, et al. 1991; Gans 1982; Lofland and Lofland 1995; Spradley 1980). This was the most time consuming of all the methods employed but yielded the most descriptive

and explanatory data. Participant observation was employed as it develops a sense of process, interaction and interrelationships of social relations, which may not be achieved by employing alternative methods (Frankenberg 1982). Therefore, the aim of this method was to gain an understanding of the relationship between the various communication technologies and their users.

As a 'privileged observer' (Wolcott 1995), or as a 'participant-as-observer' (Gold 1969), an overt role was adopted within the environment. A more accurate description of my role would be that of a 'researcher participant' (Gans 1982). 'Researcher participant' accurately describes a role with two facets: firstly that of a researcher who is able to remain to some extent detached to carry out the research; and secondly a participant who is partly involved in the environment to avoid 'going native' (Adler, et al. 1986; Hammersley and Atkinson 1995). This role ensured that all the participants were aware of my research and its objectives in order to create an open environment in which to interact and ask questions. This meant that the researcher is able to utilise the "personal interaction with subjects of study...that is the unique contribution of ethnographic research" (Friedman and McDaniel 1998: 113). The gatekeepers can sometimes dictate a role and the amount of observation allowed but the open role and timetable of observation proposed by me was acceptable to the organisation. My position as an observer and the sponsorship by key members of the organisation meant that I was granted access to relevant information and was known by the delegates in the two e-classrooms that I chose to observe. As to whether the delegates trusted me was questionable, as poor initial introductions had caused some suspicion.

However, it was very evident by the end of the research period that my position in the training setting had been accepted.

For heuristic purposes the observations of this study can be classified into two different types of observation operating interdependently but classified independently as; direct observations and remote observations. The observations made as a 'researcher participant' are classified as direct observations since I was physically present to witness the phenomena. This style of observation, and the overt role adopted, allowed the study of the video-conferenced seminars, which was an important day for the delegates as it not only reviewed previous weeks' material but also included an on-line assessment. This access also allowed the use of NCTs to remotely observe e-classrooms across the country. Remote observations are also classified as such because they required a different set of skills than directly observing a situation.

After gaining permission from the course mentor and the individual delegates, I returned to Stafford and Milton Keynes to observe the e-classrooms in operation. As I remained in constant contact with the delegates and mentors via email this process was uncomplicated (cf. Fischer 1995). Direct observation of these sites took place on a regular basis over the twelve-week period of the course. On agreed days, I observed the delegates working through the material they had downloaded from the server. I was often given the opportunity to work through a section with a delegate to learn the structure of the course and its content. I believe that the delegates were acutely aware of my presence and if they were physically guiding me through a section of the course my presence became

acceptable since I was involved in their learning. I was also able to discuss any issues on an informal basis with the delegates to gain a broader understanding of the application of NCTs in their learning environment. This understanding was greatly supplemented by directly observing the three video-conferenced review days when the tutor was seen from a remote site and when the tutor was present at a site, which also allowed discussions with the various trainers.

Unlike the direct observations, it was more difficult to gain permission to carry out the remote observations as I was not physically present. For instance, the video-conferencing screen in the e-classrooms allowed me to observe remote e-classrooms although I was not physically present at the various sites. To join the video-conferenced sessions permission had to be sought from the mentor, the trainers, the delegates at the site where I would be present and the delegates at the remote sites. As the trainer was aware of my presence at a particular site, he often informed the other delegates that there was somebody watching the session. An ethical problem arose when one trainer insisted that my presence did not need to be announced every session to the other sites. Although I was unable to change the situation, my only consolation was to assure myself that the delegates had been informed of my study and permission had been sought on the first video-conferenced session.

During the video-conferenced seminars, I usually positioned myself at the back of the classroom in order to gain an overall perspective on the class. This position also allowed me to view the e-classrooms on the screen linked via the video-conferencing technology. The remote observations made during these

sessions required different skills to those employed during direct observations as I was observing via a video-conferencing screen. While I was present in one e-classroom and was directly observing them, I was also observing three, and on two occasions four, additional remote e-classrooms. Compared to direct observation, vast amounts of notes had to taken, as it would have been impossible to remember any of the conversations and events in detail. Note taking during the sessions was acceptable as many of the delegates were recording course information. The display of multiple e-classrooms entailed a lot of concentration. This was made more difficult by the fact that the cameras were poorly positioned in the e-classrooms and often the delegates could not be seen. Although the screen was not large enough to display all the remote sites adequately it periodically displayed a full size picture of each e-classroom, which was unnecessary for the purposes of the session but of benefit to me. The screen enabled me to observe and compare the layout of the other e-classrooms, the class dynamics and the set-up of the video-conferencing technology.

The Problems and Ethics of Observation Techniques

These modes of observation may signify practical differences between them but all three modes have similar problems and ethical concerns with their application in social research. Due to the nature of observational methodology these issues needed to be addressed before the commencement of the study. As a participant observer an overt role within the research site had to be adopted to ensure that the organisational employees were aware of my role. The problems and ethical issues of participant observation had to be heeded throughout the research

process as they not only affected the data collection, its reliability and validity, but also the way in which the data could be interpreted.

The main difficulty with participant observation is that the researcher has a dual role, observation confuses participation and participation distracts from observing (Gans 1982; Jarvie 1982; Johnson 1975; Jorgensen 1989). For instance, Johnson (1975) suggested that by participating a researcher becomes involved in the environment and therefore emotions can influence the observations. This is apparent during the early stages of the research process when a researcher's emotions are heightened, so it is suggested that later observations are more valid (Ely, et al. 1991; Johnson 1975). On reflection this can be seen to be true of my own research where feelings of anxiety and nervousness about my position affected early observations and understandings. Here there was a danger of following my 'gut reactions' to events influencing data reliability (Johnson 1975). However, by participating in the e-classroom, an opportunity to ask and answer questions was created and in many instances I was able to justify my presence.

Secondly, as a participant observer, I was constantly aware that my presence might have affected the organisational employees' behaviour as a researcher may act as a catalyst (cf. Frankenberg 1982) and an overt role can be obtrusive (cf. Jorgensen 1989). On one occasion I sat with the delegates at Stafford waiting for the video-conferenced seminar to start. The tutor rang in on the audio-conferencing unit but none of the delegates were aware of how to answer the unit. Although I knew how to answer the audio call I felt unable to inform the

delegates, primarily as this would have affected their behaviour but also because I would have appeared more knowledgeable than they were. It is also possible that my presence during the video-conferenced seminars may have stopped delegates asking questions as some found it embarrassing when the tutor at a remote site did not hear them.

Furthermore, it is suggested that participating in and observing a small group, which is not typical of the organisation as a whole, can be problematic (Frankenberg 1982). By participating in and observing two e-classrooms in different parts of the country and surveying several sites I was able to ensure that the groups were typical of those enrolled on the course. Interacting with groups that were to some extent representative of the CommCo population and of those enrolled on the course was paramount to observational reliability and validity. Although the observational studies could not be repeated with the same delegates they were complemented and supplemented by data from the interviews.

Finally, gaining informed consent was not only a practical concern as such but was the principal ethical concern for the application of this methodology. To join the e-classrooms permission had to be gained from many, which entailed emailing a letter of introduction and a brief research proposal and allowing people to contact me with any questions. Ethically, gaining informed consent from delegates at the remote sites on the video-conferenced seminar days was more problematic. Although the tutor sought permission from the delegates at the remote sites it is easy to argue that these delegates were more likely to forget that I was observing. This problem was created due to the poor positioning and

application of the video-conferencing camera, which on many occasions ensured that I 'blended' in with the other delegates. On the one hand my invisibility to these delegates ensured that my presence did not affect their behaviour but on the other hand this is ethically questionable.

The In-depth Interview Technique: Listening, Talking and Getting the Data

To supplement the observational and survey data the in-depth interview method was utilised (Bryman 1988b; Denzin 1989; Jones 1985b; Marshall and Rossman 1995). The in-depth interview describes an interview that is informal, flexible, conversational and unstructured, allowing the interviewees to expand their responses and thus producing detailed information (Burgess 1991; Hammersley and Atkinson 1995; Hitchcock and Hughes 1989; Jones 1991; Mishler 1996; Reinharz 1992; Whyte 1991). The main purpose of these interviews was to gain an in-depth understanding of the culture surrounding the implementation and utilisation of NCTs and to give a voice to the individual participants. The interviews explored individual reactions to the technology and related them to the different applications and knowledge surrounding NCTs, and the social relations within the organisation.

It was over the three weeks of the e-skilling course that I carried out several recorded in-depth interviews with a select number of the delegates from many of the functional groupings and hierarchical levels of CommCo. The majority of the interviewees were purposely chosen depending on their characteristics, their survey responses and generally their reaction to my presence in the e-classroom.

The interviewees were selected from the various levels and departments of the organisation in order to gain knowledge of its structure and to learn from their varied experiences of NCTs at the various levels of the hierarchy. Trying to gain a representative sample was made difficult by the fact that many delegates did not attend the e-classroom on a regular basis and hence confirming a convenient time with them was impossible. However, an adequate sample of interviewees was created by applying the convenience sampling technique (Fink 1995b) as some delegates present at the e-classrooms volunteered to be interviewed.

An interview schedule (see appendix 12) was constructed to act as a reminder of the areas that needed to be covered during the interview. The schedule was only used as a guide, as many answers were queried further for detailed information, and to ensure that the interview was similar to a 'natural conversation' (Burgess 1991; Gillham 2000b). In order for the interview to seem like a conversation it was important to find a suitable setting in which to conduct the interview where it would not be interrupted (Edwards and Talbot 1994; Gillham 2000b). As the interviews were conducted at the research sites it was relatively easy to find an empty room in which to carry out the interview. This setting was convenient for both parties as it did not disrupt the delegate's learning for long and did not involve any travel. During the interviews, prompts and probes were used, firstly to ensure that the interview was conversational in manner and secondly that it produced detailed, descriptive data (Easterby-Smith, et al. 1991; Gillham 2000b; Whyte 1991). At the end of the interview I allowed time for some reflection on the conversation and for the interviewee to ask me questions (cf. Edwards and Talbot 1994). I hope that this technique confirmed the interviewer-interviewee

relationship and ensured that the interviewees left the interview positive with regard to my intentions.

Some commentators have suggested that knowledge of the research subject and related concepts enables the researcher to appeal for more detailed responses (Fontana and Frey 1994; Jones 1991; Measor 1985). As I was observing the e-skilling course and the video-conferenced seminars I learnt much about Internet protocols, LAN and WAN technology and Routing basics, which was beneficial to the research process. For instance, by participating in the environment I learnt the commonly used abbreviations so I did not have to interrupt conversations and interviews to ask what they were discussing. Although I had to query some words and abbreviations many were glad of the opportunity to explain in detail and display their knowledge. This also affirmed my role as a learner in the environment and established a rapport between the delegates and myself.

It is important within an interview situation to build up and maintain a good rapport with the interviewee (Coffey 1999; Fontana and Frey 1994; Lofland and Lofland 1995; May 1997; Sieber 1992) and to be aware of any power relations that may exist (Bell 1978). The importance of building research relationship is that it moves social scientists away from the notion that the researcher should remain a 'detached outsider' and not a 'subjective insider' (Fontana and Frey 1994). When utilising the qualitative interview method a researcher has to be aware of the tension between familiarity and detachment (Coffey 1999). I was familiar, and on friendly terms, with many of the delegates so it was difficult to remain detached during the interview. For instance, when discussing the

application of the video-conferencing technology many of the delegates wished to complain and it was very easy to encourage them, and ignore the benefits of the technology, as I also had experienced the setting up failures which had delayed the seminar starts. This shared experience created a common interest and stimulated a good rapport between many of the interviewees and myself (cf. Measor 1985), but made it difficult to remain detached during the interview situation.

Over-rapport with individual interviewees may also create problems that a researcher must be aware of constantly during the research process. For my research this problem was particularly acute when utilising the interview method as it was a period of intense interaction, compared to the employment of the other research methods, and was set in a relaxed environment. Fundamentally, it is important to consider why an interviewee would want to talk to the researcher (Wax 1971). This not only assisted in negotiating and gaining consent to carry out the interviews but also highlighted any ulterior motives an interviewee may have had for agreeing to participate in the interview (cf. Whyte 1991). Over-rapport may also result in the interviewee wishing to please the interviewer (cf. Whyte 1991), which is often difficult to detect. For instance, "it is difficult for the researcher to tell how representative a picture he [sic] is getting" (Dean, et al. 1969a: 21). However, many have asserted that personal interaction with the interviewees produces responsiveness and a large amount of quality data; this indeed proved to be the case during my own fieldwork (cf. Jones 1991; Marshall and Rossman 1995; Measor 1985; Oakley 1990).

In order to use this method to its full potential I had to master the technique of becoming an 'active listener' (Hammersley and Atkinson 1995) as it is difficult "...to decentre from oneself and focus on the person being interviewed" (Gillham 2000b: 3). According to Gillham (2000b), to master this technique a researcher must be aware of the verbal and non-verbal dimensions of an interview. Whereas the verbal dimension focuses upon tone of voice and emphasises the importance of the researcher listening rather than talking and giving the interviewee time and space in which to answer the questions, the non-verbal dimension refers to facial expressions, eye contact, gestures, physical contact and posture (Gillham 2000b). As I had some experiences of interviewing I was aware that many of these skills came naturally in a conversation. On one occasion during a third successive interview I become acutely aware of these skills as I was tired but trying to maintain an overt enthusiasm and interest in the conversation. However, it can be argued that an interviewer may never confidently master these skills because each interview situation is unique and very much dependent on the interviewee.

Thus, this technique of interview produced descriptive data that created an understanding of individual perceptions and narratives (cf. Hammersley and Atkinson 1995; Reinharz 1992) of the implementation of NCTs in work and training settings. The narratives of organisational members also created time scales of the implementation of NCTs providing benchmarks for an assessment of whether or not the flow of communication had been interrupted or altered over time.

Summary of Methodological Techniques Employed

The questionnaire survey method produced knowledge of the statistical composition of the e-classrooms, which could not be compiled using the other methods. This data was used to contextualise the study and ensure that the two sites chosen were representative of the delegate population on the e-skilling course. Consequently a fundamental insight into the research site was gained before I entered and hence I knew what to expect and prepare for. Also the survey data enabled a comparison of the different e-classroom experiences, as it was not physically possible to visit and observe all the sites.

The different observational techniques allowed for the general observation of the working and training environments at CommCo and also provided an understanding of the important events on the e-skilling course. The main problem associated with observational data is whether it is reliable (Adler and Adler 1994). However, in order to overcome this problem the observations were repeated at different sites to ensure that the findings were consistent and thus reliable. The observational techniques were able to document the e-classroom events but did not suggest what influences from the wider environment at CommCo affected those being observed. To gain an in-depth understanding, these processes were addressed and reflected upon in the interviews.

The interviews focused on specific areas pertinent to the study and provided extensive descriptive data on the delegates' own experiences of the application of NCTs. The interviews not only created a situation in which I was able to sensitise

my concepts (cf. Denzin 1989) but also allowed me to enter a delegate's subjective sphere of understanding and interpretation. From the delegate accounts, a comprehension of activities that could not be observed by myself could also be developed (Mishler 1996). The combination of the observational and interview techniques, and the very nature of the methods, allowed close contact with the environments and participants under study and I was therefore in a favourable position to ask informed and meaningful questions (cf. Dean, et al. 1969a). An analysis of the interview data provided interesting comparisons of the different features of the training and work settings under study.

It is evident that a 'multiple research strategy' (Burgess 1984) was adopted to undertake the field study. By combining and integrating the three different methods in a study of one particular case the data collected could be validated and extended. This multiple method approach allowed the data to be validated at two levels: within-method and between methods (Brannen 1992a). The former entailed employing observation methods on the same training day at the different research sites to verify whether the same events produced similar data. The latter, between methods, combined observation and interviewing techniques to study the same context.

In summary, the dominance of qualitative methods used was appropriate to the study of the application of NCTs within CommCo. This approach documents the cultural, technological and social changes taking place within the case study organisation. By utilising multiple methods a subjective understanding of perceptions of NCTs among organisational actors was gained and this, in turn,

produced a comprehensive account of the technological experiences and changes

within the training and working environments at CommCo.

The Effects of the Researcher

Although many of the problems of utilising individual methods of data collection

have been outlined and discussed in their respective sections there are several

overarching issues relating to the effects of the researcher that are addressed in

this section. An intrinsic part of this section's discussion is connected to how the

research is conducted and how the researcher behaves. For instance, when

assessing the validity and reliability of a study it is usual to examine how the

research was conducted (May 1997). The research was designed to be as

unobtrusive as possible so as not to disrupt or influence the routine of work and

the events of the training setting. This process allowed the development of good

field relations with the informal gatekeepers and the participants. However,

Coffey (1999) asserts that the researcher self is embodied in the fieldwork and

should be taken into account, as an acceptance of the researcher's presence

creates an improved understanding of the personal and emotional elements of

fieldwork.

The role of the researcher is central to discussions surrounding the employment

of ethnographic research methods (cf. Coffey 1999; Gans 1982; Kondo 1990;

Powdermaker 1966). An inherent part of these debates is the impact of the

researcher self on the research process and the impact of the research process on

the researcher self (Coffey 1999). This debate highlights the tension between familiarity and strangeness whilst undertaking research in the field. As a researcher I was flexible and allowed the situation to guide my fieldwork. This was not perceived as a problem as good access had been negotiated, allowing me to return to the research site as often as needed. This ensured that I was able to take up the different research opportunities that arose. It was problematic in the sense that I was often unable to plan the research days and had to be prepared to carry out an interview, to observe a setting or to participate. Obviously this arrangement had a great impact on the researcher self as it created a sense of uneasiness and uncertainty as to what may occur throughout the day.

Finally, the effects of the researcher should be discussed as they influence the validity and reliability of the study (Denzin 1989; Mason 1996). For instance, "a...major limitation [of social research] flows from the researcher's use of the relationship he [sic] establishes in the field, that is, the likelihood of bias" (Dean, et al. 1969b: 21). It is essential that the researcher affects be acknowledged otherwise they cannot be managed or reflected upon. According to Sieber (1992), conducting ethically responsible research includes considering the researcher's affects in terms of their rapport with the participants, the agreement of their verbal and body language, and the trust that is built between the researcher and the researched. For instance, if the research participants feel uneasy with the researcher then they may not give a true reflection of their experiences and opinions and ultimately the validity of the data collected becomes questionable.

A fundamental characteristic of the effects of the researcher is linked to the conceptions of objectivity. Ethnographers can often be obsessed with remaining objective throughout the research process (Altheide and Johnson 1994). To be objective, it is argued that a researcher must not allow their values to influence their observations, analysis or conclusions. Hence, a researcher has to remain detached, open and unbiased. It is often rightly argued that the researcher is an intrinsic part of the setting and the interaction, and consequently the research (Altheide and Johnson 1994; Coffey 1999; Easterby-Smith, et al. 1991). This suggests that a researcher needs to be conscious of their interdependence and interaction with their research and the researched, to maintain their objectivity and ensure the validity of the ethnographic study. However, these researcher affects are also pertinent in the interpretation, analysis and writing up stages of the research process.

Analysing the Data: Grounded Theory and Interpretation

"The greatest strength and weakness of ethnographic data is its dependence on the researcher. Not only must we rely on the researcher to collect data in a satisfactory manner, but we depend heavily on the knowledge of the researcher to assess what the data are and their significance when applied" (Fischer 1995: 111-112).

The analysis stage of the research process aims at constructing and reconstructing the data into an understandable and appropriate account, a process

that proved to be challenging and time consuming. By analysing the fieldwork descriptions and the personal narratives I was able to determine the patterns and processes of development and the utilisation of the NCTs in both the training and working settings of CommCo. It was through these personal narratives that the development of the organisational cultures and structures was analysed and this, subsequently, highlighted how these cultural elements had become 'technologised'.

Many writers have outlined the different techniques and frameworks that can be used to analyse qualitative data (Bryman and Burgess 1999; Dey 1993; Edwards and Talbot 1994; Jorgensen 1989; Tesch 1990). In this study the grounded theory framework (cf. Glaser and Strauss 1967) has been exploited to analyse the qualitative data collected. This framework was favoured as it allows concepts and theory to be formulated from the data. The theory constructed utilises the descriptions and narratives collected in the field to create a substantiated, clear and valid reflection of the culture, structure and social relations within the training and working settings of CommCo.

Grounded Theory

Grounded theory is the employment and development of actor's concepts and interpretations to construct theory (Glaser and Strauss 1967). It is argued that theory is generated inductively from the data, which therefore effectively communicates an individual's perceptions of the social world. By employing inductive logic, it is hoped that the data will give integrity to the participants'

understanding of the implementation of NCTs within the training and working environments. To extend and supplement the participants' narratives my own sociological analysis will be developed.

By utilising grounded theory I was able to adopt a more open and flexible approach to both the interpretation and analysis stage of the research process (cf. Easterby-Smith, et al. 1991). Upon reflection it is evident in my research that the generation of grounded theory involved a series stages. While some writers have outlined the stages of grounded theory as distinct, it has also been argued that the stages are not separate in practice and this is demonstrated by my own research (cf. Easterby-Smith, et al. 1991; Glaser and Strauss 1967; Hammersley 1992; Lofland and Lofland 1995; Taylor and Bodgan 1984). I constantly, throughout the fieldwork phase of the research, reviewed my observational data to ensure that I was familiar with the concepts and themes forming in the data. Generally the concepts and themes were noted in order that they could be reflected upon, tested, modified and either developed or disregarded in the light of further findings. The first report to the organisation was constructed using these themes and this enabled me to conceptualise the data and highlight those issues thought to be of importance. The in-depth interview questions were formulated from these preliminary findings. After this initial conceptualisation phase a framework was constructed using the concepts and themes, which was reviewed after further observations and interviews.

The data was interpreted and analysed using the theories and concepts of the participants with the aim of generating broader theory. The analysis of the

qualitative data compared and contrasted the personal narratives emphasising the shared and contradictory technological experiences within the organisation. The inferences gained from the qualitative analysis generated a comprehension of the consensual, pluralist and conflicting meanings of the implementation of NCTs within the working and training environments of CommCo. The sources of organisational change were analysed in relation to technological changes such as the implementation and application of, and access to, the new communication technologies.

Finally, it should be noted that the analysis and interpretation of data is rarely devoid of theoretical ideas as a researcher has often developed themes during the literature review prior to the fieldwork stage of the research process. In this research thesis my literature review made me aware of the key themes regarding the role of NCTs in reconstructing organisational cultures and structures, and highlighted the concept of the network organisation facilitated by lateral communication links. However, the themes and concepts that I developed from my data, for example the 'ethos of technology enthusiasts' and the 'ethos of technology sceptics', extended the themes evident in the literature review. Thus, the analysis developed from my data may not match the rhetoric of grounded theory but it, nevertheless, grounds these concepts in the accounts and understandings of the organisational members. In this sense grounded theory develops a more comprehensive analysis and interpretation of the debates found in the existing literature.

Interpreting the Data

The interpretation of data is the process of making meaning from the research findings. The interpretation stage is dependent on the categorisation and coding of the data during analysis. The interpretation of qualitative data and its conceptualisation are linked to processes of introspection and inference, which may be problematic. Thus, "the analysis of qualitative data is a highly personal activity...it involves processes of interpretation and creativity that are difficult...to make explicit" (Jones 1985a: 56). Overall this process allowed me to familiarise myself further with the data and to become immersed in the research setting creating an in-depth understanding of the participants' experiences and their perceptions of NCTs in the training and work settings of the organisation.

At an early stage of the interpretation I attempted to transform the qualitative data into numerical data using SPSS to try and find relationships between the variables. By doing this I realised that I had lost my focus, the richness of the data had disappeared and I had contradicted my objective of giving the participants voice by utilising their own words and experiences. The aim of interpreting the data is to create an understanding of an individual's role in the social world (Jones 1985b) and by turning it into numerical data this had been destroyed. An important factor in interpreting and analysing qualitative data is the employment of a participant's concepts to ensure a valid understanding. This can, however, be problematic as these concepts were being applied within my own framework of understanding, which inevitably was different to their own. It is therefore important to reflect upon this process of interpretation, to underpin

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my decisions regarding the validity and reliability of the explanations and theories produced.

Firstly, the way in which the data has been managed and collected should be highlighted. Fundamentally, the data compiled needs to be reorganised as fieldnotes are written in a chronological order and not under topics or themes (Fischer 1995). My research diaries were written in chronological order of the events that took place creating a story of the research process, which would have been lost if structured differently. To address this problem, when the topics and themes began to emerge separate pages at the back of the diaries were devoted to them. Under each of the themes, references to the dates of the events and conversations supporting these ideas were included to assist in the analysis stage. It can be argued that the data was compiled passively and often without any form of systematic sampling other than opportunistic sampling (cf. Denzin 1989). This was reflected in the biases created by an unrepresentative sample. Although I was conscious of the scope for misunderstanding a participant's responses I created many opportunities in which I could clarify and supplement the data particularly during the interviews and via email for those at the sites which I was unable to travel to.

Finally, an important technique of interpreting qualitative data was remaining flexible and letting myself be "...open to data that emerge[d] from the field" (Ely, et al. 1991: 132). By examining the data in this manner I was able to construct a framework that related to my interview and observational experiences to ensure that my self was represented in the data (cf. Coffey 1999). Whipp

(1998) states that constructing a framework in this manner ensures that the theory is grounded and originates from the empirical data. Therefore, the organisational employee's narratives and experiences were interlaced with the observational and survey data in order that an understanding of the theories drawn from the descriptive data could be created in a similar method to that of Zuboff (1988).

Reflections on my Methodological and Research Experiences

Initially the fieldwork phase had been emotionally draining and a stressful period as gaining entry to an organisation and being accepted at the research sites had been difficult. As I was enthusiastic about my research I believed that others would also be interested and willing to help. Gaining entry to an organisation to carry out the research was a lengthy process and had taken longer than originally anticipated. On reflection, it was naïve to assume that gaining access would be a relatively uncomplicated process. Fundamentally, it had to be realised that those in the research setting hold the power as they have the ability to control access to people and information. Therefore, 'getting in' and 'getting on' within a site requires being tactical in terms of your approach, moderating opportunism and having a flexible demeanour.

Few writers have discussed the processes and instances of the researcher leaving the field (cf. Bailey 1996; Buchanan, et al. 1988; Hammersley and Atkinson 1995; Maines, et al. 1980). The process of leaving the field was not a difficult phase of the fieldwork. Physically, driving two consecutive days a week to

remote sites in different parts of the country and then carrying out the fieldwork on arrival had been an exhausting experience. So for this reason, leaving the field was in part a relief. Although I had established good relations with many of the delegates in the two e-classrooms I had made no significant ties to the group due to the difference in age and gender. However, I kept in contact with some delegates via email, which allowed me to verify any points during the analysis and writing up stages of the research process as well as maintaining the friendships. My withdrawal from the field was easily managed as the e-skilling course I audited was scheduled to run for twelve weeks so the two e-classrooms I had been immersed in disbanded at the end of this period. As I had joined the e-skilling course at the same time as the delegates, exiting was anticipated and therefore acceptable to the delegates. On the last day of the course I was able to participate in saying goodbye with the other members of the course. The brief reports to the mentors and sponsors received little direct feedback but my findings were considered and implemented for tranche 4.

The analysis phase of the research process was to a large extent entwined with the fieldwork phase of the research process and cannot be regarded as a distinct stage of the research process. The nature of the study meant that I was constantly analysing the data whilst in the field in order to recognise the emerging themes and concepts and thereby create a framework to be verified (cf. Taylor and Bodgan 1984). This stage also entailed grouping related data in preparation for writing up the discussion chapters. The writing up stage was a difficult phase of the research process, as I had to analyse the delegates' conversations and actions to understand their meanings and motives.

Throughout the study the researcher self is evident and is embodied in the presentation and the sense-making process of the ethnographic work (Altheide and Johnson 1994; Coffey 1999). This is particularly evident, as I had became immersed in CommCo and the culture surrounding the e-skilling course and I had become an accepted part of the groups. By comprehending and representing myself, the researcher, in the field and the presentation, I developed a reflexive method of knowing (cf. Coffey 1999). By rationalising and explicating my methodological and research design decisions in an almost chronological order, I have created an explicit account of the fieldwork process and, thereby, strengthened my claims regarding the reliability and validity of the methods used and the data collated.

Chapter 5 – The Flow of Information: Management Rationales

This chapter develops a discussion of the senior and middle management rationales and the official views held in the organisation on new communication technologies (NCTs). It outlines the technological implementation of NCTs in the workplace by focusing upon issues of power, control, work processes, information flows, inter-organisational and intra-organisational communication and networks. The interviews, questionnaires and observations of the organisation's management are utilised to construct an understanding of their experiences and personal narratives, and an analysis of these features forms the substance of this chapter. The focus of this chapter is to show that for these managers organisational structures are changing through the transformation of information and communication lines, which have been enabled and supported by the implementation and application of NCTs.

First, the analytical framework and especially the employment of the concept of technological frames in this chapter and the following chapters will be clarified. The framework established in this chapter will also be used to examine management's understandings of functionality and consequences of the communication technologies implemented in the work setting at CommCo in chapter 6 and the culture of technology in chapter 7. The discussion employs this

analytical framework to analyse the management of, and the management understandings of technology. This chapter specifically utilises the managers' narratives to create an interpretative understanding of these communication technologies. The main body of the chapter outlines the management objectives for the implementation, application and operationalisation of technology. The management of work processes through NCTs is then discussed. The discussion focuses on: firstly coordinative and integrative work practices; secondly the control of communications; and finally surveillance and monitoring possibilities, and how these processes are enabled by technology. The discussion of the management of information through technology focuses upon key features of the technological culture by assessing patterns of social interaction and networks, and forms of inter-organisational and intra-organisational communication within the study organisation. This discussion is developed further through a consideration of management accounts of the organisation of technology through organisational structures. Finally, this chapter reviews the intended impact of NCTs on organisational communication and information flows in CommCo.

The Analytical Framework

Frames are social phenomena that are individually held sets of ideas and knowledge, which are learnt through socialisation and interaction within specific environments (Orlikowski and Gash 1994). These frames characterise and differentiate between collectively held ideas and ideas that are in opposition to, or in disagreement with, these collective ideas. It can be argued that

technological frames are an inherent part of an organisation's culture as they are derived from a shared set of core beliefs. Many writers have utilised the concept of shared cognitive structures, ideas and knowledge to enhance their understandings of organisations (Argyris and Schon 1978; Burns and Stalker 1961; Pettigrew 1979; Schein 1992; Weick and Bougon 1986). While this approach emphasises that an individual frame will be shared through tacit or explicit agreement between users (Weick and Bougon 1986), my analysis develops the approach further to consider how frames are shared and disagreed upon.

Following the work of Orlikowski and Gash (1994) the framework may be further developed to argue that technological frames can be congruent (cf. Pinch and Bijker 1984) or incongruent (cf. Zuboff 1988). A congruent technological frame is "...the alignment of frames on key elements...not...identical, but related in structure...and content" (Orlikowski and Gash 1994: 180). Congruent frames are created in relation to, and may be bounded by a group's (hierarchical, occupational or preferential groupings) work tasks, positions of power (within the team, department, organisational sector and organisation) and knowledge. Conversely, incongruent technological frames denote differences in possibilities, assumptions and understandings of a technology (Orlikowski and Gash 1994). For example, managers and technical officers may hold similar ideas about the employment of a technology (congruent frame) but hold discordant expectations about the consequences of technology (incongruent frame). Incongruent frames explicate the contentions surrounding the implementation and employment of new technology within an organisation. These frames provide elements of a

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framework in which the implementation and use of technology may be analysed. Therefore, as an analytical framework, technological frames provide a basis for the study of the culture, functionality, employment and management of technology, specifically NCTs, within the study organisation. These conceptions allow for the explanation of NCTs implementation and application outcomes in CommCo (cf. Orlikowski and Gash 1994).

During the analysis stage of the research process, I identified four 'frames from the CommCo data which were used to construct an understanding of the technological frames which informed the implementation and application of NCTs within the work setting at CommCo. The 'management of technology', the first frame, is discussed in this chapter and draws upon the perceived rationale for the organisation's implementation of NCTs, focusing upon management interpretations. The second frame of 'the functionality of technology' encompasses the interpretations and understandings of the capabilities and functions of NCTs. The third frame of 'technological consequences' highlights how NCTs are used and the outcomes of their employment. While each of these frames is constructed through shared understandings of technology, they are given different emphases, and can thus be regarded as incongruent in that they represent contrasting interpretations and understandings of technological implementation. The 'functionality of technology' and 'technological consequences' are analysed in reference to CommCo in chapter 6. The final frame, 'the culture of technology', is explored in chapter 7 and deals with the images, assumptions, expectations and knowledge of NCTs in relation to the organisational culture.

Objectives of Technology Implementation

Within the study organisation, technology has been implemented on an incremental basis which, according to Preece (1995), ensures that the technology is widely accepted by the employees. Technological change affects the role of management (Buchanan and Boddy 1983; Morton 1996b), worker skills (Buchanan and Boddy 1983), organisational structure (Thach and Woodman 1994), organisational communication (Hinds and Kiesler 1995; Sproull and Kiesler 1986) and may transform work processes. The interdependent but sometimes conflicting objectives of technological implementation, according to CommCo's senior management, are to: reduce costs, increase production flexibility, improve efficiency and product quality, increase control within the workplace and integrate work functions (see also Buchanan and Boddy 1983; Child 1984).

In theory the objectives of the implementation of NCTs can be divided into management and organisational rationales, but in practice this is a complex process. For instance, management rationales may encompass broader organisational rationales for the implementation and application of NCTs, but are predominantly addressing their own expectations and needs. Management and organisational rationales are interdependent and ultimately influenced by one another. However, management rationales are more explicit as they are encompassed in work processes and management communications with other organisational members. These explicit rationales are, thus, used for the main

discussion in this chapter. In comparison, organisational rationales are embedded within the culture and structure of the organisation and are more difficult to study. Nevertheless by considering the management and organisational rationales for technology implementation and application, a congruence of objectives is shown. It is important to note that even though technology may have been implemented within a shared context a degree of incongruence still exists between non-management employees and management applications and understandings of NCTs. This theme is developed further in chapter 6. The congruence and incongruence between management and organisational rationales are analysed in this section but the remainder of the chapter is founded upon the explicit management rationales identified in CommCo.

Management Rationales of Technology Implementation

The management rationales of technological implementation and application can be defined by "...the purposes management attach to technology...[and]...the intentions behind technology" (Child 1984: 247). Management rationales for the implementation and application of NCTs will primarily be explained by considering each of the communication technologies as they were implemented in specific circumstances. Management objectives regarding technology are focused upon 'intra-organisational effectiveness' (Lind and Zmud 1995) such as coordinative work practices and the subsequent related processes of increased communication and productivity. At CommCo, these are the general expected outcomes of the implementation and application of NCTs.

The central rationale of the implementation of NCTs held by CommCo management is to support work and working relationships, provide communication networks, and develop a collaborative framework in which divisions, departments and teams can work effectively. This type of environment is assumed to produce good work quality (cf. Heaton 1998). Within this work culture it is suggested that employees' usage of NCTs to collaborate and share information is promoted (Galliers and Baets 1998; Heaton 1998; Hinds and Kiesler 1995; Hughes, et al. 2000; Nohria and Ghoshal 1997; Sawhney 2002; Strieter and Tankersley 1998; Thatcher and Merrick 1996; Wellman, et al. 1996). CommCo is divided into divisions that are spilt into functional departments which each have their own specialist tasks. The individuals within these departments have their own manager who reports to a senior departmental manager who, in turn, reports to the divisional manager. Therefore, within this organisational structure, efficient and productive work is promoted through, on the one hand, good communication and the rapid flow of information and, on the other hand, integrative and coordinated work processes. Morton (1996a: 151-153) has suggested that information technology is implemented because it has "...enabled change...[and]...is enabling the integration of business functions at all levels within and between organisations". This appears to be borne out in CommCo management intentions for the implementation of NCTs.

New opportunities for innovative types of work and organisation are created by the 'enabling' capabilities of technology (Buchanan 1986). Buchanan (1986) defines these enabling characteristics as information capture, storage, manipulation and distribution. For the purposes of this study, these

characteristics can be seen to summarise and categorise the capabilities and functions of NCTs. It is suggested that whereas the enabling characteristics of technology determine *what* NCTs are implemented, management objectives decide *why* a technology is implemented. Meanwhile, precisely *how* the NCTs are implemented and applied is dependent on the organisational culture and structure (Buchanan 1986).

When considering the use of NCTs in the study organisation, the rationale behind each communication technology implemented will, of necessity, be examined separately. In examining each communication technology at CommCo the objectives for each technology and the initial implementation effects will be emphasised. For example, email technology functions as an alternative form of communication, which now supersedes any other electronic communication method. For CommCo managers, it was found that email technology has enabled them to pass on information to their team leaders and team members easily and instantaneously, thereby changing the nature and flow of their work. Subsequently an intended consequence of email implementation in CommCo was to increase communication and information sharing (see also Sproull and Kiesler 1986). The company intranet was created to provide a comprehensive source of information and to enable work to be coordinated. The Internet was made available via the company network and has created an alternative source of data, enabling CommCo employees to follow technological and marketplace developments in both the national and international arenas. These technological implementations and applications meant that information pertaining to myriad projects, targets and organisational figures are readily available, thereby reducing

delays previously encountered by employees who had had to find the data or wait for a response from a colleague to pass the data on.

Conferencing technologies, such as NetMeeting, audio-conferencing and video-conferencing, were implemented to assist integrative work practices such as team working, which were seen as essential components of the organisational structure. By implementing and encouraging the application of these technologies, it was the intention of management to improve the productivity and efficiency of the working environment. Overall, the intentions behind technological implementation were to promote smarter working, working faster, autonomy and flexibility. In contradiction to these intentions, the implementation of NCTs has also resulted in information overload, increased workloads, dehumanisation and isolation of the worker, themes which are mentioned in this chapter but developed further in chapter 6. CommCo management seemed to be oblivious to the negative effects of the implementation and application of NCTs. In some contexts these negative effects might be seen as necessary costs, but this was not apparent in the management rationales for technology implementation within the case study organisation. Rather their perspectives were constantly positive, though the senior management view of the implementation and application of NCTs was found to be more positive than the middle management view of technology (a theme supported by the work of Doyle, et al. 2000).

The changes brought about by the implementation of NCTs in CommCo were significant and in some instances controversial. Technological changes in the organisation created a need for the updating of skills and for new skills to be

learnt (cf. Morton 1996a) which prompted the construction and delivery of the e-skilling course for all members of one division of the organisation. The senior manager in control of this division believed that the skills of his managers and team members were becoming outdated and that some NCTs were not being utilised or not being used to their full potential. Therefore, he believed that an investment in communication technology skills and knowledge would be invaluable to improving work efficiency and productivity and providing a boost for employee morale. In part it was assumed that the e-skilling course, through introducing the capabilities and functions of NCTs, would promote the application of NCTs by managers and team members and lead to changes in work processes. The e-skilling course was not just about improving employee skills but about changing attitudes towards NCTs to address the negative perceptions of these technologies

CommCo management's rationales for new communication technology implementation and its positive effects on the organisation were often considered in the context of the marketplace or technological climate. For instance, one process manager talked about ways in which technological implementation and application had had a positive effect on the organisation as it had:

"...made CommCo more competitive in the marketplace" (Karl Digby).

Meanwhile one support manager stated that the technological climate

"...made CommCo react to the changes quickly" (Keith Spalding).

These middle management understandings of the implementation of NCTs at CommCo complement, if not overlap with, the organisational objectives of the implementation of NCTs. Both understandings represent the broader and more positive effects of communication technology implementation and application at CommCo. It is these findings that reinforce the initial perception that CommCo management and organisational rationales for the implementation of NCTs are interdependent.

Organisational Rationales for Technological Implementation

As a telecommunications company CommCo believes that communication and information are fundamental to efficient and productive work. The implementation and application of NCTs is believed to facilitate the promotion and maintenance of such work practices. In comparison to the management rationales behind communication technology implementation, organisational rationales can be seen to be encompassing broader aims and objectives. Organisational technology rationales are transmitted through the organisational culture and structure so that the organisational members understand them, a feature that will be discussed further in chapter 7. For example, the management philosophy of "working smarter, not harder" is widely understood, even if it is not accepted, by organisational members.

Pettigrew (1999) believed that organisations are constantly transforming to improve their performance. The organisational rationales for the implementation

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and application of NCTs at CommCo can be seen to be similar to those noted by Pettigrew (1999). Organisational structures, processes and boundaries were found to have changed with negligible performance benefits, whereas the introduction of information technologies was judged to have had more positive effects (Pettigrew 1999). Within CommCo, the implementation and application of NCTs were designed to achieve the following three objectives: to respond to external environments, to maintain efficiency and to support structural changes and developments.

By addressing external environments, in the context of technology implementation, CommCo aims to predict changes in the marketplace and to meet the future needs of its customers by ensuring that the technology is up to industry standard or better and that its employees have up-to-date knowledge and skills. A policy manager reflecting upon what she perceived to be organisational rationales suggested that in order to meet the organisational rationales of communication technology implementation and application some of the drawbacks of technology implementation had to be addressed, for instance:

"the technology is available, it is just a case of making it available, making people aware of it, and providing support when people want to try these things out" (Claire Lewin).

It may be suggested that CommCo's rationale of communication technology implementation is simply to ensure that the organisation is up-to-date with technological trends so as to remain competitive and to appear to be a market

leader. In particular, it is argued that NCTs enable rapid and specific responses to the changing marketplace (Morton 1996a). However, a services manager suggested that:

"the implementation of technology can be improved by paying attention to the disadvantages and taking a step back to rectify the drawbacks whether by process or further technology, and investing properly in the technology it has, and not paying lip service to it" (Tim Jefferson).

This services manager is suggesting that organisational rationales for technological implementation may well be aimed at keeping up-to-date but, in order to secure this position, further attention must be paid to the implementation of technology. It is, thereby, understood that organisational rationales for the implementation of technology may not be based upon well-researched or well-planned objectives, which will inevitably have consequences for the applications of these technologies. These consequences will be analysed further through the narratives of the employees below middle management in chapter 6.

Furthermore, NCTs have been implemented within CommCo to secure changes in the labour process. This is addressing the objective of maintaining cost and work process efficiency. Child (1984) argued that technological change could improve cost efficiency and affirm an organisation's position in the marketplace. A CommCo delivery manager who stated that it was important to grasp this understanding of technological change from an organisational rationale perspective shared this view:

"it is important to have an understanding of the new technologies and the benefits and commercial opportunities they offer" (Brian Dye).

It is this understanding that promotes the possibilities for organisational change, which are supported and enabled by the application of NCTs. For example, electronic meeting systems are a fundamental element of changing organisations and work practices at CommCo (for parallels see Harmon, et al. 1995; Heaton 1998; Morton 1991). By negating the need for travel they reduce travel expenses and time wasted through travelling. Video-conferencing, audio-conferencing and NetMeeting create opportunities for the coordination and integration of work processes without such costs. This, according to Coghlan (1998), is an organisational objective that information and communication technologies should address. In these ways the transformation of organisational structures may be a consequence of new processes for coordinating and integrating work.

Finally, the implementation and application of NCTs assists and reinforces the structural changes within the case study organisation. CommCo's restructuring to a flatter structured organisation involved transforming a hierarchical organisation into a division and team-based organisation. This intensified the need for easy communication and a faster flow of information. An operations manager restated this need for accessible information and swift communication but also suggested that these needs were not yet being met by the organisation's implementation of technology:

"CommCo tends to be in the forefront of these technologies and is making it accessible to all via laptops etc. However it needs to be easy to use, fast and an improvement to current means of communication" (Adam Taylor).

As a result of these requirements, work and organisational structures are being transformed by management rationales and objectives (Buchanan 1986), which coincide with, and are influenced by, organisational rationales of technology implementation. Technology strengthens networks and thereby encourages increased information and communication flows. This, in turn, reinforces the change in organisational structure. Buchanan (1986: 67) summarises this complex process succinctly in a particular way that is pertinent to CommCo, "the impact of technical change on the labour process is influenced by management objectives. These objectives are shaped by the wider social and organisational structures within which managers function".

Management of Work Processes through Technology

According to CommCo's managers the implementation of NCTs in the case study organisation has changed the management of work processes in three fundamental ways: it has improved the coordinative and integrative work of managers, allowed communication flows to be controlled (for example what is transmitted and who is part of the information loop) and increased surveillance possibilities. However, it is important to highlight the changes in management's

coordination work, as these changes show how broader work processes are being managed through technology, with both negative and positive effects on organisational members. Thus, technological implementation and application has not only altered work processes, in the ways to be discussed in chapter 6, but has enabled them to be managed in new ways.

New communication technology implementation and application has led to marked changes in the work of senior and middle management. Some writers have noted that changes to managerial work practices have not had significant outcomes on the use of NCTs (Simpson, et al. 1987). However, in the CommCo case study the implementation of NCTs can be seen to have changed management work in several ways. For example, the implementation and application of NCTs can increase workloads and the flow of communication, isolate managers and change their modes of communication. The latter effect is exemplified by the application of NetMeeting by CommCo managers.

To maintain a competitive position in the marketplace productivity and efficiency targets have to be defined and met. Although meeting these targets has always been the job of managers, there is now more pressure on managers to ensure that they are met, which in turn has increased surveillance at work. Communication technologies have resulted in connected or networked organisations. As such, there is the expectation that work can be carried out faster as people and data are at a manager's fingertips.

For instance, technology is often discussed in terms of assisting work processes, and a senior manager summed this up:

"Communication speed is a key enabler these days and is central to meeting my work deadlines" (Elaine Talley).

The belief that workloads have increased is explicit in the narratives of the organisational employees below middle management level (see chapter 6). However, while senior and middle management rarely discussed the size of their workloads, this idea was implicit when they discussed their past and present daily schedules. It may be, however, that managers are less likely to complain about their workloads since they believe that this is what their superiors expect of them. This may also be a reflection of the different kinds of employment contracts. For instance, senior and middle management employment contracts at CommCo may not specify work hours as there is the expectation that organisational members at this level will work the necessary hours to meet the responsibilities of their position. NCTs are enabling employees to work from home, which implies that they should be working from home out of normal office hours. These factors mean that employees, particularly above middle management level, will have heavy workloads.

A major shift in expectations regarding management work is occurring at CommCo as a result of the implementation of NCTs. On the one hand, they have increased the flow of communication and information between all levels of the

hierarchy. Conversely they have resulted in reduced face-to-face contact for managers. A senior manager articulated this understanding:

"Face-to-face meetings are not always necessary, transfer of information is quicker and more reliable. The need to be office bound is no longer a requirement" (Elaine Talley).

This narrative introduces the idea that management work no longer needs to be confined to the office. Although it is expected that not being 'office bound' means that this manager is able to practice "MBW...management by walkabout" (Adam Nicholson, senior manager), in this instance it signals that non-management employees are also now able to work from remote sites. Communication technologies have made it possible for employees to work from home or telecommute, a point highlighted by a development manager:

"Fast transfer of data and information is invaluable as enables me to be a home worker" (Evan Durrant).

This narrative also reiterates the idea that management work has changed in that there is less face-to-face contact. For instance, if this manager is able to work from home or telecommute then his work obviously does not require face-to-face contact with his superiors and his team. This situation is part of the process of isolation and changing methods of communication.

In addition to the flow of information and communication increasing the media and types of communication have also changed. The application of NCTs has enabled asynchronous and remote communications and interactions in CommCo, which has expanded and altered the traditional forms of communication and interaction. Within the study organisation, NCTs are the dominant methods of communication as highlighted by an operations manager:

"Less time speaking to other people, but more time spent communicating using email, via web etc" (Wilson Shaw).

A process manager also expresses this understanding of communication technology. This particular manager, however, also draws attention to the contradiction between increased communication and the solitude of management work:

"It is now all too easy to send an email instead of using the personal approach of talking by phone" (Karl Digby).

However, the increased flow of information is not only the result of easier communication created by NCTs, as both managers and non-management employees feel, but is also the consequence of changing management work. Within the study organisation, a manager's role is focused upon project work which involves managing several teams, controlling and passing on relevant data and communications, and integrating sections of information to create the completed project which will be presented to superiors. Therefore, a manager's

role is based upon the management of information and knowledge, which needs to be coordinated quickly and effectively through a process of communication. Traditional management practices placed more emphasis on communicating with a department whose personnel remained in post.

While email technology has dramatically changed the flow and method of communication within the workplace, NetMeeting technology has further altered management work in the study organisation as it has reduced the need for managers to meet in person to exchange ideas and information. Although management workloads are now 'meeting driven', the implementation and application of NetMeeting addresses the shortfall in management time and enables individuals to meet face-to-face when at different locations. The fact that a high proportion of managers utilise NetMeeting technology (see appendix 15) suggests that this technology is more accessible to managers and/or that managers are more likely to utilise the technology for the purpose of holding meetings. However, NetMeeting has had a somewhat ambivalent response from those who utilise the technology, as exemplified by a services manager and a process manager:

"The most effective way of carrying out a meeting is face-to-face. However, the facilities of NetMeeting overcome some of the disadvantages of audio-conferences, but keep the major benefits of not having to travel, hence on balance it is effective" (Tim Jefferson),

"...NetMeeting 'has its place'. A face-to-face meeting is the preferred choice for me. It is more direct, more personal and I believe more efficient in achieving the goals. NetMeeting is great when the luxury of the above is not available. On these occasions it is preferable to a straight audio-conference, though not as good as a videoconference. Basically, it fills a niche. At the right time and in the right circumstances, it is fine" (Benson Alda).

As the latter informant indicates, NetMeeting technology has not only altered management work but has also facilitated coordinative and integrative work processes as it has enabled several individuals to be linked up to share ideas and information when face-to-face was not an option or was inconvenient. Nevertheless, these managers had a preference for face-to-face meetings when possible, suggesting that new technologies did not provide a total substitute for earlier communication practices.

Integrative and Coordinative Work Practices

Although the integration and coordination of work practices were in operation prior to communication technology implementation (cf. DiMaggio, et al. 2001), the ways in which these tasks were carried out has changed substantially. The application and implementation of NCTs has altered the form and scope of integrative and coordinative work practices. For example, the implementation and application of NCTs enable coordinative and integrative work across organisational boundaries and hierarchies allowing new patterns of team

working, both across vertical levels and horizontal locations. Work practices can be managed through technology because the location of the worker and the distance between workers are now less restrictive. Work can be integrated and coordinated at any location by the manager or team members, thereby speeding up the process of work. A process manager articulated this:

"Generally it [work] has become faster, more efficient. It is also a huge benefit to be able to continue work when at some remote location. In the *old days* we would have to be content with just sitting in some bar somewhere. OK, tongue in cheek, but it is true" (Benson Alda).

The extensive and swift coordination and integration of information and knowledge ensures that there is an improved information flow and as such work processes can be speeded up. In CommCo NCTs have electronically connected people, thereby creating an integrative and coordinative working environment. The sharing and transmission of information, or the process of 'informating' (cf. Morton 1996a; Zuboff 1988), improves work efficiency as organisational members (non-management and management) are better informed and kept up-to-date with work developments. Thus, NCTs can be considered as important to the management of work processes because they enable integration, and the means to transmit information directly to management, which creates a network of individuals bringing together information (Child 1984). However, a consequence of this method of amassing information may be 'information overload', in which organisational members are overwhelmed with the amount of information available, a theme that will be explored more fully in chapter 6.

Integrative and coordinative work practices are best illustrated through an examination of team working. Teams in CommCo can be transitory where a group of people may be brought physically together, or electronically linked, for the purposes of a one particular task or project. Although Barker (1999) and Drucker (1988) were specifically referring to self-managing teams, similar principles apply to team working at CommCo. For example, teams coordinate their own internal and external information, the team leader makes decisions within management guidelines and, as with smaller teams, there is a sense of shared responsibility (cf. Barker 1993). A delivery manager highlighted the benefits of integrated and coordinative work practices while also emphasising a problem associated with this type of working:

"Work processes are quicker and more efficient, but it is more difficult to generate team spirit, ensure commitment and handle issues" (Brian Dye).

This suggests that, whilst teamwork was thought to promote shared responsibility, managers were finding it difficult to generate a cohesive and productive working unit, a problem which may be particularly evident for teams that were geographically dispersed and connected via NCTs. The generation of team spirit was an important theme as without this, principles of cohesiveness and motivation to work together through coordinated and integrated work practices would not have been effective.

Work can be coordinated and integrated utilising NCTs, and at another level teams can also be managed through technology. In this regard Hinds and Kiesler (1995) argue that communication technology is associated more with information sharing than management control. However, as the following section explains, NCTs also enabled communication to be controlled by management in several ways.

Controlling Communication

The hierarchical structure of the organisation was epitomised by vertical communication and information flows. However, the implementation and application of NCTs has made non-hierarchical communication easier, particularly with the promotion of integrated and collaborative working practices, which typify flatter organisational structures. The practice of collaborative work and the implementation of email technology have increased the flow of communication. In CommCo increased communication was the result of the recognition that work-related communications could be effectively transmitted via email (see also Markus 1994a). However, it was not only communication patterns which were affected by information and communication technologies (cf. Zuboff 1988) for the flow of information through new technology enabled control of that information and empowered those who controlled the flow of information (cf. Simpson, et al. 1987). For instance, Yates (1989) studied the history of how communication has been controlled, specifically by management, through the nineteenth and twentieth centuries. For the purposes of this analysis, 'controlling communication' addresses: who had direct control of the

communication, who had ownership, who had access to the communication and who was able to manipulate the communication.

Control can be asserted by email technology. The networking properties of communication technologies enabled managers to control work and non-management employees remotely. In this manner traditional forms of communication, such as face-to-face interactions, could be avoided and it was this avoidance that created tensions for those lower on the CommCo organisational hierarchy (see also Casey 1999). Email was found to be an accepted medium of communication by managers at CommCo. Middle management at CommCo felt that they had less choice on whether to communicate face-to-face or electronically, particularly as NCTs had been widely implemented. The efficient and speedy nature of computer-mediated communication also increased pressure for managers to communicate electronically. NCTs had been put into place because communication mediated by technology was believed to be efficient. It was also found that senior managers at CommCo were less likely to use email technology than middle management (see also Markus 1994a). Conversely, senior management preferred to meet face-to-face and had the power to arrange these meetings.

This analysis of the application of email technology in CommCo suggested that hierarchical position effects communication. Email technology was the preferred medium of communication by middle management as orders could be relayed easily, and were written, so they were less confusing than verbal orders and were considered to be more reliable. This in turn promoted management control and

supported the belief that email can be an 'agent of organisational power' (Brigham and Corbett 1997: 33), especially for CommCo's senior management.

Surveillance and Monitoring Possibilities

Other research has agreed that the informational aspects of NCTs and enhanced surveillance possibilities of the technology are inherently linked to management control (Bloomfield, et al. 1994). Not only employee performance but also whole work processes can be managed through technology in the form of surveillance and monitoring. Wilson (1999: 677) argued that, "ICT development has become a central feature in the development of managerial surveillance and control strategies". Many writers believe that surveillance is a key feature of computerised workplaces (Grint 1994; Orlikowski 1991; Sewell and Wilkinson 1992; Zuboff 1985; Zuboff 1988). Within the context of CommCo, managerial surveillance and control strategies were not overtly evident. For instance, the content of emails could be monitored and this implied that a form of surveillance was possible even if it was not common practice at CommCo. In comparison at MoCo, the first case study undertaken, managerial surveillance through technology was much more overt and evident. At MoCo, the Management of Information Systems department (MIS) was able to monitor when an employee logged on to and off their computer and employees were able to track who had read or deleted their emails, features which created paranoia in the organisation.

Although management monitoring and surveillance were not explicit at CommCo, there was evidence of a cynical and sceptical assessment of

technology implementation and integration, such as would be expected in an organisation where surveillance was evident. When these sentiments are high, employees try to find forms of escapism during their working day (Casey 1999). In the training setting escapism was particularly evident. For example I often observed individuals logging on to the Internet during the video-conferenced review sessions. It was an accepted behaviour among the trainees and may have been a reflection of the activities that take place in the work setting. Perhaps the very nature of email promoted the belief that individuals were being watched by their supervisors and this, in turn, created a cynical outlook. This outlook contributed to the 'ethos of technology sceptics' noted in chapter 6 and discussed in-depth in chapter 7.

The final two sections of this chapter discuss the methods through which information was managed at CommCo, through a technologised culture and the structure of the organisation. For the purposes of the following discussion, structure and culture are linked as the culture of the organisation promotes the flow of communication and information across and within the organisational structure (cf. Hinds and Kiesler 1995).

Management of Information through (a Technologised) Culture

Dominant organisational cultures have been defined as the corporate philosophies that underpin expectations of the ways in which employees should execute their duties, communicate and conduct themselves (Hofstede 1991;

Schein 1992). Such cultures are reflected in an established thinking process, common to the majority of the organisation's members, which is transmitted to new members. However, organisational cultures are not always homogeneous, as subcultures exist alongside the 'official culture' (cf. Watson 1994). The subcultures and countercultures incorporate and represent ideas and assumptions that may be in opposition to or in conflict with the official organisational culture. Consequently, both organisational cultures and subcultures are intrinsic parts of all aspects of working life.

The shared values and assumptions about the world that are embedded in organisational cultures can be altered with the implementation of NCTs. At the same time it is possible for information and communication to be managed through culture. However, it is also important to note that humans can manipulate the flow of information (March and Sproull 1990). In this sense NCTs and organisational culture are interdependent. As already discussed, NCTs have changed management work, work processes, communication networks and the flow of information in CommCo. In particular NCTs have changed the quantity, connectivity and direction of communication (see also Culnan and Markus 1987). By utilising the narratives of CommCo management, social interactions and networking, and inter-organisational and intra-organisational communication can be examined. The method by which information is managed through a technologised culture will be discussed.

Social Interactions and Networking

Social interaction and networking are an integral part of the successful functioning of an organisation. For instance, Swan et al. (1999) suggest that face-to-face interactions and networking promote sharing and collaboration between organisational members. Some of the animosity towards technology, which is discussed in depth in the following chapter, is focused on the fact that technology had changed the nature and methods of social interactions at CommCo. On the one hand, technology enabled a network in which people could be easily contacted, data was transferred efficiently and information could be retrieved effortlessly. On the other hand, however, organisational members seemed to miss face-to-face contact and the social interaction associated with this form of communication. A solutions manager and a delivery manager articulated this notion in different ways:

"...social interactions are less frequent and we look forward to the occasional face-to-face meetings, that are still beneficial. A lot of business is carried out in the social time outside meeting times, i.e. in the bar!" (Ken Peters),

"CommCo communication networks and social relations are poorer as there is less face-to-face contact. I don't call video face-to-face" (Brian Dye).

These comments suggest that the implementation of NCTs and the organisational culture had changed working practices in that social interactions were greatly reduced or at the very least mediated by technology at work. It was only during social times, such as lunch breaks and after work events, that face-to-face contact and interactions took place. A cultural shift away from technology needs to occur in order to increase face-to-face interactions and thereby improve social interactions and reduce feelings of isolation.

Email technology supported by the organisational network was the easiest, fastest and most accessible method of communicating and interacting of all the communication technologies implemented at CommCo. These features appeared to make it more acceptable for organisational members to utilise email to communicate rather than using NetMeeting, video-conferencing or audio-conferencing as, perhaps, a short email did not waste too much time or interrupt the flow of work. An operations manager summed up a widespread optimistic articulation of email technology:

"Email is a great way to keep in touch" (Adam Taylor).

However, it should be noted that there was a marked difference in the way senior managers and middle management interacted and networked. Senior management employed NetMeeting and video-conferencing more readily for interacting when it was not possible to have face-to-face contact. In comparison, middle management was more prone to employ email technology, as it was more compatible with their workload constraints. Middle management workloads were

based upon the management of communication and information and the employment of email allowed for this data to be followed. Thus the employment of email technology by middle management allowed them to manage and organise several projects or teams.

Information and communication technologies created a vast network of people that could easily be contacted. It has been argued that "the complexity of management lies in the web of relationships which the managers of organisations have to cope with" (Watson 1994: 10). Within CommCo the NCTs facilitated coping with this web of relationships making efficient networking a real possibility. At the same time this altered the character of these relationships. A policy manager and a process manager stressed that:

"You have a lot more acquaintances but fewer friends" (Claire Lewin),

"In a nutshell, our own personal communication network of contacts has grown immeasurably. Social relations, sadly, have not. My personal slant on this is that I often tend to have conversations with colleagues by email. It is rather impersonal and I should pick up the phone more" (Benson Alda).

Thus, NCTs increased the number of 'communication partners' organisational members had (cf. Culnan and Markus 1987). Nevertheless these consequences were accepted by many of the organisational members. Social interactions and networks have always been part of the organisational structure and have been

based upon the close proximity of colleagues. However, contemporary social interactions and networks can be seen as more purposeful and instrumental in creating a networked organisation (Nohria and Eccles 1994) and this view gained significant support at CommCo.

The Extent of Inter/Intra Organisational Communication

A networked organisation is constructed through inter-organisational and intra-organisational communication, and this depends upon the flow of information and communication through and within the organisation. This section examines the character of such flows at CommCo.

Extensive inter-organisational and intra-organisational communication was very apparent within CommCo. Inter-organisational communication had dramatically increased with the rise in access to and participation in email technology. Thach and Woodman (1994) found that within their study organisations email had altered culture and communication patterns, and had ultimately increased communication between the hierarchical levels of the organisation. Similar changes in communication patterns were also found at CommCo. An operations manager explained why CommCo's organisational communication flows had increased and the benefits of these changes:

"Communication is faster. Email makes responses quicker and more precise. It provides a record of what was decided or requested. Passing on information is easy; many people can be given the same message. The

speed of operation means email can be used to pass information during phone calls...audio-conferencing means meetings are quicker, cheaper" (Adam Taylor).

This informant drew particular attention to the technological implementations that benefited a manager's work processes. A manager's role at CommCo was focused upon managing and controlling communication and information flows and in this instance technology was central to these processes.

The increase in volume of inter-organisational and intra-organisational communication may also be explained in terms of organisational structure. As Hinds and Kiesler (1995) suggest, flatter structured organisations have led to a rise in horizontal and non-hierarchical communication. However, 'flatter' organisations, nevertheless, have some hierarchies in place so vertical communications still transpire but in this regard is often argued that an effective organisation has successful upward communication (cf. Millmore and Thornhill 1996).

CommCo's organisational structure has become flatter, though it remains in a process of transformation. The implementation and application of NCTs in this structure has enabled vertical and horizontal communication. However, a large majority of communications came downwards from senior management, which had a negative effect for middle management and non-management employees. Downward communications created a pyramid effect at CommCo, which resulted in too many daily emails for those lower in the organisational structure

to handle. This was a widely shared judgement at CommCo, captured by the comment of an engineer:

> "[email] provides an easy method of transferring briefings from management to engineers. It's great to know...but there is always so many emails to read and respond to" (Howard Bryant).

Many managers and employees at the case study organisation stressed that the influx of emails was due to the ease of communicating and transmitting information.

CommCo organisational members also claimed that unnecessary and irrelevant communications were being transferred, as stated by an operations manager:

> "The ease of communication means there is a tendency to pass on more information than necessary" (Adam Taylor).

This is consistent with the conclusion of Doyle, Claydon and Buchanan (2000), from their study of organisational change, that vertical and cross-functional organisational communication may remain problematic.

It has also been suggested in the literature that email has promoted the unequal distribution of information and that some managers have been excluded from exchanges of information (Sproull and Kiesler 1986). However, no evidence of this was found at CommCo. Notably, organisational change had not encouraged

widespread innovation in employee communication (cf. Doyle, et al. 2000). However, communication at CommCo had become less personalised and less social which was reflected in the tendency for information and communication to be passed on without any consideration as to whom it was going to. Although there was evidence of increased inter-organisational and intra-organisational communication at CommCo, there was no evidence to suggest that the substance of these communications was any different from those that took place prior to the implementation and application of NCTs. However, there was overwhelming data to suggest that technological implementation had altered the method of communication utilised by employees, increased the flow of communication and information, and reduced social interactions.

Management of Information through Organisational Structure

With the advent of information and communication technologies, organisations have had to change structurally, often on an ad hoc basis, to incorporate these technologies and utilise their capabilities to the fullest, and this has led some writers to an optimistic view of the impact of ICTs on organisational structures (Thach and Woodman 1994). Overall, CommCo's organisational structure has been positively transformed by the implementation, integration and application of NCTs, in ways that are outlined below by making comparisons with the findings of earlier literature.

Divisional, regional, national and statewide organisational structural differences have been found in Zack and McKenney (1995) and Preece's (1995) case studies and were also found to an extent at CommCo. CommCo at divisional level had moved to a flatter and more horizontal structure in which middle management roles and work processes were changing. It was widely supported that the structure of management was changing as middle management roles are disappearing and their work is distributed (see also Davidow and Malone 1992; Drucker 1988; Menzies 1996). CommCo managers gained a broader role in channelling information and were seen more as 'facilitators' (cf. Davidow and Malone 1992). At a national level CommCo employed a centralised decision making process whereas at divisional and departmental level it was more decentralised and flexible, and computer-mediated communication was more evident.

Thus, in general CommCo's organisational structure has changed from a bureaucratic and hierarchical structure to a divisional and team-based environment reducing the number of hierarchies. These changes have effectively simplified management structures (cf. Child 1984) and created a flatter structured organisation though it remained pyramid in shape as much communication continued to flow downwards. As the divisions and teams of CommCo were geographically dispersed, effective communication throughout the organisational structure was essential for coordination and integration.

It was important to see these changes in organisational structure in the context of management perspectives on technology, in line with Buchanan's (1986: 67)

argument that "...developments in technology trigger a management decision making process in which various managerial objectives are translated into work and organisation structures". The management and organisational rationales of communication technology implementation at CommCo ultimately aimed to create a networked organisation. A networked organisation is a widely accepted structural consequence, whether intentionally or accidentally created, of the implementation of information and communication technologies (Bush and Frohman 1991; Lea, et al. 1995; Nohria and Eccles 1994; Nohria and Ghoshal 1997). It was from the perspective of building such a structure that CommCo management held their optimistic views of the application and implementation of NCTs. For example, there was the perception amongst managerial personnel that greater information was available and as a policy manager stated:

"Information is better accessed and controlled..." (Claire Lewin).

It was also through this structure that collaborative and integrative work processes could be better managed, a feature celebrated by an operations manager who reported that:

"...the amount of information available is greater. Ideas and documents can be shared" (Adam Taylor).

The implementation and application of NCTs also altered the structure of control within CommCo. For instance, a process involving both the centralisation and decentralisation of power had occurred, creating autonomous working patterns

within the framework of project objectives (cf. Pava 1985; Simpson, et al. 1987). In the process of decentralisation, the control of work has been reorganised and dispersed so teams had more power over their workloads and schedules. Decentralisation was enabled by the implementation and application of NCTs as work could be effectively coordinated and integrated. On this basis the management of people through technology had become more complex, as more employees from all levels of an organisation were able to work remotely, thereby controlling the time and place of their work. However, a consequence of trying to manage information in a networked-structured organisation was that some employees became isolated as information was passed on electronically.

Summary of the Impact of NCTs on Organisational Communication and Information Flows

In summary, then, the implementation, integration and application of NCTs at CommCo were instrumental in changing the flow of information and patterns of organisational communication. Organisational structures were changing and evolving. NCTs were enabling and supporting these transformations. Specific structural changes highlighted in this chapter involved the alteration, extension and interruption in the flow of organisational information and communication. Management rationales for the implementation and application of NCTs embraced the ideas of work efficiency, extended communication and competitiveness. The disadvantageous consequences identified by CommCo middle management were concerned with the impersonal nature of electronic

communication, information overload and the intensification of work. Organisational or senior management rationales for technology implementation were broader than the middle management rationales identified. These organisational rationales were based upon technology facilitating information and communication flows in order to maintain productive and efficient work practices. For management technology had, at its best, enabled new forms of communication exchange with organisational members and those external to the organisation, such as clients and customers. Overall, management tended to talk about NCTs as being enablers of coordination, exchange and informating.

CommCo's organisational structure had been restructured in accordance with some of the ideals and structural elements of post-bureaucratic organisational forms, such as the network-structured organisation identified in chapter 2. The restructuring of the organisation, the transformation of management work and changing work processes demonstrated CommCo's moves towards new organisational forms and structures, but also indicated that some of the traditional elements of downward communication and information flows and control remained important. For example, communication technologies were employed not only to extend communication and information lines, but also to reinforce traditional downward lines of communication and information exchange. In this sense, my research at CommCo suggests that the implementation and application of NCTs does not automatically create the characteristic elements of a network-structured organisation.

As a result of these organisational transformations management work was also altered. Many managers from different occupational groupings argued that their workload had increased. However, work intensification was stated to be the result of an era where information, communication and knowledge were understood to be key elements of work efficiency and competitiveness. Consequently, management work increasingly dealt with the electronic transmission of information and communication, new electronic connections and the resultant new social relations mediated by technology. The alteration of communication and information flows involved different methods of interaction and faster methods of transferring information. These transformations can be characterised as the 'technologisation' of communication and information within the case study organisation. To some extent, however, the mediation of interaction and communication had undermined the relevance of an individual's interpersonal skills and communication had become impersonal. In this sense NCTs were disabling social interactions and relations as work processes were managed through technology and as information is managed through a technological culture. Although electronically mediated interactions and communications had negative connotations within the case study organisation, this form of communication had, nevertheless, increased.

Ultimately, information and communication flows were altered as NCTs enabled the speedier transmission of information and communication through and within the organisation. These flows were also extended in the case study organisation in ways that involved innovative work practices of coordination and collaboration. Coordinative and integrative work practices have highlighted how

information could be shared and exchanged and it was in this sense that management may be networked. As a result of these new connections enabled by NCTs, and the constant possibilities for further connections, the very structures of management have changed. For instance, management are more networked as a result of NCTs.

At the same time information and communication flows have also been interrupted by the implementation and application of NCTs. Management applications of NCTs, particularly email technology, demonstrated some of the ways in which information and communication had been interrupted. The work of managers now included the electronic transfer of information and communication and as channels of information they decided who received what information and when. In the case study organisation employees did not assume that all information and communications got transmitted. However, many organisational members also admitted that they did not read everything that they received via email because of the sheer volume of emails transmitted in the organisation. In both of these ways information and communication flows were interrupted and displaced at CommCo.

To conclude, this chapter has outlined existing organisational practices regarding information flows, communication and interaction and has defined the ways in which technology implementation has transformed those practices. The emergent organisational practices have been characterised by the alteration and extension, but also the interruption of communication and information flows. Finally, it should be noted that the management rationales for the implementation and

application of technology are explicit and broadly congruent with the more implicit organisational rationales identified. However, it will be seen that the management rationales identified in this chapter diverge from the employee rationales explored in chapter 6. Non-management level employees were more sceptical and doubtful of the advantageous outcomes of the implementation of NCTs.

Chapter 6 – Personal Narratives and Utilisation of New Communication Technologies

This chapter explores the relationships individuals have developed with new communication technologies (NCTs) using the data collected from the observations and the interviews. The analytical framework of this chapter is based upon the idea of 'technological frames' (cf. Orlikowski and Gash 1994) introduced in the previous chapter. This will enable the experiences and personal narratives of the organisation's employees to be compared and contrasted by specifically focusing on the work setting, the training setting, functional groupings and hierarchical levels. In addition, by comparing the responses from the delegates attending tranche 3 and tranche 4 it can be determined whether technological frames transcend hierarchies and geographical distances. In analysing the work setting and the training setting the effects of implementing and using NCTs in different contexts can be identified. Principally, this will identify the experiences and perspectives of these employees on such topics as the communication lines, the social networks, the organisational hierarchies, and the work processes of CommCo. The cultural and structural elements of CommCo will be discussed in chapter 7.

The first section will summarise the capabilities of communication technologies with reference to some of the literature surrounding these technologies as a foundation to the discussion of employee's perspectives. The examination of the capabilities of technologies enables their relationship to organisational change to be studied (cf. Dustdar and Angelides 1997). The main discussion utilises the analytical framework, outlined in chapter 5, to examine employee understandings of the functionality and disadvantageous consequences of the NCTs implemented in the work setting at CommCo. As in the previous chapter, employee narratives are utilised to create an interpretative understanding of role of these communication technologies. The chapter concludes by discussing the impact of the communication technologies on various elements of the work setting by considering their impact on the individual, groups and teams, highlighting the consequences of the implementation and utilisation of NCTs.

The Capabilities of Technology

Each of the communication technologies studied (email, Internet, company intranet, NetMeeting, audio-conferencing and video-conferencing) have different capabilities and functions. The concepts of capability and function can be easily differentiated. 'Technological capabilities' defines the processes and tasks the technology can perform or assist with, whereas the 'functions' of a technology describe what the technology is actually implemented and employed for by the organisational members. The capabilities and functions of technologies have to be compared and contrasted as they may be characterised by congruent or

incongruent technological frames. For instance, the interpretations and understandings of the functions of the technology may be very different to the intended capabilities of the technology. These incongruent frames can be seen to develop through a lack of training (King 1996) or expertise in the technology so that the individual does not understand the potential capabilities of the technology, or through dissatisfaction with its implementation into the workplace. Additionally by contrasting the capabilities and functions of NCTs their context of use can be understood, offering an insight into, and explanation of, an individual's or team's interaction with that technology (cf. DeSanctis and Poole 1994; Orlikowski, et al. 1995; Weick 1990). Research on technology's context of use examines the circumstances under which a particular technology is used, whether or not this is in agreement with, or in contradiction to, the capability or functionality of that technology. This involves an in-depth examination of the individual-technology relationship that guides technology application in the organisation.

Communication technologies allow an individual or a group of people to verbally, audibly and pictorially communicate with an individual or group who may be in the next room, the next building or thousands of miles away, provided that they possess compatible technology. Each of the technologies investigated possess different capabilities, which need to be clarified in order to be compared and contrasted with the functions of that technology. All of the six communication technologies studied have been implemented into the case study organisation. Some of these technologies are more established than others, as a result of their accessibility or ease of use.

Firstly, email is a widely utilised communication technology and a well-established means of communication within the company. A large proportion of the organisational employees have a personal email address. This technology allows users to communicate one-way by sending text, pictures or graphs to one individual or to many. It is argued that email can effectively replace postal mail, reduce internal mail costs and speed up the work process, as the primary delay of document and information transfer is human. A failing or limitation of email is that compared to face-to-face communication it is not believed to be a 'rich' form of communication (Brigham and Corbett 1997; Dawson, et al. 1998). 'Netiquette', the unwritten rules concerning the use of email and the Internet, promotes the use of typeface art which allows users to pictorially communicate their emotions compensating for its lack of richness (cf. Corbett 1997). Within the study organisation email is a widely used, although not a popular technology. Table 6.1 shows that email is used for a variety of tasks, thereby suggesting that there is a good understanding of this technology's capabilities.

The Internet and company intranet enable those employees who are networked to access a wide variety of information, and these were considered to be valuable resources. Both enable users to communicate and distribute information. The Internet is a global network linked by various forms of telecommunication technology. It can be accessed by anyone via a server and enables users to search for information on almost any topic. It was predicted that 60 million would have access to the Internet in 2000 (Rockart 1998). The Internet "...has revolutionised the way people communicate with each other and the way information is

disseminated in organisations" (Forster 2000: 256). However, at CommCo this is not a widely accessed technology, as specific information applicable to work in CommCo can be found on the company intranet. The company intranet is a site on the Internet that can only be accessed by organisational employees (for discussions on the implementation of intranets see Scheepers 1999). This communication technology is applied to support human resource functions (Arkin 1997), assist organisational members who work from home (i.e. teleworkers) (Arkin 1997), promote information exchange (Barua, et al. 1997), offer news ways of working (Sprout 1995), and enable vertical and horizontal communication (Rockart 1998). For CommCo employees the intranet provides up-to-date information on on-going projects, share prices, training and development opportunities, vacant positions within the company and it also contains an internal address book. After email the company intranet and the Internet are the main sources of information (see table 6.1).

Computer conferencing technologies, such as NetMeeting, audio-conferencing and video-conferencing, allow individuals who are geographically dispersed to meet, communicate and share information with each other, reducing the need for travelling. NetMeeting is often run in tandem with either video-conferencing or audio-conferencing technologies as it allows documents to be shared and viewed instantly between the users. This technology is readily available for managers and is therefore predominately utilised by this hierarchical group (see appendix 15). Although NetMeeting is multifunctional in the workplace, it is not widely used except to carry out a meeting (see table 6.1 and appendix 16). Audio-conferencing allows individuals to hear and communicate with one another via a

centrally placed speaker/microphone. In comparison to NetMeeting, video-conferencing is possibly an easier communication technology to use.

Video-conferencing enables individuals to see, hear and speak to each other via a large screen, camera and microphone. This computer-mediated method of conferencing offers a rich form of communication (Dawson, et al. 1998) and a means through which to reduce travelling (Walther 1996) and travel expenditure (Merrick 1996a). This technology is multi-functional in the organisation as it is utilised not only to carry out meetings between geographically dispersed individuals but also for training purposes as in the e-skilling course. Nevertheless, this technology is limited in that it is unable to simulate visual context cues, usually created by eye contact, and this alters the flow of communication (Dustdar and Hofstede 1999; Sellen 1995; Sproull and Kiesler 1986). This problem is accentuated when a picture-in-a-picture function is used, whereby the screen is broken down into quadrants so that all participants can be viewed simultaneously. During the e-skilling course this capability was found to be problematic and unnecessary. Employees were found to have a preference for audio-conferencing and NetMeeting, even though video-conferencing suites could be easily accessed. Even with all the capabilities offered by video-conferencing technology this is the least accepted communication technology within the organisation.

Table 6.1 Tranche 3 and 4 Responses to the Application of NCTs for Specific Tasks by Organisational Position in CommCo

TRANCHE 3 and 4	NCT	Organisational position at CommCo													Total (n=53)	% of overall response rate
		manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%		
To access up-to-date information	email	2	14	4	80	9	56	1	50	1	50	1	25	2	20	20	38
	Internet	10	71	3	60	11	69	1	50	1	50			2	20	28	53
	intranet	10	71	3	60	14	88	2	100	2	100	3	75	4	40	38	72
	NetMeeting	2	14											5	50	7	13
	VC	1	7													1	2
	AC	2		1	20											3	6
Transfer documents	email	13	93	5	100	14	88	2	100	1	50	3	75	9	90	47	89
	Internet	1	7	2	40	1	6							1	10	5	9
	intranet	3	21			5	31			1	50			1	10	10	19
	NetMeeting	1	7													1	2
	VC																
	AC																
To set up meetings	email	12	86	4	80	7	44	1	50	1	50	2	50	4	40	31	58
	Internet																
	intranet	2	14	1	20									1	10	4	8
	NetMeeting	3	21			2	13									5	9
	VC	1	7			1	6									2	4
	AC	5	36			2	13			1	50	1	25	1	10	10	19
To carry out meetings	email							1	50							1	2
	Internet																
	intranet																
	NetMeeting	4	29	1	20	2	13			1	50					8	15
	VC	3	21	1	20	1	6									5	9
	AC	11	79	4	80	11	69	1	50	2	100	2	50	5	50	36	68
To organise a team	email	9	64	3	60	8	50	1	50	2	100	3	75	6	60	32	60
	Internet	1	7													1	2
	intranet	2	14							1	50					3	6
	NetMeeting	2	14	1	20											3	6
	VC	3	21													3	6
	AC	5	36	1	20	1	6							1	10	8	15
As a means of keeping in contact	email	13	93	5	100	14	88	2	100	2	100	3	75	6	60	45	85
	Internet	1	7			1	6									2	4
	intranet	2	14	1	20	1	6									4	8
	NetMeeting	3	21													3	6
	VC	2	14	1	20											3	6
	AC	5	36	1	20	2	13									8	15
No Response		1	7									1	25	1	10	3	6

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Table 6.1, on the previous page, depicts the different applications of NCTs by individuals from different hierarchical positions for specific work tasks. This table combines the responses from tranche 3 and 4 delegates, which are quantified on two separate tables in appendix 16. The table is placed within the text in order to indicate the difference between technological capabilities and functions that have been analysed. In some respect it can be seen that the application of NCTs is not necessarily linked to the capabilities of the technologies, highlighting the inconsistencies between technological capability and function. These inconsistencies or differences are discussed further in the next section.

The Functionality of Technology and its Advantages

This technological frame is organised around three themes drawn from the data to create a comprehensive understanding of the functionality of technology. The 'working smarter' theme follows the company work motto of 'work smarter not harder' (a slogan that was popularised by Womack, et al. 1990) and draws together shared ideas of communication technologies and how they enable individuals to be more productive. The increase in the speed of communication and the distribution of information is reflected in the second theme of 'fast-talking'. The final theme, 'the autonomous and flexible worker', details how communication technologies can enable individuals to work independently of managers, a characteristic of flatter structured organisations. Together, these three themes represent a shared understanding of the ideal and optimum

application of NCTs within the workplace, which would ensure high profits particularly for private sector organisations.

Working Smarter

Although, according to King (1996), increased productivity may be on the one hand an expected payoff of technology and on the other hand the rationale behind technology implementation, it rarely lives up to these expectations. In contrast Rice and Steinfield (1994) concluded that respondents in their research site felt that email technology had been a factor in enhancing work productivity. By becoming more efficient and productive their organisation was seen to be competitive. To try and ensure that the introduction of technology was an attractive option to employees the organisational management at CommCo utilised the slogan 'work smarter not harder'. This slogan suggests that to use the full capability of the technologies on offer is to work smart and reduce individual workloads. This can be seen as an all-embracing motto as one technical officer commented:

"The CommCo slogan 'work smarter, not harder' seems to fit most areas of the modern office" (Edmond Patterson).

The idea that communication technologies aid the worker in their daily work tasks was evident throughout the hierarchical structure. The majority of respondents were positive about the outcomes of technological implementation in the organisation and spoke of the ways in which technology had increased

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their work outputs. For example, this view was strongly endorsed by a delivery manager and a teleworking technical officer:

"...[technology has] made me more productive" (Brian Dye),

"It has improved my efficiency as I can get more done..." (Cliff Robetts).

Increased efficiency and productivity at work can be achieved by improving the flow of information (Simpson, et al. 1987) and having information at hand. By allowing workers access to the Internet and the company intranet, employees have access to vast quantities of up-to-date information which, prior to this technological implementation, would have to have been researched by telephoning the relevant people or accessing paper files. A professional exemplified this idea:

"Speed and access to information. No longer do we go to dusty filing cabinets for information that was often out of date. Now we can go to an intranet site for the latest, freshest, information " (Liam Hardy).

Consequently, this technology enabled those with access to work faster, as there were minimal delays in finding out the information needed to carry out a task or project. A solutions manager talked about the ways in which he could work faster as a result of technology implementation and application:

"Information is immediately available and work can be done much more quickly" (Ken Peters).

While a process manager suggested that email facilitates:

"...the speedier receipt and transmission of information. It had improved efficiency in the way we work" (Karl Digby).

Additionally, an integral part of 'working smarter' is being able to work as a team and share information, a capability that was facilitated in a variety of ways by many of the NCTs studied. Information could be received and transmitted rapidly, implying that an extensive sharing of information took place within the organisation. Although this was not directly evident from many of the responses received and the interviews conducted, a professional and a technical officer highlighted this feature:

"The team has benefited by being able to keep in touch and exchange information easily from afar. The same goes for the whole department and CommCo...The sharing of information is so much faster, with email and document attachments being sent in seconds rather than faxing or sending by snail-mail with its inherent delay" (Liam Hardy),

"Knowledge and information can be shared more easily and rapidly" (Grant Davidson).

However, the few employees who noted that sharing information was an important part of 'working smarter' were on the whole managers and professionals. Other organisational members who contradicted this belief were those employees lower in the organisational hierarchy who felt overwhelmed by information and believed that sharing and networking only resulted in the intensification of their workload. Therefore, some non-management level employees believed that the application of NCTs meant that they were working both smarter and harder.

Another feature of the experience of 'working smarter' was that it reduced overheads. Each department within the company had a duty to maintain its budget. When interpreting the implementation and application of communication technologies it is important to understand what role a technology may play in reducing overheads. Reducing travel and stationery costs seemed to be essential functions of technology for CommCo employees, even though individuals did not have direct budgetary responsibilities. A process manager and two technical officers highlighted the ways in which overheads had been reduced by the application of NCTs:

"Reduction in business overheads by minimising travel costs due to conferencing facilities and reducing stationery costs as we now have less paper copies of documents" (Karl Digby),

"It has enabled work to be carried out in a more cost effective and efficient manner. It has reduced the travelling involved in day-to-day activities" (Grant Davidson),

"new communication technologies are moving the work processes to a paperless society" (Heather Sargent).

From the respondents' understandings of NCTs it was evident that technological application facilitated 'working smarter'. These interpretations represented the commonly shared view at CommCo that technology enabled people to be more productive and efficient as information was conveniently accessible. It was widely recognised that with the right technology and knowledge, information could be expediently and easily distributed and shared, which epitomised the philosophy of 'working smarter'.

Fast-talking

The second theme of the functionality of technology frame is based on the understanding that communication technologies have speeded up and broadened the flow of information and communication through and within the organisation. Email technology, NetMeeting, audio-conferencing and video-conferencing all enable users to broadcast and distribute information to a large audience, altering the flow of information and communication within the study organisation. For instance, a technical officer explained:

"I am able to communicate with other members of my team more efficiently and broadcast information to a wider audience more effectively and speedily" (Grant Davidson).

Other research has suggested that email has speeded up the flow and exchange of information through and within organisations (Sproull and Kiesler 1986) and this was evident in the experiences of CommCo employees. The idea that communication was speeded up was particularly apparent when a professional discussed the benefits of NCTs:

"It also bridges time-zones. For example, I can fire a request for information to the USA in the afternoon and by the following morning when I return to the office I may have the answer. Whilst I was away my email recipient has been working and given an answer, hopefully. Obviously it works the other way when I send an email east - time zones again. This saves me having to coordinate a voice call into another time zone, either having to get up early or stay late to speak with these people" (Liam Hardy).

This functionality represents one of the main capabilities of communication technologies and it was clearly recognised and sometimes (as in the above quote) celebrated at CommCo. However, although this could be understood to be an advantageous function, this was not a widely shared understanding, because the disadvantageous effects of speedy transmission were often interpreted as outweighing the benefits. If email is used as an example of speeding up

communication this would mean that, provided the recipient responded within a short period of time, employees would no longer have a reason to delay a work task if the information was available. It can also be argued that easier and speedier communication creates the expectation that work tasks may be completed faster and hence an individual's workload may be increased. This more negative understanding of technology was widespread at CommCo, as will become evident in the next section of this chapter.

The Autonomous and Flexible Worker

A consequence of NCTs in the work setting is that organisations develop more flexible structures, as they have to react to changing economic and customer environments (Forster 2000). Forster (2000) suggested that the autonomous and flexible worker characterises the ideal employee for this organisational type. In accordance with these ideas, this theme introduces the commonly shared view that communication technologies create organisational employees who are autonomous workers and are independent from other workers. This independence is created by the capability that technology has to enable individuals to access data themselves so that they do not have to rely upon others. Therefore, such individuals believe that they are in control of their work schedule and workload. It is also believed that the implementation of technology enables the worker to be flexible in terms of their working hours and the location in which they work (cf. Forster 2000; Orlikowski, et al. 1995). At CommCo an engineer defined this autonomy:

"NCT implementation has allowed me, when on call, to access documentation and exchange remotely. This saves CommCo and myself time and money. I can also access my work emails remotely which means I do not have to travel to the office daily to respond to my mail" (Howard Bryant).

Organisational members who worked from home and telecommuted, a work position that was growing in CommCo, best illustrates the autonomous and flexible worker. The teleworkers who were surveyed and interviewed believed that the functions of communication technologies were similar to those suggested by the managers and technical officers. These workers did, however, place more emphasis on NCTs giving them more autonomy and control over their work. This was reflected in their desire to work from home and the flexibility that this location permitted. As iterated by a teleworking technical officer:

"It has enabled me to work at home...I take control of my work stream...I'm no longer restricted to the nine to five day" (Cliff Robetts).

Many of the employees shared the idea that it was technology's function to ensure that work tasks could be carried out more easily by, for example, allowing the individual to work at any location, access information and maintain contact with team members, managers and customers. By furnishing employees with technology that facilitates autonomy and flexibility an optimistic understanding of technology is created, a dynamic illustrated by a team member:

"Also information can be accessed locally or remotely using dial up connections instead of having books of information. The conferencing facilities are used to discuss and update on projects etc instead of people travelling around the country" (Ben Johnson).

Additionally, the autonomous and flexible worker can be seen to be essential in the contemporary workplace. Increased mobility in the workplace implies that individuals may become harder to contact but with the implementation of communication technologies it is easier to indirectly contact, individuals through, for example, email. This was a point highlighted by a professional:

"Because people are far more mobile today, it is unlikely that you will get them immediately at their base, either via fixed or mobile comms, the latter typically being diverted to a voice mail system. Email becomes invaluable as it allows people to respond at their own pace, and possibly with an enriched message, for example file attachments" (Liam Hardy).

Within a dynamic and changing economic environment that leads to feelings of uncertainty, such as that experienced at CommCo, it is understandable that such employees would find autonomy appealing. Furthermore, it is also suggested that by maintaining control of their workloads a sense of stability can be achieved by such employees. It is evident that the capabilities of NCTs offer flexible working patterns which challenges the traditional assumptions about work by adjusting the time and place of work, and for the organisation this ensures efficiency.

Technological Consequences and Disadvantages

This portrayal of the functionality of the technology frame has underlined the significance of positive experiences of NCTs, but it has also highlighted the gap between technological capabilities, technological practices and usages. It indicates some of the discrepancies between what the technology can do, the idealised forms of its application, and its actual application by individuals. This disparity also may to some extent explain the adverse reactions of some employees toward the implementation of technology. It is evident that the technological capability that enables individuals and teams to work while geographical distant from one another promotes individual autonomy and flexible working patterns. However, one consequence of this capability is that geographical dispersal of organisational members and individual autonomy results in the dehumanised and isolated workers, and a lack of cohesion in the organisation. The 'dehumanisation' and isolation of workers is analysed as one of the disadvantages of technology implementation in this section.

This frame is incongruent to that focused upon the functionality of technology as it denotes contrasting understandings of NCTs and in many instances may be perceived as opposing the interpretations of NCTs functionalities. The three themes utilised to construct a comprehensive understanding of the consequences and disadvantages of technological implementation and application can be argued to be in conflict with those identified in the previous frame. These themes suggest incongruent interpretations of communication technologies. The first

theme of 'information overload' is widely discussed in the literature and was a prevalent understanding of a technological disadvantage in CommCo. For example, many believed email to be the main instigator of the information overload problem. Consequently, it is often perceived that workloads, in tandem with information overload, have increased with augmented productivity expectations, and this is represented by the second theme of 'work more and more work'. The final theme of this frame represents an understanding that technology dehumanises and isolates the worker. For instance if technology is believed to be controlling communication then there is reduced face-to-face interaction as more workers utilise NCTs to converse and interact and this dehumanises workers as they communicate via technology and become less real to remote people.

Information Overload

Information overload (cf. Dawson, et al. 1998; Rice and Steinfield 1994), or 'message-stress' (cf. Forster 2000), refers to the vast amount of information available, including information generated by email. The unselective forwarding of information or 'manipulative forwarding' has been found to have a negative effect on the social life at work (cf. Markus 1994b). The Internet and intranet can become a distraction for both an inept and an experienced user, where they may become lost in the large quantity of information available. When discussing email, the company intranet and the Internet one team member stated:

"We are flooded with information..." (Ben Johnson).

As workers have become mobile, working from remote locations, personal contact between employees has become harder. Email effectively solves this problem as it enables users to contact each other via electronic written messages. This technology enables users to pass on information easily, but without any or little discipline or restraint in its use it causes information overload in the form of irrelevant and abundant emails. Some have suggested that the intended consequence of email is to increase communication and information sharing (Sproull and Kiesler 1986). However, in CommCo too much communication and information sharing had overwhelmed employees. This was experienced by many employees and was summed up by both a professional and a technical officer in rather similar terms:

> "Email is relentless in driving my, and I guess everyone else's, workload. I have been away from the office for just one day and may have 30-40 new messages. Much of it may be cc'd to me just for info. However, I have to filter through it to get to the really important stuff. Going on a training course or on holiday is sometimes considered with trepidation. I know that, whilst I am away the email will keep piling up. It is no different for my peers" (Liam Hardy),

> "...email overload which means you are bombarded with information not relevant to you, so you have to constantly sort the wheat from the chaff" (Grant Davidson).

Dissatisfaction with the inappropriate use of email technology and the non-selective forwarding of data was clearly a problem for users at any hierarchical position. However, as communication lines descended this organisational structure those at the lower end of the hierarchy suffered the most from unwanted emails. Over a third (36%) of the disadvantageous consequences of implementing technology that were identified were associated with email. Technical officers generally believed that information was not conveyed easily via email and that there was the risk of information being misinterpreted (see also Markus 1994b; Sproull and Kiesler 1986). It was also highlighted that email could be utilised for inappropriate purposes which further increased the problem, as suggested by a professional and a team member:

"...Witness occasional flame-mail or people indiscriminately cc'ing information to a wide circulation list to cover their butts" (Liam Hardy),

"Lack of thought, discipline or poor e-culture from senior managers in forwarding...cascading emails. This leads to people lower down the organisational structure being inundated with unessential emails. This information is perhaps nice to know but if all emails were read this would leave little time for core job functions" (Harry Piper).

In alignment with the changes in work processes and the increased utilisation of email, the way in which people communicate has been altered. The increasing number of emails sent within the organisation characterises the manner in which individuals prefer to communicate. For instance, a technical officer talked about

the ways in which the manner of communication had changed because of the information available through these technical means:

"new communication technologies have changed CommCo communication networks and social relations by providing access to information via Internet and intranet which in the past may only have been made available after conducting several telephone calls" (Heather Sargent).

However, the consequences of the escalating quantity of emails were apparent when discussing changes in the work processes with the organisational employees. There was a shared concern about the application of NCTs within the workplace. For example a process manager stated:

"Even a very simple and quick query results in an email. This results in an increasing volume of emails to respond to, which has an impact upon carrying out other important work" (Karl Digby).

In this way email technology impacts on the work processes creating larger workloads and diverting work time from other tasks. This was the second theme of critical narrative surrounding NCTs at CommCo.

More Work and Work More

Work processes have speeded up with the advent of fast and easy communication and distribution of information. Consequently, work productivity expectations have changed. It is assumed that, because information is readily available tasks can be completed with minimal delays. Accompanying these changes, organisational structures have been reconstructed and hence changed individual work roles. A flatter structure has reduced the hierarchical structure giving managers and team leaders more autonomy and responsibility. However, this added responsibility has increased individual workloads and has involved the expectation that these individuals will perform more work. The implications of this were, however, disputed. A team member articulated this negative assessment:

"The introduction of technology, PCs etc, has put more work onto managers who have to type a lot and include more clerical functions within their work...put more pressure on people because of the expectation of instant response...Potential overload because there is no visibility of size of a person's in-tray other than the person struggling with it" (Richard Ashdon),

However a technical officer also voiced the positive view, in this instance:

" ...reduced numbers of staff require individuals to be more independent and consider risks...take responsibility for decisions and/or actions" (Wayne Thompson).

Overall there was widespread recognition of work intensification, though it was often seen as inevitable in the changing economic and technological environments of today. Both a professional and an engineer registered the effects of work intensification:

"Technology has significantly increased stress in the work place, no more so than email and occasionally mobile comms, depends if it is switched off or not" (Liam Hardy),

"...standardisation of work loads and delivery of information, but workloads have increased" (Kirk Deakin).

It was widely believed that the implementation and the sometimes undisciplined application of NCTs could create copious amounts of work. Once more email technology was understood to be a central factor in creating more work, a feature understood and highlighted by two engineers:

"Email has generated an enormous amount of work. I would never have received as many letters as I do emails" (Howard Bryant),

"I can feel pressurised to clear my email inbox at all times" (Wayne Thompson).

More work was not only created by increased expectations, changing environments and specific technologies, it could also be argued that the maintenance of the technology created more work. For example, some of the informants suggested that the increasing number of passwords needed to access databases and networks could create more work, as they constantly needed to be remembered and changed (Peter Matthews, trainee; Sean Brown, technical officer). Also, individuals needed to ensure that documents were electronically stored and logically sorted for easy retrieval, which could be time-consuming in itself (Malcolm Ingles, professional). Hence technology could create psychological pressures in a way acknowledged by one professional:

"...I have mentioned before that new technology...drives the work load and can become oppressive at times. It is a double-edged sword in that respect..." (Liam Hardy).

The reference to feeling 'oppressed' also suggests that technological consequences were not solely understood by the respondents in terms of information overload and more work, but also in terms of what the affects were on themselves. This final theme of this frame was clearly illustrated by the changing methods of communication that had led to a reduction in actual personal contact and interaction.

'Dehumanising' and Isolating the Worker

A significant disadvantageous consequence of technological implementation and application was the dehumanisation and isolation of the worker at CommCo. 'Dehumanisation' is the rendering of communication and interaction to electronic processes, which therefore deprives individuals of human contact. This process occurs when individuals prefer to use technological means of communication and interaction rather than actual face-to-face contact. Social context cues and knowledge of the sender are often lost through CMC. Consequently, dehumanisation was also seen to be the result of CMC as it was easy to understand how an individual may have become unreal in the mind of the recipient (see also Sproull and Kiesler 1986; Walther 1996). The process of dehumanising the worker was founded upon the pervasive nature of technology in the work setting.

Respondents were acutely aware that the introduction of NCTs had resulted in their feelings of isolation. From the responses it can be understood that isolation is a result of dehumanisation. The isolation of the worker had occurred due to an increasing reliance and dependence on specific technologies to facilitate work duties. Therefore, the application and implementation of NCTs had 'dehumanised' and isolated workers. So, feelings of 'dehumanisation' and isolation were not a consequence of one set of feelings or the other: they were independent but could transpire simultaneously. An engineer highlighted his feelings of isolation, which were linked to the outcome of management policies:

"...as for social relations, reduced workforce has led to more isolation" (Kirk Deakin).

However, a technical officer suggested that isolation was the result of technology implementation and application:

"...some personnel have felt isolated from their colleagues by the introduction of email etc" (Grant Davidson).

Team members also shared these feelings of isolation but they were coupled with feelings of resentment, as it was believed that some managers misapplied technology. For instance, as suggested in the literature, managers could use email as an intentional (Markus 1994b) or unintentional (Brigham and Corbett 1997; Corbett 1997) means of distancing themselves from their team members. Thus, some of CommCo's organisational members believed that those higher up the hierarchical structure use technology, particularly email, to evade discussion. For example, one team member remembered and spoke about the way that:

"Email...is also used by our managers as a convenient tool so as not to discuss many issues with us" (John Carter).

When this occurred non-management level employees did not feel like they were part of the organisation and may have started to feel isolated from management.

Organisational members who telework represented an extreme case, and also suffered feelings of isolation and resentment created by the belief that there was a lack of commitment by the organisation to their position. For instance, a teleworking technical officer displayed some resentment of his dependence on technology and suggested that this had become evident as the organisation did not recognise, or reflect, this dependence in his technology budget:

"The computing budget allocated to a home worker does not reflect the total dependence that such a person has on the quality of the technology offered" (Cliff Robetts).

In addition, over reliance on technology could create further problems when the technology failed, as identified by both a team member and an operations manager in rather similar terms:

"We have become reliant upon the technology working and being available. When the network fails it creates major disruption" (Richard Ashdon),

"A reliance on such technology means that when faults occur an office can grind to a halt" (Adam Taylor).

This perceived over reliance on technology was in part a result of the dehumanisation process. Changing methods of communication meant reduced face-to-face communication and interaction, and these were reflected in

employees' feelings of isolation. Lack of personal contact with other employees created the perception that others were remote and almost unreal as no meaningful interaction took place. Since spatial and temporal barriers were surmountable through technology a once real person could become perceived as virtual, as communication and interaction took place via technology at a time and place chosen by the sender and the recipient. Such relationships were further dehumanised by the fact the neither party had to be present, as in the case of email technology. Several team members echoed this experience:

"More people are working on their own...Less personal contact because of automated contact systems such as answering services with tiered options for the caller to select" (Richard Ashdon),

"It...[technology]...has speeded work processes up but taken away some personal element and interaction" (Charlie Doyle).

Other literature has suggested that, as individuals became more reliant on computer-mediated communication, face-to-face communication and interaction deteriorate (cf. Lupton and Noble 1997). 'Dehumanisation' occurs as more individuals prefer to use technological means of communication and interaction to actual face-to-face contact. This suggests that 'dehumanisation' was a process undertaken unconsciously and consciously by individuals, which may have been a indication of the internalised organisational culture. However, it was evident at CommCo that individuals chose to communicate via electronic media even though it was not a necessity (cf. Zuboff 1988).

An engineer highlighted this:

"Email is now used in preference over face-to-face meetings and the telephone to convey information. This leads to less personal contact and may leave the individual feeling isolated so a conscious effort must be made to make personal contact" (Howard Bryant).

The way in which the use of NCTs could encourage dehumanisation in the workplace was signalled obliquely by a development manager who argued that as a result:

"People skills do not get used as much" (Evan Durrant).

This suggests that individuals are perhaps lacking the opportunities to interact, or interface with people, as they employ technology extensively (as depicted by their preference in utilising technology to communicate). Therefore, a preference for technology combined with the capabilities of technology seemed to reduce the opportunities to meet others, indicating less personal contact and thereby dehumanisation. This was also reflected in the shared opinion of the respondents that the e-skilling course constituted an opportunity to meet people.

This discussion of the technological consequence frame has identified and analysed three of the problematical consequences of communication technology implementation and application noted by the organisational members; information overload, more work and work more, and dehumanising and

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isolating the worker. The information overload theme utilised the interpretations of the organisational employees to emphasise that, even though communication technologies enable fast and easy access to information, workers feel that they are being bombarded with too much information. In turn increased information has resulted in the belief that there is more work and that work productivity expectations are higher. The understanding that workers are becoming dehumanised and isolated draws out feelings that are often implicit in the employees' narratives. These findings parallel those in some of the literature, but draws out more fully the way in which such critical themes can coexist with a positive evaluation of technology in the perceptions and narratives of the employees of a high tech organisation such as CommCo.

The Impact of New Communication Technologies on the Work Setting

NCTs are believed to complement other forms of communication (Meyer 1991) and therefore it is important to analyse their impact on the work setting. This section draws together and builds upon the narratives explored in the previous sections but focuses on specific aspects of the work setting. The impact of NCTs on the work setting is investigated in terms of changes in information and communication lines, social relations, hierarchies and work processes. These impacts have been given some initial attention in the earlier discussion, but will now be examined in more detail.

Information and Communication Lines

Information and communication lines function as part of the structure of the organisation. These lines highlight the communication and information exchanges through and within the organisation. In turn such organisational communication sustains promotes and challenges the organisational culture. Instead it has been argued that communication "...provides newcomers with a sense of the organisation's culture and history, and it acts like glue to keep teams together during times of stress" (Corbett 1997: 28).

Primarily, NCTs impacted on information and communication lines by changing the methods and patterns of exchange. In this respect email had the greatest impact on methods of communication as indicated by one female technical officer:

"The majority of people now refer to the web sites and interact via email" (Holly Judd).

Email technology radically altered the method of communication, as people were more likely to utilise this technology instead of the telephone. The computer conferencing technologies had not had such a dramatic affect on altering traditional communications methods, although they transformed the circumstances under which a meeting or conference had to be conducted. A consequence of these changing methods of communication was that, as stated by one team member.

"less verbal discussion takes place" (John Carter).

The organisational employees recognised the preference of colleagues to utilise technology to interact and communicate in the work setting. Statements of the negative impact of these preferences on the working environment followed these understandings. The main negative effects could be seen to be that communication was depersonalised, that computer-mediated communication was less productive than face-to-face and that working relationships deteriorated. A technical officer and an informant who chose not to specify his employment position illustrated this by talking about technology and the manner in which:

"Individuals tend to use emails when a verbal exchange of views could be more productive" (Grant Davidson),

"New technologies make communication less personal and hence any working relationship suffers accordingly" (Max Brook).

Secondly, communication technologies resulted in increasing and expanding communication and information lines through and within the organisation. Email technology not only enabled individuals to communicate and exchange information more easily but enabled users to communicate with anyone, provided the recipient had an email address and a point of access, within, or external to, the organisation, demonstrating the development and extension of communication lines. These lines also expanded so information and

communication exchanges could take place irrespective of whether the recipient was present. One trainee emphasised how communication lines had expanded for him:

"It [technology] has allowed...more frequent contact with suppliers, technical teams via teleconference..." (Colin Reid).

Information lines were also increasing as information could be easily accessed and disseminated via the intranet or the Internet, as highlighted by one professional:

"The company intranet is very good for holding central policy and related documentation. Hence, when policy changes it can be disseminated to those concerned very quickly. It cuts down on or eliminates the need for local paper or other copies which may go out of date frequently and quickly" (Liam Hardy).

This understanding of expanding communication and information lines highlights some of the questionable impacts of communication technologies. As communication lines opened up between employees, suppliers and customers so did the communication lines between senior managers, middle management, departments and team members. However, these new and frequently used lines of communication also generated resentment in some, as they meant that irrelevant information was cascaded down the hierarchy.

This was an experience exemplified by two team members:

"We are flooded with information, every sample of information is sent down the tree instead of someone filtering the information that is required from that which is trivia" (Ben Johnson),

"I find email is being abused by our managers as a dumping bin to throw all sorts of rubbish at us which we have to open" (John Carter).

Overall, the experience of my informants was that information and communication lines were expanding and extending through and within the case study organisation and that they had a great impact on the work setting. Furthermore, these experiences were understood in terms of both management and non-management organisational narratives. The functionalities of information flows that arise from the implementation of new forms of computer-mediated communication were appreciated in terms of positive narratives, but were also a source of concern articulated in terms of negative narratives.

Social Relations

Informal relationships and social relations sustained by communication and interaction are an important basis of a cohesive working environment. These relations may only be replaced by an invasive, strong organisational culture, which creates a sense of commitment and acts as an integrative power. However, in CommCo social relations were believed to be fundamental elements of the

organisation that had been disrupted by the implementation and application of NCTs. When one technical officer was asked whether and how communication technologies had affected social relations and communication lines within the company he stated:

"They have killed it all" (Edward Pryce).

This statement depicted the high level of resentment that some employees felt towards communication technologies in the work setting. More importantly it highlighted the fact that communication technologies definitely affected social relations. There was a universal consensus that this aspect of organisational culture had been affected by the implementation and application of communication technologies. Thus, a technical officer stated that:

"Social Relations have suffered as there is less face to face contact" (Frank Andrews).

Another informant, a team member, outlined his understanding of how social relations had been transformed because of the implementation of NCTs by suggesting that they had become:

"More rigid and impersonal" (Richard Ashdon).

In this sense, it can be substantiated that communication technologies have depersonalised social relations at CommCo, as there was less face-to-face contact

and interaction, dehumanising and isolating the worker, as depicted earlier in discussing the employees' understandings of technology. One trainee had already experienced the depersonalisation of communication in the organisation after only four months:

"I think it's [communication technologies] made communication less personal..." (Peter Matthews).

However, if communication mediated by technology was depersonalised then there was also the suggestion that computer-mediated communication was more effective for work tasks. This was the judgement of one professional who argued that:

"...[email] is good for techie talk but not very useful for inter personal issues" (Liam Hardy).

This idea was expanded further by the same professional who believed that the computer conferencing technologies were beneficial to the organisation (for example by reducing overheads), but continued to stress the negative affect they had had on interpersonal relations:

"Audio-conferencing (AC), and to a far lesser degree video-conferencing (have to travel to a VC suite) has meant that I can have a one to two hour meeting with my peers or colleagues without having to move from my office. As the company is so lean these days, typical of industry and not

just my company, peers and colleagues are spread across the UK and possibly the continents. AC is very cost effective for getting consensus and the job done. It is poor for inter-personal issues like one to one meetings between a line manager and subordinate for a performance review. Don't laugh, there are stories of this happening" (Liam Hardy).

Liam Hardy found it almost comical that these technologies were being used for events that he deemed to warrant face-to-face interaction, such as any meeting between an employee and their subordinates, and performance reviews. It can be understood that this application of the technology was not as productive, efficient or effective as a face-to-face meeting would be.

This commentary suggested that, there seemed to be a reliance on technology to perform work tasks, communicate, interact and accumulate information rather than relying on social relations to function at work. This reliance on technology was created by organisational strategies of networking to promote more productive working social relations within the organisation. In turn these strategies have resulted in a reliance on technology as echoed by one professional:

"Dedicated networks for the fast transfer of information have been built. Downsizing of the company means that teams are geographically dispersed and have to rely on technology to communicate..." (Liam Hardy).

A possible explanation for the reliance on technology and not social relations can be found in Turkle's (1995) work, as she found that some believe the virtual world to be more flexible and less complex then face-to-face communication and interaction. However, at CommCo there was definitely an ongoing necessity for social interaction and communication between employees to maintain a productive working environment. It was very evident that employees wanted more face-to-face contact and resented communication technologies, particularly conferencing technologies, because they had taken those opportunities away. This resulted in negative attitudes toward the application of NCTs and individuals became sceptical of the technological advantages espoused by management.

Organisational Hierarchies

To comprehend the ways in which NCTs have impacted on the hierarchy of the study organisation the different understandings and experiences of employees from different levels will be analysed. By analysing the responses and attitudes to NCTs in the training setting a comprehensive view of the variations in narratives across the hierarchy could be formulated, as the sentiments of the employees were more explicit in this setting. Within a training setting, where time was restricted, and technology was a central part of the learning process, the employees were forced to make use of the new technologies in order to progress in the course. In the training setting it was apparent that the employees who were not proficient in the new technologies had a greater resentment of these technologies than when they encountered them in their work setting. There were

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also hierarchical differences in the resentment felt by the employees. Within the work setting communication technologies had been gradually implemented so employees had had time to adapt and had been able to continue to work in traditional ways until they had learnt the skills needed to operate these technologies, which was less likely in the training setting. Also, it may be argued that employees were more likely to express their uneasiness and incompetent technological skills because they believed that lack of skill and knowledge was more acceptable in an environment where they were labelled as learners. The differences between the work and training settings at CommCo are summarised in table 6.2.

Table 6.2 Comparing the Two Settings Studied at CommCo

Training setting	Work setting
Learning centred around technology	Technologies are integrated into work day
Technologies introduced rapidly, on an ad hoc basis and without context	Technologies phased in context of task environment
Technological incompetence more readily observed	Incompetence disguised by focus on other competencies
Safe and permissible environment to admit skill and knowledge weaknesses	Focus on strengths to maintain status with employees and managers
Delegates self motivated to learn but not to learn new technology skills to complete the course	Employees self motivated to learn, or improve technology skills, as little assistance with technology

In the training setting tranche 3 managers were more likely to perceive video-conferencing technology as effective (see appendix 17). During tranche 4, video-conferencing technology was only utilised for contact with the mentors but managers still understood communication technologies to have been effectively applied and implemented on the course (see appendix 17). However, those positions lower in the hierarchy understood technology to be a hindrance to the learning process and an unnecessary part of the course review session (see appendix 17). Team members and technical officers also believed communication technologies were ineffective training tools (see appendix 17). This suggests that those higher up the organisational hierarchy have different understandings of NCTs, which may be argued to be part of the culture of the organisation. For instance, the more positive evaluations made by managers suggest that they were more unequivocally committed to the dominant organisational understanding of the positive character of NCTs, perhaps because they were in a position to experience these benefits. However, the more sceptical views of non-management level employees suggest that they were more ambivalent about the role of NCTs in the work and the training settings. For instance, they were more likely to experience the negative impacts of the technologies alongside the more positive impacts.

Additionally, it was found that managers on the CommCo courses were more likely to email the mentor with any queries, compared to team members who preferred contact with the mentor via the telephone (see appendix 17), which reaffirms the suggestion that reluctance to use the newer communication media was greater for those in lower hierarchical positions. Hierarchical differences

were also established in employee perceptions of their computer skills and knowledge of new technologies. Team members, technical officers, trainees and engineers displayed greater resentment toward the NCTs in the training setting as they did not believe that the course was a good opportunity to increase their knowledge or improve their skills concerning these technologies (see appendix 18).

Finally, by comparing the perceptions and understandings of the functionality of NCTs for employees from two hierarchical positions, an initial analysis of the impact of communication technologies on organisational hierarchies can be developed. Managers and technical officers represent two distinct positions in the organisational hierarchy with distinctive work tasks and it is therefore likely that they would experience and understand these technologies differently. Both positions were recreated and extended during organisational restructuring and together they represent a large proportion of the workforce, a feature which is reflected upon in the numbers attending the courses.

Managers believed that the functions of communication technologies were to make employees more productive, more work effective and to reduce overheads. Managerial positions involve working to deadlines, and meeting production and financial targets. Therefore working faster, more effectively and cheaply could assist in meeting these targets and was a prominent perceived function of communication technologies for managers. In comparison, the function of NCTs identified by technical officers was to enable them to work faster (and arguably work as a team although there is little evidence to support this argument). For

instance, technical officers identified fast communication, quick and easy distribution and access to information as advantageous functions of NCTs. However, both managers and technical officers perceived the function of NCTs as speeding up communication and creating fast access to information, features pertinent to both work roles. The contrasting understandings of technology by managers and technical officers demonstrate that organisational position influenced how NCTs are perceived and applied. The differing perceptions of the functionality of technology evidence a further way in which technology has impacted on organisational hierarchies at CommCo.

Work Processes

The employees' narratives also addressed the ways in which work processes have become reconstructed around the potential capabilities of NCTs, and this process of reconstruction is the final consequence of NCTs in the workplace to be considered in this chapter. New technology offers new methods of carrying out work tasks (cf. King 1996). Firstly, technology has been invasive, permanently and constantly changing the manner and processes of work at CommCo. As a result of these changes employees have become 'informated' (embedded in a network of technological information flows). Lastly the work productivity rate was speeded up, as technological capabilities improved and output expectations increased.

Within the study organisation certain NCTs were employed for specific work tasks and specifically for the type of information required, requested and

accessed. It should be noted at this point that the survey results did not demonstrate significant differences in the findings from tranche 3 and tranche 4 (see appendix 16). There was also little variation between the hierarchical positions of the users and the technology chosen to carry out a specific work task for tranches 3 and 4 (see appendix 16). Therefore, the results from tranche 3 and 4 were combined as a stronger basis for exploring patterns of technology implementation (see table 6.1). Overall, CommCo managers were more likely to utilise the Internet compared to technical officers and engineers who had a preference for accessing the CommCo intranet.

For my informants at CommCo the fundamental manner in which work processes had changed led them to perceive technology as pervasive and ubiquitous. As discussed previously, there was an overwhelming reliance on technology by employees to interact, communicate and perform their work. A technical officer identified, and spoke about, one way in which technology was viewed as ubiquitous, in a way that transformed the workplace:

"We now operate in an electronic office" (Grant Davidson).

Like many of his fellow employees this technical officer had witnessed significant changes in office structure and culture, and consequently work processes, because of technological applications and implementations. Whilst different working strategies were encouraged by the organisation the beneficial affects of communication technologies also promoted a reliance on technology, a point emphasised by a teleworking technical officer:

"As everything is cheaper, faster, more efficient, no time for social relations – words like *you will be assimilated* come to mind" (Cliff Robetts).

NCTs can be designed with different intentions, a feature highlighted by the comparison of the capabilities and functionality of technology. Zuboff (1988) and Thach and Woodman (1994) suggest that technology can have different implications for workers as they either intend to automate (control and deskill) or informate (empower and upskill) the worker. These intentions affect how the worker responds to technology implementation and application. In the case of CommCo, automating technology was well established in the organisation with the advent of automated electronic telephone exchanges. On the other hand, NCTs were aimed at informating the worker to enable working smarter, fast-talking and autonomy for the worker. Informating the worker has occurred in correspondence with the growth in information and communication lines.

Interpretations of the Outcomes of Technological Implementation

The capabilities, functions and disadvantageous consequences of communication technology implementation and application have had varying affects on the work and training setting at CommCo. An examination of the impact on information and communication lines, social relations, organisational hierarchies and work processes highlights the 'technologisation' of interaction. It is this outcome of

technological implementation that has had the overall affect of 'dehumanising' the work setting, and in the instance of the e-skilling course 'dehumanising' the training setting too.

An organisation such as CommCo exists to achieve corporate goals by working together. It is critical that interaction between organisational members is effective. Furthermore, informal and unstructured interaction and communication can contribute to the creation of a cohesive and productive workforce. However, it is evident in the case study organisation that communication technologies do not fully support this form of interaction. Email technology is the easiest of the communication technologies to use for informal interaction, but is unsuccessful in this regard at CommCo. The social network created by informal email communication is underdeveloped at CommCo as organisational members are overwhelmed by information via email and there are few explicit informal communication lines and interactions. It can, therefore, be argued that email does not have a strong impact on the organisational culture but impacts more on communication lines, work processes and individual understandings of organisational roles.

The most prominent outcome of technology implementation and application is that interactions have become 'technologised'. 'Technologised' interaction negates the need for physical proximity and promotes and supports collaborative working practices but can create a 'dehumanised', detached and impersonal work setting. For example, technology creates an unreal and artificial environment, and employees are becoming more detached from their work colleagues which

results in poor motivation and satisfaction. Video-conferencing technology supports the interaction and work of team members but at the same time cannot duplicate or reproduce the same richness of face-to-face interaction so the familiar personal touch is lost. This loss of working interaction can have detrimental and disadvantageous effects on organisational members and their productivity. This ultimately produces negative and sceptical attitudes about technology implementation and application. However, as the functions and capabilities of NCTs are changing so are the organisational forms they are implemented in. This conclusion is developed further in chapter 7.

Summary of the Functionality of Technology and Technological Consequences

Two incongruent understandings of technology are illustrated by the analysis of the narratives celebrating the functionality of technology and the narratives regarding the consequences of technology. These incongruent understandings were observed in the two settings, but with different emphasises, suggesting that the context of technology implementation is important to understanding the ways in which these narratives are deployed to address the outcomes of the application of NCTs. The functionality of technology frame presented the understanding that NCTs facilitate a supportive working environment by providing fast communication, easy access to information, and also facilitate flexible and autonomous working conditions by providing the means for workers to carry out their work from any location. However, within the technological consequences

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frame an alternative understanding of technology was depicted. In this frame technology was understood to be invasive, overloading workers with information and work, controlling interaction and isolating the worker.

From survey one, it was established that negative assessments of NCTs arising from the disadvantageous consequences of technological implementation were focused on email. In contrast the advantageous consequences of technological implementation identified covered a wide variety of areas, suggesting that overall a more optimistic understanding, even an enthusiastic culture of technology, existed within the organisation. It was evident that senior managers were more optimistic in speaking about the possible outcomes of the employment of NCTs as, overall, they advocated more advantages of technology than technical officers. Middle management, on the other hand, often discussed the similar number of advantageous and disadvantageous consequences of implementing NCTs.

To summarise, it is suggested that technology can be understood in a positive light when it enables individuals and teams to 'work smarter', creates easy access to information, facilitates the speedier transmission and distribution of communications, and promotes autonomous, responsive and flexible working patterns. Negative and sceptical interpretations of technology are produced when individuals become overwhelmed with the amount of data that is available and the quantity of work that is created. These interpretations of NCTs imply that for some employees there is a process of empowerment, in which individuals feel in control, whilst others feel disempowered as control of daily work tasks are lost.

For instance, some organisational members talked about the ways in which their daily schedules and workloads were controlled, and even dictated, by technology, as computers were switched on and emails were dealt with at the start of each day. Organisational members also, to some extent, controlled others' work, as an individual might have to wait for a colleague to pass on information or finish their part of a project. However, the understandings of the dehumanising and isolating affects of technological implementation and application created the strongest negative ethos. Poor understandings of the capabilities and the limitations of technology are arguably the result of poor infrastructure surrounding the implementation and application of NCTs. Some of the main sources of negativity toward technology were work pressures, and lack of training, support and understanding about the capabilities of technologies. In turn the ensuing ethos resulted in the inefficient use of the technology, a feature that was particularly observed in the training setting. These arguments create the foundation for the discussion of changes in the organisational culture in chapter 7, constructed around an exploration of the 'ethos of technology enthusiasts' and the 'ethos of technology sceptics'.

Chapter 7 – Reconstructing the Practice of New Communication Technologies: Changes in Organisational Culture

This chapter aims to identify the relationship between new communication technologies (NCTs) and the culture of the case study organisation by drawing upon both the management rationales and the employee narratives about these technologies, examined in the preceding two chapters. These cultural responses to the implementation and application of NCTs within the organisation are outlined by focusing upon the technologised character of communication, information, social interactions and networks. Thus an analysis of the responses of employees to NCTs through these technologised cultural elements provides the foundation of this chapter. On this basis, the chapter draws together the findings of chapters 5 and 6.

Firstly, the culture at CommCo is outlined to show how participants understood the internal and external environment of technological implementation and application. The following sections utilise the narratives of CommCo's employees, from all levels of the organisation, to extend the analysis of cultural responses to the implementation, integration and application of NCTs. By utilising these narratives some hierarchical difference will be highlighted, though this is not the key focus of this chapter. To extend the understanding of CommCo

culture the 'ethos of technology enthusiasts' and 'ethos of technology sceptics' are examined, as they represent congruent and incongruent ideas concerning communication technologies in CommCo's work and training settings. The final sections of this chapter analyse how communication and information lines, and social interactions and networks have become technologised. The chapter concludes by summarising and drawing out further implications of the analysis of the culture surrounding the implementation and application of NCTs.

The premise of this chapter is that organisations exist as sets of shared meanings, ideas and assumptions that are developed and maintained by their organisational members. By studying organisations as cultures a crucial insight into the socially constructed relationship between an organisation, its environment and organisational change can be gained. Culture is difficult to observe and interpret when conceptualised as a set of internalised shared assumptions (Sathe 1985). To create an interpretation of organisational culture a holistic approach was adopted, utilising observations, employee and organisational narratives, and a study of the organisation's history and environment. The analysis of organisational narratives is essential to my understanding of culture as a process of constructing, reconstructing and changing organisational values, beliefs and assumptions (see also Putnam, et al. 1999; Smircich 1983a).

The Culture of CommCo

CommCo's internal and external environments and its economic history all create a complex culture, which is at present in transition. By comparing CommCo's organisational characteristics with those outlined by Depres and Hiltrop (1995), the transformation from a conventional firm to a knowledge-intensive firm can be appreciated. The existing organisational design and structure, authority and power can still be characterised largely in terms of the attributes of a conventional firm. Decentralisation has, for the most part, been unsuccessful in establishing an organic and knowledge based design and structure. Organisational work and instructions are implemented and performed through the hierarchy, where power and control are situated. However, structural changes supported by communication technologies have, in some organisational divisions, created fluid boundaries, which are comparable to a networked organisation, where the control of work and outcomes are vested in, and negotiated by, individual employees. These features of hierarchy and network coexist in the organisation as the divisions are somewhat autonomous and the teams within the division are constituent elements of the hierarchy with team leaders reporting to a superior. However, in chapter 6 individual autonomy was found to be a strong influence on work practices and processes at CommCo suggesting that there has been significant movement in the direction of the knowledge-intensive network organisation.

A range of factors in CommCo's external environment have affected, and played a significant role in techno-organisational change. CommCo has had to confront

accelerating rates of change in its internal and external markets, and changes in the development, innovation and application of technology. Flexible working patterns, market competition and new economic pressures have intensified with the advent of new legislation and increased globalisation. The changing patterns and methods of communication have had the greatest impact on CommCo's internal environment, because they have created new understandings of efficiency and networking, and changing work patterns, as discussed in chapter 5.

The official role of technology within CommCo is primarily to sustain the 'atomised' structure (cf. Deal and Kennedy 1988) created by changes in the organisation's external environment. This structure is characterised by small, flexible teams that carry out work interdependently and are connected by communication technologies. The management of an atomised organisation in this way is often seen to be dependent upon the notion of a strong organisational culture (Casey 1995; Deal and Kennedy 1988). The organisational slogan of 'working smarter, not harder' highlights the important role of technology within such a culture at CommCo, but it is also a slogan contested by those sceptical of the management rationales for technology implementation. There is the belief that as employees, from all levels of the organisation, utilise the technology they will become more productive, implying that without the technology an individual would be working harder. These ubiquitous cultural assumptions dominate positive and negative perceptions of technology within CommCo.

Despite the pervasive emphasis on the potentially positive role of technology, there was a general opinion that CommCo's adoption and application of technologies, particularly NCTs, was characterised by caution. This opinion reflects the lack of corporate commitment stated by some organisational members in both the work and training settings. According to one technical officer innovation has been characterised:

"By poke and hope" (Edward Pryce).

As a result of this cautious attitude toward technology, CommCo has implemented technology on an ad hoc basis with no defined strategic plan, but with the expectation that employees would accept and use the technology unreservedly. Both the distribution, implementation and the impact of technology have been uneven, and as a result technology has been received with mixed feelings, creating contrasting cultural responses. These responses can be divided into two different ethoses, which exist as two framings within CommCo's culture, representing contrasting and incongruent ideas concerning technology.

Within the CommCo culture there is an 'ethos of technology enthusiasts', an ethos that reflects individual, group and managerial assumptions and understandings of the attractions and effectiveness of technological implementation, integration and application. The ethos of technology enthusiasts is comparable to the 'enhancing subculture' (Martin and Siehl 1983), which was examined in chapter 2. In opposition to this ethos, there is an 'ethos of technology sceptics', which is reflected in varying levels of negative and

pessimistic understandings of technology in the workplace. This ethos is a reflection of the 'counterculture' defined by Martin and Siehl (1983). In some instances a respondent's optimistic understanding of technology, an essential element of the organisational culture at CommCo, is in contradiction to their own negative understandings of technology formed through their personal application of technology. The orthogonal subculture (for definition see chapter 2 and Martin and Siehl 1983) within CommCo is represented in part by the elements of the ethos of technology sceptics. Individuals adopting this ethos are critical of management's motives for technology implementation, but still embrace and employ the technology. The incongruent ideas represented here are reflected with varying emphasis in the narratives of different user groups and occupational groups (cf. McLaughlin, et al. 1999) but it should be noted that in the case study organisation the differences are not department specific.

The ethos of technology enthusiasts and the ethos of technology sceptics present in CommCo represent incongruent sets of beliefs, assumptions and values that inform the organisational process of technological adoption, implementation and adaptation. Therefore, these ethoses can be defined as 'frames of reference', which ultimately influence the utilisation of NCTs. The two ethoses are in effect two technological framings or ways of talking about technology. Discursive frames are defined as:

> "a process whereby human beings draw on sets of linguistic resources, categories, and concepts made available in their culture to make sense of a particular aspect of their lives and are thereby influenced in the way

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they conduct themselves in that part of their life" (Watson and Harris 1999: 6).

The contrasting ethoses exist as differences in opinions, assumptions and applications regarding NCTs, and are expected (recognised as operating) and accepted (equally encouraged and sanctioned). As a result these conflicting understandings and perceptions regarding technology affect an individual's technology application as will be discussed in this chapter.

Before continuing it is important to note that the different responses and attitudes toward the implementation, integration and application of NCTs are defined here by two distinctive framings and are in effect ways of talking about technology. These two framings are called 'the ethos of technology enthusiasts' and 'the ethos of technology sceptics'. The concept of 'ethos' seeks to capture the overall philosophy and the relatively binding nature of each technological framing. Each ethos may be conceptualised as offering an identity that can be adopted by individuals at different points in time and in different contexts. However, individuals can embody either ethos at different instances or simultaneously, signifying that they can coexist not only within the organisation but also in the discourse of an individual organisational member.

The Ethos of Technology Enthusiasts

The ethos of technology enthusiasts represents shared assumptions and understandings of the capabilities and functions of technology within this

organisational culture. Within the CommCo culture this ethos is an integral part of creating, recreating and sustaining a dominant organisational reality (cf. Kunda 1992). It should be noted that these shared assumptions and expectations about technology are not team, departmental or level specific but have wide currency across these groupings. Thus, this ethos characterises technological ideas and values that are evident throughout the organisation. This section identifies the ethos of technology enthusiasts, examines its foundations and discusses how it is unconsciously transmitted and reinforced through integration and socialisation techniques employed by managers and other organisational members. The ethos of technology enthusiasts, a central feature of the case study organisation, is captured by shared assumptions of liberation, creativity, connectivity and efficiency. These elements are defined in terms of congruent (supportive) ideas and narratives about technology, its functions and capabilities.

Technology has become integral to daily routines whether in the work setting or at home (cf. Cockburn and Ormond 1993; Mackay 1995; Wajcman 1997; Zuboff 1988). It is such experiences of technology that participants draw upon for their understandings of technology. In particular, the two ethoses represent socially constructed perceptions of technology that have been developed through the employment of technology and express the narratives associated with those employments. As daily work routines are becoming more and more influenced by, and embedded within, technology (cf. Deal and Kennedy 2001), whether at a conscious or unconscious level individual and collective understandings of technology are transmitted and reinforced. This was a conspicuous feature of working life at CommCo. For example, one professional expressed enthusiasm

and almost excitement about communication technologies, revealing the existence and successful transmission of the ethos of technology enthusiasts within the organisational culture:

"Personally I have benefited from new communications technologies as it is a job in itself for me, and very interesting and dynamic..." (Liam Hardy).

In the case study organisation the ethos of technology enthusiasts was founded upon the accepting attitudes and more optimistic analyses of communication technology within the organisation that were analysed in chapter 6. For instance, technical officers were positive about the implementations and applications of communication technologies within CommCo while the managers, although holding a more pragmatic outlook, were also generally confident about technological application. The shared assumptions that made up the ethos of technology enthusiasts suggested that technology has been successfully integrated into the organisational culture. Therefore, as this integration has been successful, technology was viewed and as experienced as "...usable, useful and valued" (McLaughlin, et al. 1999: 41) at CommCo. The assumptions and images surrounding the implementation of communication technologies, from all those responding to survey 2 and those interviewed, embraced the belief that the introduction of communication technologies had been beneficial to individual work roles, teams, departments and CommCo as a whole (see appendix 14). Their shared assumptions, expectations and ideas interdependently formed the

ethos of technology enthusiasts and were expressed in terms of the role of NCTs in liberation, creativity, connectivity and efficiency at work.

Primarily technology was discussed as being liberating, releasing workers from temporal and geographical constraints and increasing opportunities for flexible working processes, a feature which was particularly evident in the work of senior managers. It was felt that these flexible working practices empowered workers to make their own decisions about when, where and how to work. This working environment has been created by increased access to, and transmission of, knowledge and information, ensuring that an individual was well resourced, informed and positioned to make decisions regarding work based on the information available. This access engendered a strong sense of empowerment and autonomy for some individuals in the organisation. In the case of CommCo, senior managers were more able to keep in touch with teams, and transfer knowledge and information, as communication technologies enabled these tasks to be undertaken more efficiently if utilised proficiently. Efficiency of communication and interaction could free up a manager's time to undertake additional duties, although this was not a uniform experience. Thus, work efficiency could be interpreted as a process of liberation which promoted creativity in the workplace.

Secondly, CommCo employees tended to talk about technology that promoted creativity in the work environment. By interpreting the judgements of the informants, creativity can be defined in terms of the autonomy and flexibility that communication technology offers. Within CommCo there were many media with

which to communicate and it was this application of communication technology that allowed co-present, remote, synchronous and asynchronous communications. Computer-mediated communication (CMC) allowed users to decide not only which medium but also to select the time and place of the interaction but could also be influenced by the recipient or recipients. Creativity may also be defined in terms of information and knowledge creation, presentation and transmission. By selecting different media of communication users were able to choose how much information was transmitted and what form it should take. Email enabled users to send asynchronous communication to a remote individual, or group, in written or pictorial form. Motion pictures and sound recordings could also be transmitted by this medium, though they were not as efficient unless used with a broadband connection. In comparison, NetMeeting facilitated the synchronous transmission of written and oral communication with the option of a video-link. Thereby, this creativity ideally promoted new ideas and thought processes as geographical dispersed individuals were able to collaborate together and exchange ideas and views.

Some of the literature suggests that the convergence of technologies and communication affect organisational cultures (cf. Fulk and DeSanctis 1995; Lewin, et al. 1999) by promoting connectivity. In turn, effective connectivity creates a sense of efficiency as work processes are assumed to have been improved, to be faster and more productive. At CommCo, the shared assumptions about technology liberating and promoting creativity in the work setting also involved a sense of connectivity, community and cooperation. People working in the case study organisation spoke about connectivity in terms of

extended networks, improved information flows through and within the organisation, and increased social interactions and exchanges supporting individual and collective work. In this sense, technology was facilitating trans-boundary communication in the way other literature suggests (cf. Hiltz 1994; Sproull and Kiesler 1991; Travica 1999). This shared assumption promoted a sense of inclusiveness and community, as everyone with access to the technology could be contacted easily. As an analytical tool the concept of a networked-structured organisation illustrates the culture and structure of an organisation that has achieved effective horizontal connections, but does not imply the end of hierarchy. At the time of the research, CommCo had only partially achieved the connective and collaborative possibilities of a network-structured organisation. For instance, the organisation to a large extent remained hierarchical even though some divisions operated as teams.

Finally, a fundamental element of the ethos of technology enthusiasts was the collective discussions of efficiency. If technology was thought to hinder work, communication and information flows then the implementation and application of technology would be regarded as unsuccessful at all levels of the organisation. Increased efficiency and productivity were stated to be the product of liberation, creativity and connectivity and this was evident in both the training and work setting of CommCo. For instance, employees tended to speak about technology as a tool for efficiency, as emphasised by an engineer:

"[we]...can be more responsive to work demands and priorities. No need to be interrupted when dealing with problems but can still remain aware of other people needing to contact you" (Wayne Thompson).

Understandings of efficiency were founded upon individual, team, departmental and organisational effectiveness and, provided that an individual could relate to one or more of these, then the ethos of technology enthusiasts could be further internalised. For example, if an individual believed that they were able to work more efficiently by employing NCTs, then the benefits could be felt by the individual who would, as a result, be more enthusiastic about the technology when talking about its capabilities and functions. In turn other members of their team might also feel this enthusiasm. The assimilation of the cultural theme of technological efficiency by employees at CommCo was exemplified by this engineer's endorsement of the relevant organisational dictum:

"...allows better, more efficient use of time or time shifting – CommCo terminology of work smarter" (Wayne Thompson).

This sense of organisational reality, captured by this dictum, was apparent in many of the narratives of the organisational employees at a conscious (explicit) and unconscious (tacit) level as discussed in chapters 5 and 6. Organisational members readily discussed their attitudes to work by referring to the organisational dictum and explaining with conviction the belief that technology had enabled them to 'work smarter' with less effort. This belief system was sponsored by senior management, but also adopted more widely by

organisational members themselves and is, therefore, in a sense created by the organisation.

It is important to recognise that this belief system could also be in contradiction to an individual's ideas about work while being endorsed as an organisational reality. People could accept that the implementation and application of NCTs was beneficial to, and constructive for, the others and for the organisation as a whole. However, scepticism could arise when asked whether NCTs were beneficial to the individual and his/her work role. On this basis, we can conclude that the dominant organisational culture regarding technology was widely accepted and internalised by members, but there was also evidence of some forms of distancing, resistance or even opposition to the ethos of technology enthusiasts. For instance, although it was evident that there was a strong ethos of technology enthusiasts at CommCo, employees were nonetheless wary of the benefits of technology implementation and application for them personally and in regard to their own work role (see appendix 14). It was this uncertainty and conflict of beliefs that establishes the foundation for the ethos of technology sceptics.

The Ethos of Technology Sceptics

The collective assumptions, ideas and values of the ethos of technology sceptics embodied a range of pessimistic and guarded attitudes and assumptions toward technology, and in the case study organisation these were expressed in several

strands of interpretation of technology. This ethos involves three forms of scepticism and doubt concerning NCTs within the organisation: scepticism about the applications of technology, scepticism regarding specific technologies and finally, scepticism concerning management rationales and motives for the implementation of NCTs. These forms of scepticism are characterised in this section, utilising the narratives of the organisational members.

As discussed in chapter 6, there were inconsistent and contradictory outcomes of implementing and employing technology and these were sometimes seen in terms of the incongruent capabilities and functions of communication technologies. The ethos of technology sceptics interacted with the dominant organisational culture alongside the ethos of technology enthusiasts. This helps to explain the varying expectations of technological implementation and application. The results of tranche 3 and 4 suggest that only five respondents stated that there were no disadvantageous consequences of implementing communication technologies.

The ethos of technology sceptics was transmitted and reinforced in similar ways to those suggested for the ethos of technology enthusiasts. For example, the experience of problems with technology implementation or functionality could nurture scepticism. This was evident in a delivery manager's discussion regarding his reluctance to use video-conferencing technology and resort to a more traditional form of communication:

"After one terrible meeting using the video-conferencing suite I gave up trying to use that technology and always try to conduct meetings face-to-face. It makes life simple" (Brian Dye).

In turn this action communicated a negative attitude and could influence other employees' expectations of the technology.

Different views on the employment and functionality of technology within the organisation were evident from my data, and were particularly explicit in the training setting. Those e-classrooms containing delegates who had little or no access to audio-conferencing, video-conferencing and NetMeeting were reluctant to utilise these technologies in the training setting. However, even those delegates that had experienced and/or employed NCTs still showed some reluctance to utilise the technologies, as they felt they were at odds with the effective organisation of a training setting. These negative attitudes were reinforced by delegate assumptions that CommCo was saving costs by hiring one tutor to teach geographically dispersed groups and that it was primarily an attempt by management to be 'technologically up-to-date', both of which were seen as incongruent to the declared aims and expectations of management. The declared management aims for the implementation and application of NCTs in the training setting were largely focused upon efficiency. For instance, a lesson taught by one tutor to many geographically dispersed classes meant that more people were able to take the course, and the use of downloadable material was intended to enable delegates to manage their work and learning simultaneously. The application of NCTs in the training setting was justified in terms that a large

number of employees would have up-to-date knowledge and skills in a shorter period of time than if the tutor had taught each class using traditional methods.

In the training setting no training was given in the employment of video-conferencing and audio-conferencing because the course mentors and management presumed that these communication technologies were readily employed in the work setting and as a result no training in their use was required. However, although audio-conferencing was readily available and used by line managers, it was rarely utilised by other members of the team, which meant that a large proportion of employees did not possess the knowledge and skills to operate this technology. In addition, those who had not employed audio-conferencing felt that, as they were in a training setting, they should be taught and not left to 'figure it out' for themselves. These concerns were also reflected in responses to the employment of video-conferencing, which was only a recent addition to the work setting, when it was deployed in the training setting. Few employees had had access to video-conferencing technology and they were negative about its employment in the training setting, as they did not know how to use the technology or understand its capabilities.

For managers the first priority of the course was to get the employees trained in new forms of technology to control the transmission of data, and hence address the need to develop employees' knowledge and skill in these areas. As an afterthought it was decided that the e-skilling course would also give employees the opportunity to learn and develop their communication technology skills. However, this idea was not an explicit part of the course and as a result of a

breakdown of communication it was not advertised as part of the course. As a secondary aspect of the course, it resulted in incongruent assumptions and expectations of the course between the managers, mentors, tutors and employees, and also contributed to unsatisfactory outcomes.

The training setting reflects the shared assumptions of middle management and non-management level employees that were held in the work setting and were more easily observed in the training setting because delegates were under pressure to complete certain topics during the one day so feelings were intensified. The ethos of technology sceptics was based upon the rejection of specific technologies, a sense of the intensification of work and information, the impersonal nature of the technology, and frustration and stress arising from the use of such technologies.

Firstly, there was a complete or partial rejection of technology, which was underpinned by sentiments of oppression and fear (cf. Deal and Kennedy 2001) and feelings of being controlled and watched (cf. Boden and Molotch 1998). Rejection of technology was not represented by an outright refusal to accept or utilise technology, but more by a suspicious attitude that had implications for the application of some or all technologies by these individuals. In some instances rejection was made explicit by, for example, an individual's preference to contact a colleague by telephone, not because of the type of response required, but because other technologies were assumed to be inconvenient. For instance, email was sometimes rejected as a medium of communication as a response could be delayed if the recipient had many emails to answer. It was also suggested that an

individual could feel more in control of the interaction than if it was mediated by technology. A senior manager articulated the resulting scepticism about the practical consequences of NCTs while justifying her avoidance of these technologies:

"Face-to-face meetings can sometimes be beneficial, particularly in complex situations, but over use of new technology can impede progress" (Elaine Talley).

Elaine Talley's justification for rejecting this application of technology itself appealed to recognised organisational objectives and was, therefore, not explicitly opposing these objectives. Instead broader organisational goals were being involved to sustain the ethos of technology sceptics.

The spread of mildly sceptical responses to technology within the organisation was made explicit by one professional:

"We all have not wholly got used to technology in the work place...[and]...we are still encountering problems when using some technologies which is annoying...I often waste time trying to figure out how things work or how they are meant to work" (Liam Hardy).

This implicit ambivalence about technology was supported by the belief that technology was being invoked by senior managers to prove that they were progressive and in line with competitors. When technology was implemented

with little or no technical support and training then it was seen as such a statement, and not as a tool to assist work processes. The appeal of technology was undermined and suspicion of technology was strengthened in a way that was summarised by a trainee:

"Technology should be used where needed, not for the sake of being modern" (Colin Reid).

This statement reflected a major source of scepticism concerning technology implementation and application. Furthermore it suggests that the ethos of technology sceptics was strongly embedded, as the assumptions and attitudes that defined this ethos had been internalised by an individual who had, at the time, only been an organisational member for nine months.

The scepticism regarding technology also appeared to be a response to the intensification of work and information management discussed in chapters 5 and 6. As we have seen, the role of technology in the case study organisation was widely regarded as pervasive, influencing and changing all aspects of work. However, there was also a general assumption that one aspect of this was that technology had intensified work, as the flow of information and communication exchange had been expedited. In contradiction to the organisational dictum that technology made work easier, employees tended to talk about technology creating more demands and higher expectations rather than simplifying work processes. As a result people talked about work intensification and the resultant overload (cf. Travica 1999). Within the internal environment of the organisation,

it was often stated that information overload had been created by poor information management at all levels of the organisation, particularly with the application of email technology. Organisational members at the lower levels of the hierarchy received in excess of seventy work-related emails a day, which inevitably creates more work. A sense of disorganisation and lack of control was widely experienced and internalised, which created an important element of the ethos of technology sceptics. From this perspective technology was discussed as a hindrance to work processes, and this in turn had negative implications for its application.

The way in which the technology was experienced as impersonal (cf. Deal and Kennedy 2001) also added to the ethos of technology sceptics and reinforced feelings of isolation and dehumanisation. As communication and information exchange was increasingly achieved through technology individuals became more remote, which added to their feelings of isolation and dehumanisation. Although the declared aim of the implementation and application of NCTs was to create, promote and sustain a deeper sense of inclusion in organisational reality, a sense of exclusion and isolation was often created. This sense of exclusion and isolation was in part a consequence of the uneven distribution and access to technology, as pointed out by a process manager:

"CommCo has only recently begun to practice what it preaches i.e. video-conferencing, working from home, flexible working etc. This should be promoted more. Escalated. Some people within CommCo still - hard to

believe but true! - have no regular easy access to email and the net. This is being addressed I'm assured, but is it quickly enough?" (Benson Alda).

This narrative captured some of the cynicism regarding technology implementation and application as it failed to live up to individual expectations and its potential promoted as by management. Limited or no access to technology created a group of organisational members who were unable to communicate, exchange information and knowledge, and interact with a large proportion of the organisation. This set of organisational members inevitably created their own methods of contacting each other, which contradicted the methods of work promoted and sought after by the organisation. In this instance, technology was not only rejected at one moment, but was likely to continue to be rejected by these members as other methods of exchange were becoming customary and preferred. Exclusion from the technology implemented in the organisation, particularly organisational intranets, also meant that individuals felt detached, as they did not have access to up-to-date information and knowledge circulating through the organisation. Detachment from the organisation could produce apathetic, isolated and unproductive workers, as they may not feel integral to the successful functioning of the organisation.

Collective feelings of isolation could also occur when organisational members did not possess the necessary skills and knowledge to operate the technology. The inefficient and inappropriate application of technology could result in negative attitudes, though in this context more training could potentially mitigate this source of dissatisfaction. This was emphasised by a professional when he

acknowledged that some people currently had insufficient training. For him this could be resolved by:

"Better training of people in netiquette and use of desk-top applications. On the latter point people are still struggling with Word, Excel, PowerPoint and email" (Liam Hardy).

When combined, shared feelings of isolation, exclusion and dehumanisation could create stress and frustration. In her research Casey (1999: 23) recognised these sentiments, "new information technologies can displace interpersonal contacts, and the technologies themselves can become a new site of tension and sublimated confrontation". The significance of the ethos of technology sceptics at CommCo suggests that Casey's characterisation of information and communication technologies in this regard needs to be taken further. The observational data from CommCo suggests that technological frustration and stress was a widely experienced and understood element of the ethos of technology sceptics. Tensions were created by both major and minor incidents, such as technical difficulties, viruses, multiple passwords, outdated hardware and software, incompatible software, slow connections, and inexplicable disconnections and shutdowns. A technical officer, who was a teleworker, summarised many of the difficulties he had had to overcome and his feelings on the situation by stating:

"...a degree of stress is experienced when the technologies don't live up to my expectations" (Cliff Robetts).

Frustration and stress was not only caused by technical difficulties but by poor implementation, application and knowledge of technology. As the speed of communication and information exchange had increased so had the expectations of the users. For example, users could become frustrated when a recipient did not respond quickly enough or with an adequate response. At CommCo, email was the main source of this tension, as exemplified by the comment of a trainee:

"Our reliance on email...it is a useful tool, but is used by some people as a delaying tactic" (Colin Reid).

This comment also implied that users sometimes sought to manipulate and/or control technology in ways that frustrated other users. These users, therefore, had to find ways of coping with this frustration otherwise the application of the technology would become counterproductive.

Additionally, inadequate knowledge and skills to use specific technologies could create problems. This was clearly evident in the training setting of the organisation. For example, delays in starting the training were created not only by technical difficulties but because delegates did not know how to use the technology. For instance, video-conferencing equipment was not turned on, audio calls were not answered and NetMeeting functions were ignored. This observed behaviour not only indicated a lack of communication technology knowledge but also indicated an active form of rejection of technology by the delegates. For example, this active rejection in the training setting was seen at the

Stafford e-classroom where the technology scepticism was explicit. As delegates became more frustrated with the technology during the course so the hostility towards these technologies grew. On the final day of the course in both e-classrooms the technology was set up and ready to go, but in this case delegates were, perhaps, motivated by the prospect of a short day.

Although the course was in part designed to train delegates in the employment of communication technologies, a number of users considered the training to be an interruption to work. This led one technical officer to remark:

"We spend more time learning computer skills than doing real work" (Edward Pryce).

So, on the one hand there were debates about not enough training and on the other hand it was believed that there is too much training. In addition to these debates more complex issues concerning training were raised: who was the training aimed at and what was the training designed for? If the e-skilling course is taken as an example of training within the case study organisation then training was seen as a means of maintaining up-to-date skills and knowledge. The knowledge and skills required by organisational members were identified by supervisors and management as was who attends the course and which tranche they would join. Those individuals who sought to go on the course were not necessarily enthusiastic about technology, a point indicated by the delegate's own aims for partaking in the course.

This section has explored the character and sources of the ethos of technology sceptics that coexisted uneasily with the ethos of technology enthusiasts at CommCo. However, although there is much evidence to support the existence of this ethos of technology sceptics within CommCo, technology is firmly embedded in the organisation. The following sections seek to explore the character and implications of the embeddedness of technology against the background of the competing ethoses. The next section analyses the effects communication technologies have had on communication and information lines by focusing upon email and video-conferencing technology. A further section explores the technologised structures of communication and information. The finally section examines social interactions and networks by exploring cultural isolation and cohesion. In this way, this analysis seeks to develop and consider accounts of the effects of technology on the social processes that form organisational life at CommCo

Technologised Communication and Information Lines

Communication and information lines are intrinsic parts of an organisational culture, affecting and influencing all aspects of working life and organisational reality. My analysis of the implications of technology implementation and application for the cultural features of communication and information lines is focused on their 'technologisation'. This builds on the argument that technology has transformed traditional patterns of communication, and has changed organisational cultures that are maintained by these communication patterns

(Deal and Kennedy 2001). Technologised communication and information lines are consequences of expanding human-computer interaction and increasing computer-mediated communications (CMC). CMC and the flow of information through and within CommCo will now be analysed using the key examples of the application of email and video-conferencing technology. These two specific technologies were widely applied in the case study organisation and are analysed here as instances of copresent, remote, synchronous and asynchronous communication and information flows. An exploration of email and video-conferencing technologies also highlighted the methods users employ to adapt their communication and interaction behaviours to communicate electronically (cf. Tidwell and Walther 2002).

Communication and information lines are central to the functioning of any organisation. Intra-organisational communication, that is communication lines within an organisation, create and recreate the social structure of that organisation (cf. Smircich 1983b). Both inter-organisational and intra-organisational communication can be formal, promoting work relations and networks, and informal, promoting social interactions and networks. Information lines define the paths in which data and knowledge are conveyed. Analyses of communication and information lines should depict a network or web configuration in which lines continuously transverse the organisational structure and are not limited to vertical or horizontal pathways. It is through information and communication lines that an organisation coordinates work, promotes innovation, supports knowledge management and sharing, and creates and sustains interactions and networks both social and work related. It is also through

these lines of communication that processes of competition, cooperation and exclusion are conducted. The existing literature suggests that an increase in computer-mediated communication and expansion of information lines can result in a process of depersonalisation (a method which disguises an individual's status) (Sproull and Kiesler 1986), deindividualisation (a behavioural complex that denotes less personal behaviour) (Travica 1999: 54) and dehumanisation (a blurring of the distinction between human and machine) (Lupton and Noble 1997: 83).

It is well documented that the employment of new technologies has affected communication (Barley 1990; Rockart 1998), informal and formal organisational structures (DeSanctis and Poole 1994), and information lines. Rice and Shook (1990) argued that technology implementation and application had had a greater impact on these features at executive level. Technology can link individuals, teams, departments and offices at various locations, which generate opportunities for increased coordination or electronic brainstorming, as suggested by Gallupe and Cooper (1993). Technology's potential to increased coordination is believed to result in increased communication (Cross, et al. 2002; Rockart 1998). Additionally, technology is seen as a new medium of inter-organisational communication put in place to increase communication and not to replace existing media (Contractor and Eisenberg 1990; Culnan and Markus 1987). However, further research has shown that while email may increase communication, as a result face-to-face communication dramatically decreases, creating an overall decrease in organisational communication (Sarbaugh-Thompson and Feldman 1998). Although innovativeness (McLoughlin 1999) and

new information (Sproull and Kiesler 1986) are argued to be a result of increased communication and coordination these processes may also be blocked or hindered by electronic communication. For instance, Bush and Frohman (1991) established that a network-structured organisation encompassing horizontal and vertical information flows supported innovation, but communication restricted to vertical lines blocked innovation.

Organisations such as CommCo, that are geographically dispersed and located in different time zones, depend heavily on electronic communication (cf. Nohria and Ghoshal 1997; Sarbaugh-Thompson and Feldman 1998). The employee's experiences and views about email and video-conferencing technology provide the potential to understand how communication and information lines have changed. These two communication technologies are utilised in this analysis as they clearly represent the differing levels of acceptance of communication technologies in the organisation. Although both technologies were considered to be problematical, email was widely used whereas video-conferencing technology was disregarded and rarely employed. This discussion analyses the supportive and sceptical ideas in play regarding the application of these communication technologies by comparing the congruent and incongruent conceptualisations deployed by organisational members.

Communication by Email

Communication by email transforms the work and social structure of organisations not only by changing the method of communication but also by

changing the type and the flow of information and communication transmitted. In CommCo, communication (formal and casual) and the transference of knowledge was predominately carried out through the application of email, which was widely employed by the organisational members at all levels. Assessment of the gains and disadvantages did not always correspond for the organisation and the employees. This technology was employed extensively to communicate and, even though it was highlighted to be problematic by those below middle management level, there was an overriding belief that it was a convenient method to communicate. The supportive and sceptical beliefs that were associated with email usage will be discussed in terms of the perceived advantages and disadvantages of the technology, which are then summarised in an analysis of the implications of email technology for communication and information lines. This analysis does have policy implications as it suggests that, to be effective, there needs to be a revision of the management of communication and information using NCTs at CommCo, particularly email.

Email technology was perceived to be advantageous for CommCo and its employees as it liberated organisational members from time and space constraints. In CommCo, the elimination of geographical constraints on work enabled some employees to opt to work from home and these people were defined as teleworkers. The mobile workforce equipped with laptops and remote connections via mobile phones were able to connect into the organisation's intranet and email system, which increased communication and established new information and communication lines and flows. There was some discussions at CommCo that the resulting sense of liberation could create a more contented and

productive workforce, promoting new, and increased, information and communication (cf. Sproull and Kiesler 1986). It was also highlighted that email changed the communication context: as status was not evident there was an equalising effect on communication. In a predominately male culture, female workers did not feel ostracised.

The dominant problem with email technology identified by CommCo employees was information overload, generated by an increasing number of emails received daily by organisational members. Information overload is often seen as a barrier to improving organisational efficiency (Kelly 2000), and this was evident in the experiences of employees at CommCo. Circulation lists and copy to (cc) functions created a mass of communication and information, much of which was not pertinent to all the recipients. This overload, and lack of control of the quantity of emails sent, raised questions about the quality of the communication and information distributed through and within the organisation. Although more asynchronous communication was taking place via email, actual organisational communication and interaction was low, as emails were left unanswered, deleted or deemed not relevant. In CommCo, it was assumed that information and communication was being passed on, but many of the organisational members did imply that they were selective as to which emails were read, and suggested that numerous communications were not even opened. Some of the employees suggested that many emails were being neglected, so in this respect this communication technology had become an inefficient and ineffectual method by which to communicate and transmit information.

Those interviewed at CommCo noted that email could also be problematic in other respects, as this form of communication could easily be misunderstood and as a result users could feel frustrated (cf. Markus 1994b). Email exchange between friends and colleagues, who were acquainted, could reduce confusion and misunderstandings, as knowledge of the sender made the email content easier to comprehend. For example, friends were able to decipher and differentiate between important and trivial information, and recognise a joke, which decreased the incidences of email content being misconstrued. Perhaps for these reasons, at CommCo email was believed to be an effective informal means of communication. However, formal and important information was believed by some to be more difficult to convey. Nevertheless, it was also found that email was used between individuals who had to communicate and interact with others that they felt uncomfortable with. In CommCo, email as a means of communication, therefore, allowed communication and information lines to be sustained even in difficult circumstances.

Additionally, communication by email intensified feelings of remoteness, creating a sense of isolation for some employees within CommCo. It was stated that these sentiments were the result of little or no face-to-face, or actual verbal, interaction and communication with people. This corresponds with the findings in the literature that individuals have little sense of who they should be communicating with, or how they should be communicating with one another, as there is a lack of social context cues that would usually guide a conversation, such as body language, eye contact, touching, word positioning and pauses (Boden and Molotch 1998; Tidwell and Walther 2002; Walther 1996). Email

communication creates a loss of social context cues as they are filtered out by the nature of the method (Culnan and Markus 1987; DeSanctis and Monge 1999; Walther 1996). In line with these findings, the experience of communication by email as rather impersonal was one theme identified in the employees' discussions at CommCo. Some researchers have also suggested that the speed of transmission and delivery of communication via email combined with the loss of cues also creates problems. Tensions are easily created as individuals do not reflect or pause to think about their responses, which can result in 'flaming' (Sarbaugh-Thompson and Feldman 1998; Sproull and Kiesler 1991). However, although two organisational members discussed the phenomenon of 'flame mail' it was not perceived to be a problem at CommCo, as it rarely happened.

The benefits and problems of email technology have implications for both communication and information lines, and have had a mixed effect on CommCo. It was felt that email has an 'informating capacity' (cf. Zuboff 1988) ensuring that departments and teams receive the same information, and that new information was produced and transmitted, which created a sense of empowerment for some individuals. The allocation of work, deadlines and projects could be monitored, controlled and collated by technology, creating an 'electronic mediation of work' (cf. McLoughlin 1999). Team and departmental communications were now managed and mediated via technology, altering the practices and processes of management work. There is much research to suggest that email supports managerial communication (Markus 1994a; Rice and Shook 1990). In CommCo this was also apparent, as managers applauded the benefits of email, such as fast communication and the ability to easily and efficiently

disseminate relevant information. However, these same features may in part explain the feelings of information overload of those lower in the organisational hierarchy. Consequently, managerial work had now taken on a new role of information and communication management, which has had repercussions for individual organisational members. This management of information and communication entailed coordinating, collating and transmitting data to the relevant personnel.

Although it has been suggested that email has evolved into an interactional form of communication (cf. Boden and Molotch 1998) within an organisational environment, this was not the case at CommCo. On the one hand, many managers and senior managers stated that email was principally employed for work related activities. On the other hand, a few non-management level employees stated that the high volume of emails meant that informal communications were classed as low priority and could ultimately be overlooked. Certainly, informal communication was most evident in the open offices and the informal areas of the organisation such as the company restaurant and coffee bars. When I had lunch in two of the employee restaurants, they were well used and there was a high volume of conversations, which did not appear to be work related. Also during my observations of an open place office, the conversation was not always pertinent to the work in hand and individuals were moving about and passing documents around. This suggests that any informal conversations via emails had not displaced the pursuit of face-to-face informal conversations and the need for copresence. However, a more detailed study of

email usage would be needed to determine how far it involved a more informal interactional exchange.

Communication by Videoconference

Video-conferencing technology enables face-to-face communication and interaction and attempts to simulate this form of communication. It is believed that the capability of this technology to enable two or more remote individuals to see and hear each other is more valuable than just audio communication (Sellen 1995). It is important to note that this technology addresses the perceived drawbacks of email technology, such as the loss of context cues and the need for copresence. However, video-conferencing, although multi-functional and the most advanced of communication technologies, invoked a negative response amongst most of the CommCo members who participated in the study. Compared to email technology, video-conferencing was rarely used and was really only employed by those higher up the organisational hierarchy.

The implementation and application of video-conferencing technology at CommCo is analysed here as an important contrast with email technology. Unlike email technology, video-conferencing technology had not been widely implemented, applied or accepted within the case study organisation. In particular, the application of conferencing technology was contentious in the training setting. It was also regarded as problematic in the work setting although its application there was not as controversial. The disadvantages of the employment of conferencing technology were mainly discussed in reference to

the training setting, as its problems were most evident in this setting. However, the delegates drew upon their experiences of video-conferencing technology in the work setting. Delegates in both e-classrooms were very verbal about video-conferencing technology. Most individuals showed some form of frustration with the technology, which others took to be permission to complain. The complaints also prompted discussions of how the technology should have been set up, used and improved, which also applied to the application of video-conferencing technology in the work setting.

In principle the face-to-face interaction or copresent communication provided by the video-conferencing technology allows for simultaneous communication and spontaneity, as individuals can interrupt and join in conversations. Although this is possible, to some extent, using video-conferencing technology, normal conversational rules do not apply, as the speed of face-to-face communication cannot be replicated, at present, by this conferencing technology. For instance, a different set of cues need to be used to signal agreement, disagreement and the need to speak, as rapid movements and quiet murmurs are often missed by this technology (cf. Dustdar and Hofstede 1999). These features are taken up in the literature by imploring the need for a 'meeting etiquette' (Merrick 1996b) and a framework of floor control (Dustdar and Hofstede 1999) when employing this technology.

These problems were evident in the use of video-conferencing technology in CommCo's training setting and as a result, communication often became stilted as each individual waited for the other to finish speaking and whilst they waited

their turn to speak. In the training setting, the video-conferencing technology also highlighted issues of control. Although no direct manipulation (for example directing and focusing the camera, and moving the microphone or taking control of the video remote) of the video-conferencing technology was found in the training setting, it was obvious that the delegates in the remote e-classrooms were unable to fully participate in the class or subsequent discussions. These delegates were marginalised and felt a lack of control over the situation because they were effectively unable to participate in the e-class. From my observations the delegates who had the tutor present in their e-classroom were able to control the class to the extent that any student is able to rule and influence a tutor. For much of the class discussions the e-classroom with the tutor present maintained floor control (cf. Dustdar and Hofstede 1999). In the remote e-classrooms, where the tutor was not present, control of the floor was left to those with loud clear voices or to those who were in direct view of the camera. Then a few individuals with the skills and knowledge to operate the video-conferencing technology operated and controlled the camera in order to attract the attention of the tutor by aiming and focusing the camera on themselves. These knowledgeable individuals monopolised the video-conferencing unit and fortuitous access was gained for a few. In the e-classrooms where none of the delegates knew how to operate the technology there was ineffective access to the technology for the whole group. Therefore, it seems that the capabilities of communication technologies enable easier manipulation and control of information and communication than in traditional training settings.

Other research has suggested that the elimination of touch (Merrick 1996a) and lack of intimacy (Corbett 1997) of conferencing technologies also make remote conversations difficult. Sellen (1995) concluded that video-mediated communications were more formal than face-to-face communications as there were formal handovers, people were introduced before they spoke and less simultaneous speech occurred. These findings are consistent with the evidence of the present research that participants felt that communication had been 'technologised' with the implementation, application and integration of NCTs. At CommCo this 'technologised communication' involved the centrality of the technology as an instrument of communication. The technologisation of communication, therefore, meant that communication had not only been expanded, but the conditions of interaction had been altered as time and space had been restructured. This conceptualisation provides the basis of our understanding of the effect of NCTs on work processes at CommCo.

When compared with email technology, video-conferencing nevertheless has important advantages, which makes it more difficult to comprehend the persistent counter-culture surrounding its implementation, integration and application at CommCo. Current research has suggested that the greatest benefit of video-conferencing technology is that it enables cooperative working practices (cf. Heaton 1998). 'Virtual teams' (cf. Dawson, et al. 1998; Jackson 1999a; Merrick 1996a; Warkentin and Beranek 1999) can consist of geographically dispersed individuals, which makes it possible that individuals can be chosen not on their proximity to the remainder of the team but on their relevant skills and knowledge pertinent to a project.

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Part of the advantage highlighted by this literature is that, as a consequence, travel costs are reduced. Indeed this is believed to be the principal advantage by Merrick (1996) and Walther (1996). This emphasis was shared in the judgement of many CommCo members, though some painted a broader picture. For example, a technical officer highlighted new working practices and their influence on his work:

"My work has changed...personnel at various remote sites can now work as a virtual team, which I become part of, even though we will probably never meet face-to-face. Its different" (Grant Davidson).

However, most organisational members stressed the savings on travel cost, rather than the positive benefits of virtual team working. It is also worth noting that the application of video-conferencing technology in the training setting was aimed at creating an interactive exchange of information, as in teamwork, but this was not achieved. Existing literature suggests that, although video-conferencing can bring together virtual teams, which are believed to be advantageous for organisational work processes, it was often difficult to create team building (Merrick 1996a) and effective communication. For example, the reduction in context cues can make it difficult for problems to be solved and decisions to be made (cf. Dustdar and Hofstede 1999) and consequently virtual team working is not as beneficial as it seems as was the case highlighted by some CommCo employees.

It is evident that at CommCo video-conferencing technology was in no way experienced as a normal means of communicating between team members and departments. Video-conferencing technology addressed the need for copresent interaction and synchronous communication that was lost in the application of email technology. Video-conferencing allowed face-to-face interaction and could simulate forms of communication, but delays in transmission and lack of direct eye contact still created difficulties. Although this was observed in the work setting, it was particularly evident in the training setting and resulted in ineffective interaction and communication in both settings. However, many employees stated that broadband transmission in these settings would have ensured that communications were not delayed in order that communication in this respect would have been similar to, and comparable to, copresent communication.

It was evident, then, that the employment of video-conferencing technology in the training setting was very controversial. During tranche 3, video-conferencing was used to train and teach individuals, as the tutor was in most instances at a remote e-classroom. As copresent communication could not be simulated by the technology delegates found it difficult, and often frustrating, trying to attract the tutor's attention, as this was for most of the session focused on the local/present class and not the remote classes. For tranche 4, video-conferencing technology was only used for communication between delegates and mentors each week, and not for training purposes. The different applications of video-conferencing for tranche 3 and 4 created a shift in the perceptions of this technology. Tranche 4 delegates were more enthusiastic about the application of video-conferencing

technology, and consequently it was then considered to be advantageous to the course and its objectives. This shows that the evaluation of this technology was quite sensitive to its perceived suitability for the role it was envisaged to play in the learning process. However, communication between delegates and mentors still took place via email technology, as this was defined as more conducive to the role and work of the course mentors.

The use of video-conferencing technology in both the work and training settings of the case study organisation represented an additional way in which communication and information lines were technologised. Communication and interaction mediated by this technology were inevitably affected. Dustdar and Hofstede (1999) suggest that communication effectiveness and style is changed when mediated by conferencing technology. The present research suggests that different types of communication, such as copresent, remote, synchronous and asynchronous, may be affected differently by the application of communication technology, and this issue will be addressed further in the next section.

Copresent, Remote, Synchronous and Asynchronous Communications

Many writers have found differences in communication if both communicators are present or remote from one another (Boden and Molotch 1998; Culnan and Markus 1987; Sproull and Kiesler 1986; Walther 1996; Warkentin and Beranek 1999; Zuboff 1988). Copresent and synchronous communication represent traditional forms of communication and this research suggests that communication technology needs to be made compatible with those forms of

communication in order to be more readily accepted in organisational settings such as CommCo. In contrast, remote and asynchronous communication define communications between geographical dispersed individuals that does not take place at the same time, for example an email communication is asynchronous as it is not part of a two way conversation. The two technologies analysed in the previous sections represent these different types of communication that can take place utilising communication technology. However, these types of communication are not restricted to these recent communication technologies, as the telephone can be defined as a remote, synchronous communication method.

There is considerable research which claims that copresent, synchronous interaction and communication promote small talk (Boden and Molotch 1998; Sarbaugh-Thompson and Feldman 1998), and are richer (Boden and Molotch 1998; Dawson, et al. 1998; Sproull and Kiesler 1986). Consequently, copresence is believed to be more efficient, as it allows individuals to move rapidly through streams of turns than does remote, asynchronous communications. This may in part explain an individual's need for copresence (Sarbaugh-Thompson and Feldman 1998) and the 'compulsion of proximity' (Boden and Molotch 1998).

Certainly in CommCo organisational members preferred copresent communication and interaction. However, CommCo managers were found to use copresent communication more than those lower on the organisational hierarchy, a feature of organisations also noted by Boden (1998) and Zuboff (1988). While such forms of communication and interaction have been overtaken, and are increasingly being controlled and maintained by communication technologies,

organisational members at CommCo had a stronger preference for face-to-face contact. For example, a technical officer extolled the benefits of face-to-face communication:

"A face-to-face session is much more productive than an email or video-conference" (Edward Pryce).

Another technical officer also expressed his preference for copresent communication, and emphasised the impersonal nature of asynchronous communication via email:

"Much easier to contact people within the company. However, emails are a bit cold and I don't mean cool! It's still nicer and sometimes faster to speak to people on the phone from time to time" (Neil Rogers).

As suggested here, and as articulated in the ethos of technology sceptics, other methods of communication were employed by organisational members in response to individual dislikes of communication technologies. These decisions were based upon the drawbacks of electronically mediated communication, such as information overload, fewer information cues and frustration. According to CommCo employees the technologisation of communication and information lines had produced too frequent, impersonal and sometimes ineffective communication. Potentially, such preferences could prompt choices that would ultimately circumvent such new communication technology applications. However, in CommCo it was believed that organisational communication and

information exchange could be improved by increasing socialisation opportunities while replacing other face-to-face interaction with computer-mediated communication (see also Meyer 1991). Implicit in this view was the suggestion that social interactions and networking could also be technologised in the same manner as communication and information lines, a process which is discussed after the next section.

Technologised Structures of Communication and Information

Organisational communication and coordination facilitate, and are essential to, contemporary organisational structures that are based upon extensive communication, especially virtual organisations (Rockart 1998). However, our analysis must also take into consideration that organisational structures are constantly being created and recreated by organisational communication (Smircich 1983c). Advances in communication technologies further complicate this relationship. In the light of such considerations Kelly (2000) suggests that an organisation constantly needs to change its structure, culture, strategy and goals to improve organisational communication.

How, then, did CommCo fair in these respects? An expansion of communication and information lines was evident in the case study organisation. However, it is has been suggested that computer-mediated communication does not act as a substitute for traditional organisational communication, but only supplements this communication by expanding it (Hiltz 1984). Therefore, the analysis of

organisations as structures of communication and information must not be limited to organisational communication created by the application of communication technologies, but should include face-to-face communication and interaction. As has been seen at CommCo, many employees stressed the importance of face-to-face interaction and communication, and the effects that technology had exerted on those exchanges. It is thus necessary to study CommCo's communication structure and its construction of an electronically connected workplace to explore the character of technologised organisational structures. Throughout this section the conclusions drawn from the data collected in the case study organisation are related to existing literature on these issues.

With the advent of information and communication technologies, organisational communication can be defined in terms of networks, the direction of communication and information, and channels of information (Culnan and Markus 1987: 436-438). This conceptualisation in terms of networks also highlights the possibility of increased and extended lines of communication with and without the application of communication technologies (see Hiltz 1984). The application of NCTs in CommCo provided possibilities for coordination, collaboration and sharing between organisational members. The employees suggested that the increased collaboration and information sharing had encouraged organisational communication through discussion and the exchange of ideas and knowledge. These findings support the conclusions of previous research (cf. Miles and Snow 1986; Sproull and Kiesler 1991).

A feature of communication structure defined by Culnan and Markus (1987) encompasses the direction of communication within and through an organisation. In addition to an analysis of the direction of communication, the objectives of communication need to be examined. For instance, it is important to distinguish between information that involves instructions, demands performance targets and that which invokes queries, responses and delivery of outcomes. As suggested earlier, CommCo's networks and application of communication technology facilitated the expansion of information and communication lines. It was these networks that highlighted the lateral and vertical directions of communication and information through and within CommCo. By defining organisational communication in this way, it was suggested that there is a strong relationship between structure and communication within an organisation.

In CommCo, it was very clear that there was still a large proportion of the workforce who did not have access to the intranet or email. There were also individuals who were overwhelmed by the amount of information available via the intranet, the Internet and sent by email, so they did not always access the information. The volume of information forwarded by email in the case study organisation also suggests that communications were not always read in any depth simply because there was too much to manage and read in a work day without it overtaking everyday work tasks. Paradoxically this suggests that less communication could be better for an organisation such as CommCo, because there was considerable tension and frustration surrounding the implementation and application of NCTs that enabled increased information and communication flows.

At CommCo, it can be argued that computer networks were both replacing and changing the work of middle management, as they became channels of information, and this was evident from the management narratives (see also Davidow and Malone 1992; Zuboff 1988). Thus in my case study, it was apparent that communication and information flows had altered. However, while traditional lines of information and communication may have altered in CommCo, there were still norms, or rules of communication, defined by the organisational cultures that were adhered to. Although individuals can circumvent their supervisors and communicate directly with senior management, it was not put into practice, as a hierarchy of communicating still exists at CommCo. Thus several non-management level employees claimed that information and communication was expected to be channelled through supervisors and team leaders. When questioned, many employees were unaware of those in control of their division, as they predominately communicated with team members or their counterparts in other divisions.

CommCo's organisational structure and form may at present be going through a process of transformation and restructuring, as many organisations are. The implementation and application of information and communication technologies in CommCo have created a communication-connected workplace. The advantageous and disadvantageous capabilities and functions of communication technologies have been incorporated in the culture and structure of the organisation, each compensating for the others' inadequacies. For instance, organisational members and teams have become geographically dispersed which

has weakened the cohesive nature of culture. Communication and social interactions have become technologised, dehumanised and depersonalised. In CommCo it was evident that the application of NCTs had enabled new connections to be created. These new connections, or communication and information lines, according to employees, were to create a cohesive organisation of which they were part. In this sense, then, a cohesive technologised structure can be seen to be compensating for damaging effects of technology application on organisational cultures.

Technologised Social Interactions and Networking

The implementation and application of NCTs at CommCo has expanded communication lines and interaction, which has reinforced this network. It was through this network that information was transmitted, and that the significance of information was interpreted. However, Deal and Kennedy (1988) argue that a hidden hierarchy constitutes the cultural network and this was also evident at CommCo. A hidden hierarchy defines communications and information that is only transmitted to certain individuals in the hierarchy. Communication and information lines in CommCo were more often downward and vertical, which meant that the quality and quantity of information received was dependant upon, or influenced by, the receiver's hierarchical position in the organisation.

In opposition to the cultural network, the implementation and application of technology has generated individuals who feel isolated from the organisation and

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its cultures. In CommCo, face-to-face social interactions were reduced with the application of NCTs and individuals spoke about being isolated and dehumanised. Email, for example, reduced social interaction in CommCo. Some informants suggested that it was often easier, and more convenient, to communicate via email technology than to arrange a copresent interaction, which parallels the findings of Deal and Kennedy (1988). Work processes were altered, and work was intensified which also resulted in reducing social interactions and networking at the cost of detached and isolated organisational members. However in CommCo, there was a stronger influence of cultural cohesion and cooperation created by communication technologies, than of isolation, and this feature is discussed in detail in the final section of this chapter.

Summary of Organisational Culture and Structure: Reconstructing the Practice of NCTs

It is evident from comparing the interpretations of the implementation and application of communication technologies that CommCo had a powerful culture that transcended geography and organisational hierarchies. Both the 'technology enthusiasts' and 'technology sceptics' ethoses were evident in geographically dispersed departments and offices, and at different levels of the hierarchy. The culture of communication technology represented 'technologised' elements of communication, information, social networks and interactions. In CommCo the implementation, application and integration of NCTs have not only altered patterns of communication but have expanded face-to-face communication, and

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transformed the structure and context of those interactions (see also Deal and Kennedy 2001; Mackay 1995). It is essential to highlight that people perceive themselves to be communicating with others even if they are utilising email and never actually verbally conversing with that person or meet them in person.

By recognising two coexisting framings in CommCo, the ethos of technology enthusiasts and the ethos of technology sceptics, an understanding of the implementation and application of technology can be gained. The ethos of technology enthusiasts, which was in alignment with the main aims of the organisation, elucidated the technological narratives and experiences of organisational members. In contrast the ethos of technology sceptics represented those that were unconvinced by the potential benefits and advantages of technology that were advocated by the organisation. These framings were not distinct or independent of one another but clarified the assumptions and values that individuals in the organisation may hold. An individual did not automatically subscribe to one ethos but throughout their organisational life experienced elements of both ethoses. It may be suggested that it was hard for management to eradicate the ethos of technology sceptics, even though it could be disruptive to organisational goals, because it was not explicit for continued lengths of time. For instance, an organisational member could regularly utilise email technology and appreciate its connectivity capabilities, but could also experience frustration at its misuse by others. This highlights how the ethos of technology enthusiasts and ethos of technology sceptics could coexist, neither dominating at any particular instance.

Organisational members might not acknowledge the existence of the ethos of technology enthusiasts and the ethos of technology sceptics but both played a fundamental role in maintaining a progressive and competitive organisation. The ethos of technology sceptics could be seen as a hindrance to the implementation of technology but could also highlight application problems, user difficulties, identify the need for training and demonstrate where technology was required or needed to be upgraded. It can be suggested that, when these issues are addressed, technology implementation and application can be improved. The creativity created by technology application creates new ways of working and may also show how technology implementation can be improved as part of ongoing technological development and progression. Also, the internalisation of technology values creates a positive environment in which to employ technology.

Chapter 8 – Conclusions

This chapter reviews and highlights the conclusions that have been identified in this thesis. Firstly, as a prelude to these conclusions, I will characterise the process of 'technologisation' and its role in my understanding of the implementation and application of new communication technologies (NCTs). This will be followed by a brief summary of the transformations of CommCo's structure and its culture. Secondly, the patterns of interruption, extension and alteration of information and communication through and within the organisation, explored in chapter 5, are summarised. Following this, the ethos of technology enthusiasts and the ethos of technology sceptics are re-examined, drawing upon the arguments of chapters 6 and 7. The final conclusion of the thesis focuses upon the context of technology implementation and application, and the possibilities for innovative structures and cultures. This is linked to an assessment of arguments about the network-structured organisation. Finally, by reflecting upon the research and its findings, the possibilities for future research on NCTs are discussed.

Over the course of the thesis I have argued that the integration, implementation and application of NCTs has transformed the cultural elements, such as communication, information flows and social relations, of the case study

organisation. A recurrent theme in this thesis is that these elements have changed because organisational cultures and structures have become technologised. By this I mean that technologies have become integral to these cultures and structures rather than separate and external influences. 'Technologised culture' defines the centrality of technology within a specific context. I believe that an appreciation of this technologisation of organisational culture is essential to our understanding of the role of new technologies in organisations like CommCo. This comprehension provided a basis on which to explore the effects of technology implementation and application on the organisation of work (who manages and controls work and how work is shared) and on work processes (how work is executed). An account of these organisational practices was developed through the interpretation of employee narratives.

It is evident from these narratives that the implementation, integration and application of NCTs have transformed work processes and practices in the case study organisation, and as a consequence technology implementation and application have transformed departmental and organisational structures. Innovative organisational structures, and the possibilities for further developments, have been enabled and sustained by the implementation and application of NCTs. In CommCo, the departments and divisions are structured into teams, and managers organise and control the work of those teams. Innovative working practices are based upon new methods of communicating and interacting with work colleagues, and new ways of organising and processing work. Also, organisational members have, and believe that they have, more autonomy in certain aspects of their work. For instance, organisational

members can work independently from others as information is readily available electronically, and the flexibility of work location and communication promotes a sense among employees that they control their work schedule. However, employee workloads are organised, managed and controlled by team leaders and senior management so organisational members are not as autonomous as they sometimes stated. Work intensification and stress were also common themes in the narratives of the organisational members. These were seen to reflect both the escalation of work and targets, which were underlined by the monitoring of performance by supervisors and the tighter integration of workflows through the technologised workplace. The pressures of work, evident in the case study organisation, contrast sharply with idealised accounts of autonomous working practices. The possibilities of management monitoring also question how autonomous workers can actually be and the extent of these working practices in an organisation where monitoring and reporting is standard practice.

Nevertheless, these working practices have altered the traditional hierarchical structures where communication and information was channelled down the chain of command and individuals were controlled through a succession of managers and supervisors. NCTs have enabled these structural changes by electronically connecting organisational members and facilitating the easy transfer of instructions and information. These electronic network connections have, therefore, extended communication and information flows through and within the organisation. The teams, departments and ultimately the divisional units have become more autonomous, controlling their own work and the application of NCTs, and this in turn has changed the wider organisational management

structure. Divisional units are further joined together through computer networks in order that information and knowledge can be shared. Organisational restructuring has enabled and been enabled by transforming information and communication lines.

These transformations have highlighted new understandings of the effect of NCTs within an organisational context. In summary three conclusions can be drawn from the thesis: firstly, information and communication through and within the organisation has been altered and extended but also interrupted; secondly, the positive ethos and a negative ethos regarding NCTs coexist within the organisation; and finally such differences in the context of technology implementation as that between work and training settings influence the specific forms of new communication technology application and the ways in which organisational members respond to these applications.

Altered, Extended and Interrupted Information and Communication Flows

The first conclusion drawn from the research highlights how the flow of information and communication through and within the organisation has been altered and interrupted. Information and communication lines are fundamental elements of innovative organisational structures and forms. As organisational structures are constantly evolving they are maintained by the application of NCTs. This application of NCTs enables networks of information and communication through and within the organisation to be created, and represents

one way in which the flow of information and communication has been extended. The implementation and application of NCTs in CommCo has transformed the methods, quantity, connectivity and direction of communication and information flows.

Fundamentally, technologised forms of communication and interaction have displaced existing information and communication flows, so that the changes involve both the alteration and interruption of such flows. These flows have been altered as the method of communication and the method of transferring information have been transformed. Information is transferred electronically and instantaneously. Also, information and communication flows have been interrupted as organisational members with no access to the company intranet and the email system were excluded and marginalised. Many informants alluded to the dramatic changes in the methods of communication, which have been enabled by technology. The methods of communication and interaction were found to be very different for management and non-management level employees.

Senior management were more often observed interacting and networking through traditional methods of communication. For senior management these forms of interaction were more accepted as they were seen as conducive to their work. In comparison, middle and non-management level employees were more likely to employ NCTs to communicate, interact and transfer information. Middle and non-management level employees were more constrained by their work schedules and the deadlines set by senior management. In this context it

was widely believed that communicating and transferring information was faster through the application of NCTs. However, this resulted in both positive and negative responses to the employment of NCTs, the character of which is discussed in detail below.

NCTs enable possibilities for coordination, collaboration and new connections. NCTs that are employed to create a network have resulted in greater connectivity and an increase in communication and information flows. As I have discussed in chapter 5, the increased and extended flow of information and communication is not simply a consequence of the implementation of NCTs, but marks a shift in management work. Middle managers stated that the majority of their work was to collate, organise and transmit vast quantities of information and communication. This suggests that, as a product of greater connectivity, the directions of communication and information have been altered. The employment of NCTs has increased the scope for non-hierarchical communication (for example lateral or horizontal communication). Furthermore, communication and information lines are constantly being altered and extended, as they are part of an evolving organisational structure.

These examples of the alteration and interruption of information and communication flows define the process of technologisation. The concept of technologised communication, as examined in chapters 5, 6 and 7, indicates that the expansion of communication and information lines has depended upon the embedding of NCTs. This process has also characterised the changes in the conditions of social interaction and networking. The possible technologisation of

these cultural elements is a consequence of the ways in which NCTs provide a restructuring of time and space. For instance, the application of NCTs negates the need for physical proximity to communicate, so computer mediated and remote interaction and exchanges have become the norm in the work settings of CommCo. The speedy transmission of communication and easy access to a vast quantity of data underlines the possible capabilities of NCTs, for which the process of technologisation becomes both cause and consequence. Many of my informants believed that when NCTs were applied effectively then their full potential could be exploited. However, this perspective of NCTs implies that there may be difficulties when implementing NCTs within an organisational context, as lack of training and understanding about technology may hinder the effective application of that technology. These difficulties may result in mixed responses and reactions toward NCTs.

The implementation and application of NCTs in an organisational context, such as that of the case study organisation, has had unintended consequences and revealed unanticipated possibilities and this has resulted in a variety of responses and attitudes toward technology. The positive and the negative responses were examined in chapters 6 and led to the discussion of the ethos of technology enthusiasts and technology sceptics in chapter 7. In the case study organisation, the themes of working smarter, fast-talking and the autonomous and flexible worker represented the positive responses of organisational members to technology. These responses were found to be supportive of technology implementation and application, embracing its integration. Whereas the themes of information overload, more work and work more, and 'dehumanising' and

isolating the worker characterised the negative and sceptical responses toward technology in the organisation. These responses and attitudes encapsulate the two ethoses, and are in turn influenced and constituted by them. It is these responses that lead to the second major conclusion of this thesis.

The Ethos of Technology Enthusiasts and the Ethos of Technology Sceptics

Supportive and sceptical ideas regarding the implementation and application of NCTs in the case study organisation are evident when the management rationales for technology (discussed in chapter 5) and the understandings of non-management level employees (explored in chapter 6) are compared and contrasted. As outlined in chapter 6 specific communication technologies have different capabilities and functions, and the users of those technologies have varied expectations and assumptions concerning such attributes. It is the differences and inconsistencies between these expectations that provide the basis for the two contrasting ethoses in the case study organisation: the ethos of technology enthusiasts and the ethos of technology sceptics. These ethoses define the dominant organisational and employee narratives about NCTs at CommCo.

Individual organisational members do not subscribe to one ethos but may manage elements of both and may subscribe to one ethos in a particular context. These ethoses represent how different elements of the technologisation of organisational cultures may be internalised, and to what extent they may be internalised, by organisational members. Overall, then, the case study

organisation has been characterised by two contemporaneous ethoses, which represent positive and negative attitudes toward the use made of technology. These ethoses coexist by challenging the existence of the other and by offering contrasting assumptions and viewpoints. For instance, the capabilities and potential of NCTs are widely experienced and accepted as positive in CommCo, but individuals still have reservations and may experience scepticism.

The ethos of technology enthusiasts represents the views of organisational members when, and the extent that, they are positive about the implementation and application of NCTs. This ethos focuses upon the synergy of technology and the mutual gains of its employment. When the employee narratives were analysed three positive coexisting assumptions and beliefs about NCTs were highlighted and these were examined in depth in chapter 6. This ethos encompassed examples of individual empowerment and autonomy whereby employees talked about being liberated by the ability to work from any location and to work within a team. Technology enthusiasts also extolled the virtues of networking and extended communication lines that had been enabled by NCTs. Increased work productivity and efficiency were also highlighted by the technology enthusiasts, and this reflected the official organisational rationale for technology implementation portrayed in the slogan 'work smarter not harder'.

Within the work setting the attitudes and assumptions of the ethos of technology enthusiasts were widely shared. It can be argued that the integrative character of this ethos is relatively successful and in accordance with the dominant organisational culture. However, this ethos is not exhaustive and one possible

way to understand an alternative is to consider an ethos that opposes or contradicts it and thereby identifies another level of technology internalisation. Levels of internalisation are defined by the extent to which an individual embraces, adopts or rejects the dominant paradigm. The opposing, negative and cynical responses toward the implementation and application of NCTs are defined as the ethos of technology sceptics, which encompasses different levels of technology acceptance and rejection.

The ethos of technology sceptics is characterised by different strands. These strands represent the varying levels of scepticism toward technology that organisational members have articulated. The disadvantageous consequences of the implementation and application of NCTs identified in chapter 6 in part explain and justify the existence of negative attitudes toward technology in CommCo. Elements of this ethos can alert the organisation to the limitations and failures of NCTs within both the training and work context. For instance, when the negative responses to the e-skilling course were examined, it was found that video-conferencing technology limited the interaction between the remote tutor and the delegates. On the one hand, this ethos has negative affects for the individual and for group cohesion, which to some extent results in inefficient work practices and the inappropriate use of technology. On the other hand, the negative consequences of technologised work practices influence and reinforce the ethos of technology sceptics. Therefore, the ethos of technology sceptics is both the result of negative experiences of NCTs and a cause of negative attitudes toward NCTs.

The first strand identified is in opposition to, and a critique of, the ethos of technology enthusiasts. It is characterised by the belief that the application of NCTs means working harder as well as smarter. Therefore, the gains for individuals in using the technology are more questionable as they still have a heavy workload. Although work intensification is seen as inevitable, it is still a site of contention between management and non-management level employees. Also, technology is believed to be stressful and frustrating when it fails to meet expectations. However, the individuals who have internalised these beliefs may be reconciled with the ethos of technology enthusiasts as further training, increased technical support and the implementation of technology in consultation with employees may change such negative attitudes. Negative attitudes are promoted further when organisational members do not have access to a computer and are excluded from the communication and information transmitted on the company intranet and via the email system.

Closely linked to this first strand is the critique of management's motives for technology implementation that characterises an alternative strand of the ethos. It is founded upon the strong belief that technology has been adopted for the wrong reasons, such as to maintain the organisation's appearance of being up-to-date. The e-classrooms were seen as an attempt to be up-to-date. Many delegates could not understand why they had to come into an e-classroom in the first place as the course material was available on the company intranet and they could have completed the course in the office or at home. In the training setting the implementation of NCTs was also considered to be part of a cost saving exercise. For instance, video-conferencing technology was assumed to have been used to

save the organisation the cost of employing several tutors, as the seminar of one tutor could be transmitted to several e-classrooms simultaneously. Thereby, this strand epitomises the belief that management has implemented technologies in the wrong places for the wrong reasons.

The final strand of the ethos of technology sceptics represents a more cynical attitude regarding the implementation and application of NCTs. There is a strong conviction in CommCo that NCTs have been implemented and used for the wrong tasks. This is illustrated by the disadvantageous consequence of information overload (identified in chapters 5 and 6), which is created by the poor use and management of email technology. In the training setting, this aversion or negativity to technology was further exemplified by delegates who refused to switch on the video-conferencing units and answer the audio-conferencing units at the start of the training sessions. Organisational members disliked the negative consequences of the employment of NCTs and as a result they were selective about their employment of specific technologies. This selectivity can in some instances be seen to impede management efforts to move to more technologised work practices, as individuals communicated by traditional methods of communication, which senior management considered to be time-consuming and less constructive. However, even though technology sceptics have created a culture in which it is acceptable not to utilise a specific technology for a task, they still apply NCTs in their daily work. Therefore, organisational structure as an external force is seen to be acting upon these individuals, influencing them to use the technology and questioning the extent of their autonomy.

To summarise, both the positive and the negative assumptions regarding NCTs were observed in the training and work settings of the case study organisation. These contrasting ethoses have effects on an organisation's culture and structure as they are embedded and articulated in and by the organisational culture and structure. Management and non-management level employees articulate these ethoses in different ways. For management the effects of these ethoses were expressed in terms of work productivity, efficiency and organisational objectives. Non-management level employees expressed their attitudes toward NCTs in terms of their experiences of NCTs. The two ethoses are essential to our understandings of NCTs as they highlight how the use of technology is shaped through ideas, assumptions and beliefs. This understanding incorporates the functional components of technology (for example the practical and impractical applications of technology) and the symbolic components of technology (for example technology may represent advanced working practices and the assumed advantages and disadvantages of those practices). This analysis of the organisation's culture provides a framework in which to study the relationship between culture and technology in other organisational settings, a theme to be returned to toward the end of this chapter.

The Consequences of the Context of the Implementation, Integration and Application of NCTs

The final conclusion focuses upon the context of the implementation, integration and application of NCTs and its consequences. I have argued throughout this research that certain organisational features have become technologised through the implementation, integration and application of NCTs, which has resulted in the transformation of information and communication flows. For the individual the transformation of work and the technologisation of cultural elements have resulted in different interpretations of NCTs. NCTs are, therefore, shown to be embedded within organisations but to have varied cultural meanings. It is concluded that the integration and application of NCTs does not have uniform consequences or outcomes and is dependent on the context they are implemented within, a feature particularly evident through the examination and comparison of the work and the training settings. It was also found that individuals from different occupational groupings and various hierarchical levels do not have the same reactions to technology implementation and application in similar contexts.

Within the work setting and the training setting, the different ethoses were observed even though both settings were embedded within the same organisational environment. By drawing upon this contrast between the training and the work settings of CommCo, it is claimed that the context in which a technology is implemented and employed has varying consequences and possibilities. Negative and positive attitudes regarding the implementation and application of NCTs were examined in both settings. However, in the training

setting, very negative and sceptical attitudes concerning technology were observed. Whereas in the work setting a more positive attitude concerning the implementation and application of technologies was discovered. Overall, a more negative response to technology was found in the training setting compared to the work setting even though the two settings constitute part of the same organisation.

The flow of information and communication through and within the organisation and the related patterns of social interaction inform and influence the implementation, integration and application of NCTs. This in turn influences and informs emerging patterns of communication, information flows and social interactions. The existing and emergent organisational practices produce and sustain the organisational narratives that are defined by the ethos of technology enthusiasts and the ethos of technology sceptics. The varied responses to the implementation of NCTs may be explained by the way these cultural elements are defined differently in the training setting and the work setting. As highlighted in the following argument there is an active mediation of cultural elements by NCTs in a technologised culture in both contexts studied.

Within the work setting an intended consequence of the implementation and application of NCTs is the possibility for the speedier transmission of information and communication through and within the organisation. The application of NCTs has arguably had the unintended consequence of disabling face-to-face social interactions and relations, a feature which was observed in the case study organisation. In the work setting communication and information

flows were identified as essential to efficient and productive work. These elements, as already concluded, have been technologised by the application of NCTs. This transformation has had significant implications for organisational work practices and this has, in turn, informed organisational narratives. NCTs have enabled new methods of communication and innovative work practices. Consequently an enthusiastic ethos concerning technology has in part been created and sustained by the successful application of NCTs in the work context.

In comparison, more direct social interaction and communication were believed to be important to an effective training setting. The problems with video-conferencing and the absence of a tutor, who was unavailable for face-to-face interaction, created and reinforced negative attitudes toward the technology in the training context. Although the application of video-conferencing received a negative response in the work setting it was not as strong as that identified in the training setting. However, the negative attitude was identified in different occupational groupings (professional, engineer and technical officer) and at different hierarchical levels (senior management, middle management and non-management level).

The application and implementation of NCTs has led to significant changes in organisational structures and cultures, but these changes do not necessarily conform to the common model of a network-structured organisation. As previously suggested, NCTs go through a filtering process of social norms, attitudes and values. This process is dependent upon the context in which the technology is implemented. As a more negative attitude is present in the training

context, the implementation and application of communication technologies is less effective than if implemented in the work context. However, problematic features of NCTs can also be identified in the work setting. For instance, work intensification and information overload are widely talked about. Isolation and marginalisation are also discussed by a minority of workers as a disadvantageous consequence of technology application in the work setting.

A networked-structured organisation is defined by coordinative and integrative organisational practices, but this is only one possible outcome of the implementation and application of NCTs. Within a network-structured organisation, innovative work practices and the organisation of work are founded upon frameworks of collaboration and frameworks of communication and information. These are predominately achieved through a combination of structural and cultural elements. This returns to, and is illustrated by, the changes in CommCo's structure and culture discussed at the start of these conclusions.

From these conclusions it can be surmised that organisational transformations are not the unmediated result of the implementation and application of NCTs, although they do play an important role in those changes. NCTs have been implemented and used to enable possibilities for new cultures, and innovative structures and work practices. In contrast to these positive possibilities the implementation, integration and application of NCTs has also resulted in work intensification, and 'dehumanised' and isolated workers which evokes a negative ethos. The context of technology implementation and application plays a significant part in whether this is successful or not. Although there will always be

some form of resistance or scepticism regarding the implementation and application of NCTs in organisations, NCTs are fundamental elements of future work and training settings. Most importantly, NCTs offer and enable the possibilities for innovative organisational settings but these have to take in to consideration the disadvantageous possibilities of the implementation and application of NCTs.

Proposals for Further Research

This study was concerned with examining in depth the effects of the implementation, integration and application of NCTs in one case study organisation. The focus on one case study can be problematic as there are issues of comparability and generalisation that are always raised by such research. From this case study the technologisation of organisational cultural elements has been identified and this has created a framework in which to study NCTs in other organisations. Further research in other organisations from different sectors would reveal how far the conclusions drawn from this case study can be generalised and would help to define more tightly the context in which the phenomena discussed here are likely to emerge.

Although the occupational grouping and the hierarchical position of the participants have to some extent been used in the analysis of the narratives, it has not been a focal issue. However, in general, senior and middle management narratives regarding NCTs in a training context have been more optimistic than

those of non-management level employees. In the work context, non-management level employees were more likely to be sceptical about the application of NCTs than management level employees. Overall, more sceptical interpretations and narratives regarding the integration, implementation and application of NCTs in the training context of CommCo were noted than those observed in the work setting. These findings have particularly prompted the need for further research into similar contexts within hi-tech organisations as this would reveal whether these conclusions are specific to the case study organisation or representative of this sector.

Additionally the organisational narratives of the employees from the case study organisation were found to be unconnected to gender. My research showed no significant differences between the understandings of NCTs of both men and women. In this high tech, male dominated milieu both men and women had similar narratives, interpretations and perspectives regarding NCTs, which thereby suggests that women are well integrated into this milieu. Further research is needed to explore whether the integration of women into a male dominated work context and their similar narratives are unique to CommCo.

The ethnographic study of the training setting has identified some of the advantages and disadvantages of the implementation and application of NCTs in this context. These findings have been beneficial to the organisation that, as a result, has transformed the e-skilling course. A report on my findings was presented to the senior management of CommCo and was subsequently used to restructure the e-skilling programme. Although I did not receive direct feedback

on the report, the programme mentors were interested in my comments as an observer of the course. The e-skilling programme has continued to change in accordance with comments from the delegates and tutors. A re-examination of this setting would be very interesting because it would highlight whether technology implementation was the main cause of the negative attitudes of the delegates. Overall, this research has identified the relationship between NCTs and organisational transformation, a relationship that is constantly evolving and deserves further exploration.

Appendices

	Gender		Age					Organisational Position in CommCo						
e-classroom location	male	female	20-30	31-40	41-50	51-65	no response	manager	team member	technical officer	trainee	prof.	engineer	unknown
TRANCHE 3														
Birmingham	11	1		5	7	1		6		1			2	3
Bristol	9			4	4	1		1		4			1	3
Milton Keynes	14		2	3	8	1		4	1	3	2	1	1	2
Stafford	6		1	2	3				1	3	1	1		
Tranche 3 total	**40**	**1**	**3**	**14**	**22**	**3**		**11**	**2**	**11**	**3**	**2**	**4**	**8**
TRANCHE 4														
Birmingham	3	1		3	1					2				2
Bristol	3			2		1		1	1	1				
Glasgow	4			1	2		1		1	2		2		
Leeds	4			1	3				1	2			1	
Milton Keynes	8	1	1	4	2	1	1	2	1	3	1			1
Stafford	2	1			2	1		2		1				
Tranche 4 total	**24**	**3**	**1**	**9**	**12**	**3**	**2**	**5**	**4**	**11**	**1**	**2**	**1**	**3**
TOTALS	**64**	**4**	**4**	**23**	**34**	**6**	**2**	**16**	**6**	**22**	**4**	**4**	**5**	**11**

APPENDIX 2: DELEGATE ORGANISATIONAL POSITION OF THOSE RESPONDING TO SURVEY 1

SURVEY 1								
Classroom	Organisational Position in CommCo							Total
	manager	team member	technical officer	trainee	prof.	engineer	unknown	response rate
TRANCHE 3								
Birmingham	4							**4**
Bristol	1		3			1		**5**
Milton Keynes	3		3	2	1	1		**10**
Stafford		1	3	1	1			**6**
Tranche Total	**8**	**1**	**9**	**3**	**2**	**2**	**0**	**25**
% of total response rate for tranche 3	**32**	**4**	**36**	**12**	**8**	**8**	**0**	**100**
TRANCHE 4								
Birmingham			2					**2**
Bristol		1	1					**2**
Glasgow		1	2		1			**4**
Leeds			1			1		**2**
Milton Keynes	2	1	3		1			**7**
Stafford	2		1					**3**
Tranche Total	**4**	**3**	**10**	**0**	**2**	**1**	**0**	**20**
% of total response rate for tranche 4	**20**	**15**	**50**	**0**	**10**	**5**	**0**	**100**
OVERALL TOTAL	**12**	**4**	**19**	**3**	**4**	**3**	**0**	**45**
OVERALL % RESPONSE RATE	**27**	**9**	**42**	**7**	**9**	**7**	**0**	**100**

prof. = professional; delegates who work within CommCo in an advisory capacity (e.g. planner, consultant, analyst etc.) and do not work within a specified team.

APPENDIX 3: DELEGATE ORGANISATIONAL POSITION OF THOSE RESPONDING TO SURVEY 2

SURVEY 2								
Classroom	Organisational Position in CommCo							Total response rate
	manager	team member	technical officer	trainee	prof.	engineer	unknown	
TRANCHE 3								
Birmingham	6		1			2	2	**11**
Bristol	1		2			1	3	**7**
Milton Keynes	3	1	3	1			2	**10**
Stafford		1	3					**4**
Tranche Total	**10**	**2**	**9**	**1**		**3**	**7**	**32**
% of total response rate for tranche 3	**31**	**6**	**28**	**3**	**0**	**9**	**22**	**100**
TRANCHE 4								
Birmingham			2				2	**4**
Bristol	1	1						**2**
Glasgow					1			**1**
Leeds		1	1			1		**3**
Milton Keynes	2	1	3	1	1		1	**9**
Stafford	1		1					**2**
Tranche Total	**4**	**3**	**7**	**1**	**2**	**1**	**3**	**21**
% of total response rate for tranche 4	**19**	**14**	**33**	**5**	**10**	**5**	**14**	**100**
OVERALL TOTAL	**14**	**5**	**16**	**2**	**2**	**4**	**10**	**53**
OVERALL % RESPONSE RATE	**26**	**9**	**30**	**4**	**4**	**8**	**19**	**100**

prof. = professional; delegates who work within CommCo in an advisory capacity (e.g. planner, consultant, analyst etc.) and do not work within a specified team.

APPENDIX 4: THE PROFICIENCY OF NEW COMMUNICATION TECHNOLOGY SKILL LEVELS OF THE DELEGATES ON TRANCHE 3 AND TRANCHE 4

TRANCHE 3						
Skill/Proficiency	very competent	competent	basic knowledge	not used	no response	Total
keyboard skills	3	20	2			25
word processing	5	15	4		1	25
spreadsheet packages	1	13	11			25
database programmes	1	10	8	6		25
email	7	14	3		1	25
Internet	7	12	6			25
CommCo intranet/network	4	15	5		1	25
video-conferencing	1	1	7	15	1	25
audio-conferencing	2	9	4	9	1	25
other		6			19	25
TOTALS	31	115	50	30	24	250
% OF TOTAL RESPONSES	12%	46%	20%	12%	10%	100%

TRANCHE 4						
Skill/Proficiency	very competent	competent	basic knowledge	not used	no response	Total
keyboard skills	3	14	3			20
word processing	5	14	1			20
spreadsheet packages	5	9	5	1		20
database programmes		4	14	2		20
email	5	14	1			20
Internet	4	13	3			20
CommCo intranet/network	4	12	4			20
video-conferencing	1	2	8	9		20
audio-conferencing	6	6	5	3		20
other	1	2			17	20
TOTALS	34	90	44	15	17	200
% OF TOTAL RESPONSES	17%	45%	22%	7.5%	8.5%	100%

Dear

I am an Economic and Social Research Council funded doctoral student in the department of Sociology at the University of Warwick. As part of the research element of my studies I am focusing on the distance learning community at CommCo. XX, at Stafford, forwarded your details to me as it was considered that you may be interested in helping.

My research is investigating the application of new communication technologies and systems, such as computer based training, email, intranets, video and audio conferencing, within the workplace. My study is concerned with how the implementation of new electronic communication technologies has affected organisational cultures. As a key part of my research I wish to learn from the experiences of the CommCo employees participating in the e-skilling programme, by observing and talking to you about these technologies.

I would like to assure you that I will be abiding by the British Sociological Association Ethical Guidelines throughout my research and the identities of the organisation and individual informants will not be revealed. Also I would like to confirm that all returned surveys, interview notes and tapes are for my own personal use.

For your information I have copied a brief outline of the nature and purpose of my study which can also be confirmed by my supervisor, Dr Tony Elger, at the university.

Thank you for taking the time to read my letter and complete the survey.

Yours sincerely

Sally-Anne Barnes

Department of Sociology
University of Warwick
COVENTRY CV4 7AL

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RESEARCH PROPOSAL

Provisional Title

The Uses of New Communication Technologies at Work

Research Focus

My research is concerned with how the applications of new electronic communication technologies have affected organisational cultures. Thus I am studying the operation of computer based training, email, intranets, video and audio conferencing in terms of their impact on the way organisations work.

Objectives

To examine the character of work relations among staff within the distance learning community at CommCo, namely the mobile workforce, focusing on the new technologies used for learning in the e-age. This would be facilitated by comparing the experiences of several e-classroom groups.

To assess the application of new communication technologies used in e-skilling by focusing upon the work environment and the e-classrooms settings.

To create an understanding of the patterns and forms of access and participation in the new technologies and e-learning, and therefore to assess whether these new forms of technological application are advantageous to the individual, department and organisation.

Contribution of the Study

The increasing consumption of new communication technologies in the public and private spheres has increased the need for detailed research into the issues surrounding these technologies. Whilst there is much literature on the efficiency, innovation and services of new communication technologies, social and cultural issues have been neglected. It is the objective of my research to address these omissions by establishing the ways in which employees experience and understand technological development in organisations.

My study will enhance our understanding of the ways in which organisations operate their communication systems, in ways relevant for both the management of such systems and their uses. An important feature of my case study will be to consider ways in which the experiences of the case-study organisations may be applicable across the wider organisational context.

APPENDIX 6: HAND DELIVERED SURVEY 1 FOR TRANCHE 3

E-SKILLING SURVEY

The purpose of this questionnaire is to gain an overall account of those attending the e-skilling course, and to map the existing patterns of expertise.

The data collected from this survey will be used in conjunction with additional information to assess the role of new technologies in delivering training through computer based distance learning and to propose new strategies for increasing the benefits of distance learning for participants.

Thank you for taking the time to complete this survey.

Sally-Anne Barnes
University of Warwick

Section 1 - About You

1. Name: _____

2. Gender: male _____   female _____

3. Age: 20 - 30 _____   31 - 40 _____

            41 - 50 _____   51 - 65 _____

4. Which e-classroom are you attending? _____

5. What day are you are attending the e-classroom?

        Tuesday   _____   Wednesday _____

        Thursday   _____   Friday   _____

6. What is your current position within CommCo?_____

7. How long have you worked for CommCo?_____Years_____months

8. Which county/counties is your work based in? _____

Section 2 - Training and Communication Technologies

9. Have you participated in any training in the last five years?

<center>No _____   Yes _____</center>

If yes, please indicate which methods of learning/training you have participated in. (please tick all that apply)

	yes	no
traditional class-room based training		
on-the-job training		
distance learning courses		
computer-based learning		
Internet based training		
LAN and server based training		
CD-ROM and diskette based training		
other (please state)		
other (please state)		

10. Prior to the start of this course did you have access to a computer...(please tick all that apply)

	at home	at work	other (please state)
Desktop			
Laptop			

11. Please indicate your level of proficiency in each of the following computer skills.

	very competent	competent	basic knowledge	not used
keyboard skills				
word processing				
spreadsheet packages				
database programmes				
email				
Internet				
CommCo intranet/network				
video conferencing				
audio conferencing				
other (please state)				
other (please state)				

12. Which new communication technologies do you use? (please tick all that apply)

	at work	at home
email		
Internet		
CommCo intranet/network		
audio conferencing		
video conferencing		
other (please state)		
other (please state)		

13. In what ways has the introduction of new communication technologies, as listed above, been beneficial or advantageous to your work role?

_____
_____
_____
_____

14. In what ways has the applications of new communication technologies, as listed in question 12, been disadvantageous in your work role?

_____
_____
_____

15. What do you hope to gain from attending this e-skilling course?

_____
_____
_____
_____

I would appreciate an opportunity to talk with you further about your experiences of this e-skilling course. If you would you be willing to talk to me at a later date please indicate below.

Yes _____   No _____

Email address _____

Thank you very much for taking the time to complete this questionnaire.
Please email the completed questionnaire to me at
sal.barnes@netmatters.co.uk

E-SKILLING SURVEY

The purpose of this questionnaire is to gain an overall account of those attending the e-skilling course, and to map the existing patterns of expertise.

The data collected from this survey will be used in conjunction with additional information to assess the role of new technologies in delivering training through computer based distance learning and to propose new strategies for increasing the benefits of distance learning for participants.

Thank you for taking the time to complete this survey.

Sally-Anne Barnes, University of Warwick

Section 1 - About You

1. Name:

2. Gender: male female

3. Age: 20 – 30 31 – 40 41 - 50 51 - 65

4. Which e-classroom are you attending?

5. What day are you are attending the e-classroom?
Tuesday Wednesday Thursday Friday

6. What is your current position within CommCo?

7. How long have you worked for CommCo? Years months

8. Which county/counties is your work based in?

Section 2 - Training and Communication Technologies

9. Have you participated in any training in the last five years?

No _____ Yes _____

If yes, please indicate with an 'X' which methods of learning/training you have participated in. (please tick all that apply)

Traditional classroom based training
On-the-job training
Distance learning courses
Computer-based learning
Internet based training
LAN and server based training
CD-ROM and diskette based training
Other (please state)

10. Prior to the start of this course did you have access to a computer...(please tick all that apply)?

	at home	**at work**	**other (please state)**
Desktop			
Laptop			

11. Please indicate your level of proficiency in each of the following computer skills.

	very competent/	**competent/**	**basic knowledge/**	**not used**
keyboard skills				
word processing				
spreadsheet packages				
database programmes				
email				
Internet				
CommCo intranet/network				
video conferencing				
audio conferencing				
other (please state)				
other (please state)				

12. Which new communication technologies do you use? (please tick all that apply)

	at work	**at home**
email		
Internet		
CommCo intranet/network		
audio conferencing		
video conferencing		
other (please state)		
other (please state)		

13. In what ways has the introduction of new communication technologies, as listed above, been <u>beneficial or advantageous</u> to your work role?

14. In what ways has the applications of new communication technologies, as listed in question 12, been <u>disadvantageous</u> in your work role?

15. What do you hope to gain from attending this *e*-skilling course?

I would appreciate an opportunity to talk with you further about your experiences of this *e*-skilling course. If you would you be willing to talk to me at a later date please indicate below.
Yes
No

Thank you very much for taking the time to complete this questionnaire. Please return the completed questionnaire by email to <u>sal.barnes@netmatters.co.uk</u> or post to

SA Barnes (PG)
Department of Sociology
University of Warwick
Coventry CV4 7AL

E-SKILLING SURVEY 2

The aim of this survey is to gain an overall perspective of your personal experiences of the e-skilling course and to gain an understanding of the application of new communication technologies at work. The information gathered will supplement the previous survey data and my observations and be used to assess the role of technology in delivering training.

If you feel that you have already answered any of the questions in previous discussions then please proceed to the next question.

Thank you again for taking the time to complete my survey.

<div align="right">Sally-Anne Barnes
University of Warwick</div>

SECTION 1 - ABOUT YOU

Name: _____

Age: 20-30 ☐   31-40 ☐   41-50 ☐   51-65 ☐

Current position at CommCo: _____

SECTION 2 - COMPUTER-BASED DISTANCE LEARNING AND NCTS

1. Did you request to go on the e-skilling course?

   Yes ☐   No ☐

2. Why was it decided that you should go on the e-skilling course?

_____

_____

_____

3. In terms of your current position at CommCo how does the e-skilling course fit in to your job?

_____

_____

_____

4. Has the structure of this course been similar to other computer-based or distance learning courses you have attended?

Yes ☐ No ☐ have not attended any CBT ☐
courses (please go to
question 5)

5. In what ways has this course been similar and dissimilar to other computer-based or distance learning courses and has this been advantageous or disadvantageous?

_____

_____

_____

6. Did you receive any instruction or training on how to use the video conferencing technology at the start of the course?

Already used video conferencing	
Yes, sufficient instruction	
Yes, only basic instruction	
None at all	

7. Did you find the review sessions...(please tick all that apply)

	Yes	No	No opinion
a good method of reviewing the previous weeks			
good preparation for the assessment			
a good opportunity to ask questions			
an opportunity to meet others on the course			
an effective use of the video conferencing technology			
the technology was an unnecessary part of the review			
the technology was a hindrance to the learning process			
other (please state)			

8. What are the advantages of the video-conferenced tutor-led sessions?

_____

_____

_____

9. What are the disadvantages of the video-conferenced tutor-led sessions?

_____

_____

_____

10. What difficulties have you encountered in the tutor led sessions? (please tick all that apply)

	tutor present for review	tutor at remote site
unable to hear tutor		
unable to hear remote sites		
unable to ask questions or query points		
unable to see tutor		
unable to see other delegates		
topics covered to fast		
other (please state)		
other (please state)		

11. What difficulties do you think the tutor has had to face when using video-conferencing technology to review the *e*-skilling material? (please tick all that apply)

	Yes	No	No opinion
difficulties setting up the technology			
unable to hear remote sites			
unable to see remote sites			
other (please state)			
other (please state)			
other (please state)			

12. How do you think the tutor's difficulties may be overcome?

_____
_____
_____
_____

13. In what ways can the course and assessment process be improved?

_____
_____
_____
_____
_____

SECTION 3 - NEW COMMUNICATION TECHNOLOGIES AT WORK

14. What do you use new communication technologies at work for? (please tick all that apply)

Activity/Technology	email	Internet	CommCo intranet	NetMeeting	video conferencing	audio conferencing
to access up-to-date information						
transfer documents						
to set up meetings						
to carry out meetings						
to organise a team						
as a means of keeping in contact						
other (please state)						
other (please state)						

15. Do you think that NetMeeting is an effective way of carrying out a meeting?

Yes ☐ No ☐ Not used ☐

Please explain why.

_____

_____

_____

_____

16. Has the introduction of new communication technologies been beneficial to...(please tick all that apply)

	Yes	No	No opinion
you personally			
your own work			
your team			
the department			
CommCo			
other (please state)			

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17. In what ways do you think that new communication technologies have changed the work process?

_____
_____
_____

18. How have new communication technologies changed CommCo communication networks and social relations?

_____
_____
_____

19. How do you think CommCo could improve its application of new communication technologies?

_____
_____
_____

Please return the completed survey in the envelope provided to

Sally-Anne Barnes – PG
Department of Sociology
University of Warwick
Coventry CV4 7AL.

E-SKILLING SURVEY 2

ABOUT YOU
What is your current position at CommCo?

Age (Please indicate with an 'X')
20-30
31-40
41-50
51-65

COMPUTER-BASED DISTANCE LEARNING AND NCTs
1. Did you request to go on the e-skilling course?
Yes/No

2. Why was it decided that you should go on the e-skilling course?

3. In terms of your current position at CommCo how does the e-skilling course fit in to your job?

4. Has the structure of this course been similar to other computer-based or distance learning courses you have attended?
Yes
No
have not attended any CBT courses

5. In what ways has this course been similar and dissimilar to other computer-based or distance learning courses and has this been advantageous or disadvantageous?

6. Did you receive any instruction or training on how to use the video conferencing technology at the start of the course?
Already used video conferencing
Yes, sufficient instruction
Yes, only basic instruction
None at all

7. Please indicate an 'X' for each true statement. Did you find the review sessions?
a good method of reviewing the previous weeks
good preparation for the assessment
a good opportunity to ask questions
an opportunity to meet others on the course
an effective use of the video conferencing technology
the technology was an unnecessary part of the review
the technology was a hindrance to the learning process
other (please state)

8. What are the advantages of the video-conferenced tutor-led sessions?

9. What are the disadvantages of the video-conferenced tutor-led sessions?

10. What difficulties have you encountered in the tutor led sessions? Please state whether the tutor was present (P) or at a remote site (R) for the review.
unable to hear tutor
unable to hear remote sites
unable to ask questions or query points
unable to see tutor
unable to see other delegates
topics covered to fast
other (please state)

11. Please indicate with an 'X' which difficulties you think the tutor has had to face when using video-conferencing technology to review the e-skilling material?
difficulties setting up the technology
unable to hear remote sites
unable to see remote sites
other (please state)
other (please state)

12. How do you think the tutor's difficulties may be overcome?

13. In what ways can the course and assessment process be improved?

NEW COMMUNICATION TECHNOLOGIES AT WORK

14. Please state which new communication technologies you use for each task. (email 'E'; Internet 'I'; CommCo intranet 'CommCo'; NetMeeting 'N'; video conferencing 'V'; audio conferencing 'A')
to access up-to-date information
transfer documents
to set up meetings
to carry out meetings
to organise a team
as a means of keeping in contact
other (please state)

15. Do you think that NetMeeting is an effective way of carrying out a meeting?
Yes
No
Not used

Please explain why.

16. Please indicate with an 'X' for each true statement. Has the introduction of new communication technologies been beneficial to...
you personally
your own work
your team
the department
CommCo
other (please state)

17. In what ways do you think that new communication technologies have changed the work process?

18. How have new communication technologies changed CommCo communication networks and social relations?

19. How do you think CommCo could improve its application of new communication technologies?

Please return the completed survey to sal.barnes@netmatters.co.uk or send a hard copy to
Sally-Anne Barnes – PG
Department of Sociology
University of Warwick
Coventry CV4 7AL.

E-SKILLING SURVEY

The purpose of this questionnaire is to gain an overall account of those attending the e-skilling course, and to map the existing patterns of expertise.

The data collected from this survey will be used in conjunction with additional information to assess the role of new technologies in delivering training through computer based distance learning and to propose new strategies for increasing the benefits of distance learning for participants.

Thank you for taking the time to complete this survey.

Section 1 - About You
1. Name

2. Gender: **male/female**

3. Age: **20 – 30/ 31 – 40/ 41 - 50/ 51 - 65**

4. Which *e*-classroom are you attending?

5. What is your current position within CommCo?

6. How long have you worked for CommCo? **Years months**

7. Which county/counties is your work based in?

Section 2 - Training and Communication Technologies
8. Have you participated in any training in the last five years? **No/Yes**

If yes, please indicate with an 'X' which methods of learning/training you have participated in. (please tick all that apply)
Traditional classroom based training
On-the-job training
Distance learning courses
Computer-based learning
Internet based training
LAN and server based training
CD-ROM and diskette based training
Other (please state)

9. Prior to the start of this course did you have access to a computer.
(please state whether at home or at work)
Desktop
Laptop

10. Please indicate your level of proficiency in each of the following computer skills using the terms very competent (VC), competent (C), basic knowledge (BK) and not used (NU).
keyboard skills
word processing
spreadsheet packages
database programmes
email
Internet
CommCo intranet/network
video conferencing
audio conferencing
other (please state)

11. Which new communication technologies do you use?
(please state whether at home or at work)
email
Internet
CommCo intranet/network
audio conferencing
video conferencing
NetMeeting
other (please state)
other (please state)

12. In what ways has the introduction of new communication technologies, as listed above, been <u>beneficial or advantageous</u> to your work role?

13. In what ways has the applications of new communication technologies, as listed in question 12, been <u>disadvantageous</u> to your work role?

14. What do you hope to gain from attending this *e*-skilling course?

I would appreciate an opportunity to talk with you further about your experiences of this *e*-skilling course. If you would you be willing to talk to me at a later date please indicate below.
Yes/No

Thank you very much for taking the time to complete this questionnaire. Please return the completed questionnaire by email to <u>sal.barnes@netmatters.co.uk</u> or post to
SA Barnes (PG)
Department of Sociology
University of Warwick
Coventry CV4 7AL

E-SKILLING SURVEY 2

ABOUT YOU
What is your current position at CommCo?

Age (Please indicate with an 'X')
20-30
31-40
41-50
51-65

COMPUTER-BASED DISTANCE LEARNING AND NCTs
Please use 'X' to indicate your answer.

1. Did you request to go on the e-skilling course?
Yes/No

2. Why was it decided that you should go on the e-skilling course?

3. In terms of your current position at CommCo how does the e-skilling course fit in to your job?

4. What do you think about the course as a 6-week programme?
Adequate length to cover the material
Too short
Too long
Other (please state)

5. Has the structure of this course been similar to other computer-based or distance learning courses you have attended?
Yes
No
Have not attended any CBT courses (go to question 7)

6. In what ways has this course been similar and dissimilar to other computer-based or distance learning courses and has this been advantageous or disadvantageous?

7. Please indicate an 'X' for each true statement.
It was reassuring to have the mentor contact us during the day via the video conferencing technology.
It was advantageous to be in contact with the mentor via the video-conferencing technology.
Contact with the mentor via the video-conferencing technology was unnecessary.
It was easy to contact someone to ask a question.
I preferred to contact the mentor/trainer by telephone to ask questions.
I am more likely to use email to contact the mentor/trainer to ask questions.

8. Do you think that the e-skilling course has improved your computer skills?
Already competent in computer skills
Yes, improved a lot
Yes, only slightly
No not all

9. Did you receive any instruction or training on how to use the video conferencing technology at the start of the course?
Already used video conferencing
Yes, sufficient instruction
Yes, only basic instruction
None at all

10. Please indicate an 'X' for each true statement. The course was...
a good opportunity to increase my knowledge of new technologies
a good opportunity to improve my computer skills
an opportunity to meet others in my field
good preparation for the CISCO assessments
an effective use of technologies to train
ineffective as the technology was a hindrance to the learning process
difficult as there was no contact with a teacher/trainer
other (please state)
other (please state)

11. What do you think of the course content?

12. In what ways can the course and assessment process be improved?

NEW COMMUNICATION TECHNOLOGIES AT WORK

13. Please state which new communication technologies you use for each task. (email 'E'; Internet 'I'; CommCo intranet 'CommCo'; NetMeeting 'N'; video conferencing 'V'; audio conferencing 'A')
to access up-to-date information
transfer documents
to set up meetings
to carry out meetings
to organise a team
as a means of keeping in contact
other (please state)

14. Do you think that NetMeeting is an effective way of carrying out a meeting?
Yes
No
Not used
Please explain why.

15. Please indicate an 'X' for each true statement. Has the introduction of new communication technologies been beneficial to...
you personally
your own work
your team
the department
CommCo
other (please state)
Please explain why.

16. In what ways do you think that new communication technologies have changed the work process?

17. How have new communication technologies changed CommCo communication networks and social relations?

18. How do you think CommCo could improve its application of new communication technologies?

Please return the completed survey to sal.barnes@netmatters.co.uk or send a hard copy to
Sally-Anne Barnes – PG
Department of Sociology
University of Warwick
Coventry CV4 7AL.

APPENDIX 12: INTERVIEW SCHEDULE

Interview Questions Specifically for the Course Delegates

NCTs at Work

Could you describe an average day/week at work?
- mobile or stationary
- access to which NCTs
- main use and purpose of NCTs
- human contact

How do your expect your role within the CommCo to change?

What technological developments do you foresee in your department/workplace and the company as a whole?

In what ways do you think that communication technologies have changed the organisation and the work process?
- culture
- communication
- networks
- structure/hierarchy
- social relations

I have noted from your survey that you use em/I/CommCo intranet/AC/VC and Chat (via web browser), what do you mainly use these NCTs for?
- general information
- personal communication
- transfer documents
- setting up meetings
- a means of keeping in contact

Would you consider NetMeeting a NCT? Have you used it? Do you think it is an effective way of carrying out a meeting?

In particular has the introduction of new communication technologies been beneficial/useful/advantageous?
- personally beneficial
- to your own work role
- beneficial to the department
- beneficial to the company

What do you think are the disadvantages of new communication technologies are?

Have you had any official training in the use of these new communication technologies?
- optional or compulsory
- internal or external training

How do you think the company could improve its use of new technologies?
- upgrading system
- restricted or unrestricted access
- offering/changing/improving training
- use more or less
- implementing new technologies

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Distance Learning and NCTs

Did you request to go on the e-skilling course or was your name put forward?

How does this course fit into your job/role within CommCo?

What do you hope to use the knowledge gained on this course for?

Has the structure of this course been similar to other computer based or distance learning courses you have attended? In what ways?

What do you think the advantages/disadvantages of a distance learning course are?

Did you receive any training in the use of VC technology and/or NetMeeting prior to the start of the course?

Did you find the video-conferencing review sessions...
- beneficial to the review process?
- good preparation for the assessment?
- a good opportunity to ask questions?

What are the advantages/disadvantages of the video-conferenced/tutor led sessions?

What difficulties have you encountered in the tutor led sessions?

What difficulties do you think the tutor has to face when using video conferencing technology to communicate?

How might they difficulties be overcome?

In what ways can the course/assessment/video-conferenced sessions be improved?

Overall have you enjoyed the opportunity to participate in the computer-based distance learning course and the option to work in the e-classroom or at home?

Additions?

Interview Questions Specifically for the Course Mentors

What is the overall aim of the CB/DL course?

What difficulties do you face as an e-mentor?

What do you think the advantages/disadvantages of a distance learning course are?

What are the advantages/disadvantages of the video-conferenced/tutor led sessions?

What problems do you think the delegates face during the video-conferenced review sessions...?
- beneficial to the review process
- as good preparation for the assessment
- a good opportunity to ask questions?

What difficulties do you think the tutor has to face when using video conferencing technology to communicate?

How might they difficulties be overcome?

Are there any planned changes to the course/assessment/video-conferenced sessions?

Are they changes addressing previous comments from delegates?

Is there a survey for the delegates at the end of the CBT course? If not how do you learn delegate opinions?

APPENDIX 13: RESPONSE RATES FOR INDIVIDUAL CLASSROOMS AND ATTENDANCE DAYS FOR TRANCHE 3 AND 4

TRANCHE 3						
e-classroom location	day	class total	Response Rates			
			survey 1	% of class total	survey 2	% of class total
Birmingham	Tuesday	9	3	33	6	67
	Wednesday	9	1	11	2	22
	Thursday	4	0	0	3	75
Bristol	Tuesday	10	4	40	3	30
	Wednesday	6	1	17	4	67
Milton Keynes	Tuesday	10	2	20	5	50
	Wednesday	9	8	89	5	56
Stafford	Tuesday	6	6	100	4	67
	Wednesday	3	0	0	0	0
TOTAL		66	25	38	32	48

TRANCHE 4					
e-classroom location	class total	Response Rates			
		survey1	% of class total	survey 2	% of class total
Birmingham	5	2	40	4	80
Bristol	5	2	40	2	40
Glasgow	8	4	50	1	13
Leeds	8	2	25	3	38
Milton Keynes	11	7	64	9	82
Stafford	6	3	50	2	33
TOTAL	43	20	47	21	49

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APPENDIX 14: COMPARING RESPONSES TO THE INTRODUCTION OF NCTS

TRANCHE 3

Has the introduction of NCTs been beneficial to...	Organisational Position in CommCo														Total (n=32)	% of all responses
	manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%		
you personally	6	60	1	50	6	67	1	100			1	33	2	29	17	53
your own work	9	90	2	100	8	89	1	100			2	67	6	86	28	88
your team	9	90			8	89	1	100			3	100	7	100	28	88
your department	8	80			8	89	1	100			3	100	6	86	26	81
CommCo	8	80	1	50	8	89	1	100			3	100	7	100	28	88
no response	1	10			1	11									1	3

TRANCHE 4

Has the introduction of NCTs been beneficial to...	Organisational Position in CommCo														Total (n=21)	% of all responses
	manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%		
you personally	3	75	3	100	5	71	1	100	2	100	1	100	3	100	18	86
your own work	4	100	3	100	5	71	1	100	2	100	1	100	3	100	19	90
your team	4	100	2	67	5	71	1	100	2	100	1	100	3	100	18	86
your department	4	100	2	67	6	86	1	100	2	100	1	100	3	100	19	90
CommCo	4	100	2	67	6	86	1	100	2	100	1	100	3	100	19	90
no response																

% = percentage of hierarchical subsection totals

prof. = professional; delegates who work within CommCo in an advisory capacity (e.g. planner, consultant, analyst etc.) and do not work within a specified team.

APPENDIX 15: THE UTILISATION OF NETMEETING TECHNOLOGY

Do you think NetMeeting is an effective way of carrying out a meeting?	TRANCHE 3				Total
	Yes	No	Not used	No response	
Position in CommCo					
manager	4	1	4	1	10
team member			2		2
technical officer	1		8		9
trainee		1			1
professional			3		3
engineer					0
unknown	4		3		7
Total	**9**	**2**	**20**	**1**	**32**
% of total response rate	**28**	**6**	**63**	**3**	**100**

Do you think NetMeeting is an effective way of carrying out a meeting?	TRANCHE 4				Total
	Yes	No	Not used	No response	
Position in CommCo					
manager	3		1		4
team member	1		2		3
technical officer	2	1	3	1	7
trainee	1				1
professional	1		1		2
engineer			1		1
unknown			3		3
Total	**8**	**1**	**11**	**1**	**21**
% of total response rate	**38**	**5**	**52**	**5**	**100**

APPENDIX 16: THE APPLICATION OF NCTS FOR SPECIFIC TASKS DIVIDED BY ORGANISATIONAL POSITION

TRANCHE 3 Survey 2:Question 14	NCT	Position in CommCo														Total (n=32)	% of overall response rate
		manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%		
To access up-to-date information	email			1	50	6	67	1	100					2	29	10	31
	Internet	8	80	1	50	6	67	1	100							16	50
	intranet	6	60	1	50	9	100	1	100			2	67	2	29	21	66
	NetMeeting	1	10											5	71	6	19
	VC																0
	AC	2	20	1	50											3	9
Transfer documents	Email	9	90	2	100	9	100	1	100			2	67	6	86	29	91
	Internet	1	10	2	100									1	14	4	13
	intranet					5	56							1	14	6	19
	NetMeeting	1	10													1	3
	VC																0
	AC																0
To set up meetings	email	8	80	2	100	4	44					1	33	2	29	17	53
	Internet																0
	intranet	2	20											1	14	3	9
	NetMeeting	1	10													1	3
	VC					1	11									1	3
	AC	3	30			2	22					1	33	1	14	7	22
To carry out meetings	email																0
	Internet																0
	intranet																0
	NetMeeting	2	20													2	6
	VC	2	20			1	11									3	9
	AC	8	80	2	100	7	78					1	33	2	29	20	63
To organise a team	email	6	60	1	50	5	56					2	67	3	43	17	53
	Internet	1	10													1	3
	intranet	1	10													1	3
	NetMeeting	1	10													1	3
	VC	2	20													2	6
	AC	4	40			1	11									5	16
As a means of keeping in contact	email	9	90	2	100	9	100	1	100			2	67	4	57	27	84
	Internet	1	10													1	3
	intranet	1	10	1	50											2	6
	NetMeeting	2	20													2	6
	VC	1	10	1	50											2	6
	AC	4	40	1	50	2	22									7	22
No Response		1	10									1	33	1	14	3	9

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TRANCHE 4 Survey 2; Question 13	NCT	Position in CommCo													Total (n=21)	% of overall response rate
		manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%		
To access up-to-date information	email	2	50	3	100	3	43			1	50	1	100			10	48
	Internet	2	50	2	67	5	71			1	50			2	67	12	57
	intranet	4	100	2	67	5	71	1	100	2	100	1	100	2	67	17	81
	NetMeeting	1	25													1	5
	VC	1	25													1	5
	AC																0
Transfer documents	email	4	100	3	100	5	71	1	100	1	50	1	100	3	100	18	86
	Internet					1	14									1	5
	intranet	2	50	1	33					1	50					4	19
	NetMeeting	1	25													1	5
	VC																0
	AC																0
To set up meetings	email	4	100	2	67	3	43	1	100	1	50	1	100	2	67	14	67
	Internet																0
	intranet			1	33											1	5
	NetMeeting	2	50			2	29									4	19
	VC	1	25													1	5
	AC	2	50							1	50					3	14
To carry out meetings	email							1	100							1	5
	Internet																0
	intranet																0
	NetMeeting	2	50	1	33	2	29			1	50					6	29
	VC	1	25	1	33											2	10
	AC	3	75	1	33	4	57	1	100	2	100	1	100	3	100	16	76
Organise team	email	3	75	2	67	3	43	1	100	2	100	1	100	3	100	15	71
	Internet																0
	intranet	1	25							1	50					2	10
	NetMeeting	2	50	1	33											2	10
	VC	1	25													1	5
	AC	2	50	1	33									1	33	3	14
As a means of keeping in contact	email	4	100	3	100	5	71	1	100	2	100	1	100	2	67	18	86
	Internet					1	14									1	5
	intranet	1	25			1	14									2	10
	NetMeeting	1	25													1	5
	VC	1	25													1	5
	AC	1	25													1	5
No Response																0	0

N.B respondents could give multiple answers to each question

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TRANCHE 3															
Survey 2; Question 7 Did you find the review sessions...	Organisational Position in CommCo														Total	% of overall
	manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%	(n=32)	response rate
a good method of reviewing previous weeks.	9	90	1	50	7	78					3	100	5	71	25	78
good preparation for the assessment.	8	80	2	100	9	100	1	100			3	100	5	71	28	86
a good opportunity to ask questions.	7	70	1	50	5	56	1	100			3	100	4	57	21	66
an opportunity to meet others on the course.	6	60			5	56	1	100			3	100	4	57	19	59
an effective use of video conferencing technology.	4	40			3	33					1	33	2	29	10	31
the technology was an unnecessary part of the review.			1	50	3	33	1	100					1	14	6	19
the technology was a hindrance to the learning process.	5	50	2	100	5	56	1	100			1	33	2	29	16	50
no response.																

% = percentage of organisational position subsection total

TRANCHE 4															
Survey 2; Question 7 Please indicate with an 'X' for each true statement.	Organisational Position in CommCo														Total (n=21)	% of overall response rate
	manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%		
It was reassuring to have the mentor contact us during the day via the video conferencing technology.	3	75	1	33	4	57	1	100	2	100			1	33	12	57
It was advantageous to be in contact with the mentor via the video conferencing technology.	3	75	1	33	3	43	1	100	2	100			2	67	11	52
Contact with the mentor via the video conferencing technology was unnecessary.			1	33	1	14					1	100			3	14
It was easy to contact someone to ask a question.	3	75	2	67	6	86	1	100	2	100			1	33	15	71
I preferred to contact the mentor/trainer by telephone to ask questions.	1	25	2	67	2	29			1	50					6	29
I am more likely to use email to contact the mentor/trainer to ask questions.	1	25			1	14									2	10
no response.													1	33	1	5

% = percentage of organisational position subsection total

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TRANCHE 4															
Survey 2; Question 10 Please indicate an 'X' for each true statement. The course was...	Organisational Position in CommCo														Total	% of overall response rate
	manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%	(n=21)	
a good opportunity to increase my knowledge of new technologies.	3	75	3	100	6	86	1	100	2	100	1	100	3	100	19	90
a good opportunity to improve my computer skills.			1	33	2	29							2	67	5	24
an opportunity to meet other in my field.			1	33	1	14							1	33	3	14
good preparation for the CISCO assessment.					3	43	1	100					1	33	5	24
an effective use of technologies to train an opportunity to meet others on the course.	3	75	1	33	4	57	1	100	2	100			2	67	11	52
ineffective as the technology was a hindrance to the learning process.	1	25	2	67	1	14					1	100			5	24
difficult as there was no contact with a teacher/trainer.	2	50	1	33	3	43	1	100					1	33	8	38
no response.	1	25													1	5

% = percentage of organisational position subsection

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APPENDIX 18: PERCEIVED E-SKILLING AFFECT ON DELEGATE COMPUTER SKILLS

(only asked of tranche 4 delegates)

TRANCHE 4															Total	% of all responses
Survey 2; Question 8 **Do you think that the e-skilling course has improved your computer skills?**	Organisational Position in CommCo																
	manager	%	team member	%	technical officer	%	trainee	%	prof.	%	engineer	%	unknown	%	(n=21)	
already competent in computer skills	1	25	1	33	2	29	1	100	2	100	1	100			8	38
yes, improved a lot					1	14							1	33	2	10
yes, improved slightly	2	50	1	33	4	57							1	33	8	38
no not at all	1	25	1	33											2	10
no response													1	33	1	5

% = percentage of organisational position subsection total

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