

Chapter 1

Introduction

“Ours is a brand-new world of allativeness.

‘Time’ has ceased, ‘space’ has vanished.

We now live in a global village...a simultaneous happening.”

Marshall McLuhan and Quentin Fiore,
The Medium is the Message, Random House (1967)

1.1

Introduction

Computerised information systems have progressed from those that could simply replicate or automate the most simple numeric tasks previously performed by clerks, to those that are intended to convey far more complex information. Information is created so that it can be shared and the expectation may be that any two people reading it would interpret it identically, and hence that meaning would be shared without difficulty. As the information becomes more complex however, it becomes less and less likely that this will be the case and this presents us with one of the key problems of the Information Systems (or Informatics) discipline, namely, how to use technology to assist people to share meaning derived from complex information and how to teach people to use the technology optimally. The central purpose of this thesis is to explore one aspect of modern technology, namely e-mail, and its role in allowing people to share meaning.

This thesis does not try to identify how individuals share meaning in general, but investigates how communicating via e-mail affects the functioning of virtual teams (or dispersed collaborative teams), and in particular, how this influences the viability of such teams in telematic (or web-based) education. Virtual teams have clearly defined objectives, which require the team members to work together on a single project that is not routine, and requires joint problem solving. The research topic is relevant, therefore, with respect to specific new social structures (virtual teams and virtual organisations) and new organisational outcomes (for example, web-based education).

Although the research is carried out within the specific area of interest described above, it fits within the wider area of organisational change management, particularly the adoption and adaptation of technology within organisations. Orlikowski's model of the duality of technology [Orlikowski, 1992a] proposes "*a perspective that positions IT centrally within the process of Structuration*" [Orlikowski & Robey, 1991:5] and this has been applied in various case studies studying use of technology [Olesen & Myers, 1999; Okamura et al, 1995; Orlikowski, 1996; 1992b; 1991]. Orlikowski's model depicts the relationships between institutional properties, human agents, and technology. Not only do organisations use technology in sometimes unexpected ways that reflect their needs and character, but the technology will also bring about changes to the organisation's structures and procedures. The use of e-mail by a task-oriented team will similarly affect the functioning of the team and the team will use e-mail in ways that reflect its individual character.

This research also reflects the change of emphasis in information systems development from developing customised systems to developing tools which are flexible and easy to use. This is a very significant change, as it allows end users at all levels in organisations, and society as a whole, to use technology more actively, and to find, manipulate, and reconfigure information to suit their own purposes. Access to such tools and the information resources that they make available are potent factors contributing to economic and social development. This close and unavoidable interplay between technology and society (including the individual) is the reason Information Systems is considered to be a social science. Information technology tools that access formal databases and retrieve information have been widely adopted in organisations, but technology such as mobile telephones and e-mail is used extensively by individuals in their work and private communication. Thus, the use of e-mail has social consequences far beyond the work environment. There is likely to be an effect on society as a whole, which is similar in some ways to the effect that Orlikowski's model of the duality of technology describes within organisations with a more formal structure and clear purpose. In other words, the adoption of e-mail as a means of communication will result in e-mail being used in ways that are not foreseen, and social structures will themselves begin to change as a result of this use of technology. In particular, in the educational context, the use of virtual teams is likely to produce unexpected team behaviour, unusual new patterns of use and ways of using it, and changes to the educational system. This type of finding has been reported extensively with respect to general use of e-mail.

The research undertaken here differs from the general body of research on computer-mediated communication in its emphasis on collaborative learning. This research has found that individuals, using e-mail as a means of communicating during collaborative work, need extensive training as to how to compensate for the intrinsic leanness of the medium. A variety of frameworks, and depictions of factors and their interrelationships were developed as concepts emerged during this research. These are described further in Section 1.5.

1.2

Motivation for this study

The proposed research contributes to one or more of the future research challenges proposed by Leidner and Jarvenpaa [1995].

“Research is needed on technology applications to promote sociocultural learning “ which is described as ”... to immerse students in the content of the material, yet enabling them to communicate and contribute their own ideas and values based upon their own culture. ... Research is needed on the added value of technology to the learning models. ...

Research is needed on the influence of moderating variables on the learning models and their technological enhancements”

The research for this thesis makes specific reference to a web-based learning environment. This is appropriate as the concept of sharing complex information and reconstructing meaning lies at the core of education, particular at university level. Along with the unprecedented speed and enthusiasm with which the Internet was adopted came the idea that it could also be incorporated into education. It can be, and is, used widely as a form of electronic notice board, a medium easily accessible from anywhere at any time on which factual information can be stored. The essence of education is not, however, the provision of lecture summaries, schedules, or even allowing individuals access to their own, private, information such as marks or account information. The importance of deeper discussion of topics and the active involvement of the students in these discussions, and thus in constructing their own knowledge, is central to the constructivist model of learning.

Seely Brown and Duguid [1996] say,

“Learning, at all levels, relies ultimately on personal interactions and, in particular, on a range of implicit and peripheral forms of communication, some of which technology is still very far from being able to handle proficiently.”

Dreyfus [1999] points out that the claims made for web-based learning tend to be unrealistic and that only the first two stages of learning (the aesthetic where there is almost no commitment, and the ethical where commitment is temporary) can be implemented with information technology. Seely Brown and Duguid [1996] and Dreyfus [1999] emphasise the role of the community of practice in education and the apprenticeship which is served by students. This thesis describes an investigation as to what evidence there is that a learning community can not only survive but prosper when communication is predominantly via e-mail.

An attempt has been made to go beyond the type of research which studies the inclusion of the technology in education from an instrumental point of view and instead investigates the impact of the technology on the process where learners construct meaning. This involves aspects of both impact and effectiveness.

“In general, evaluation research in this area, whether quantitative or qualitative, is scarce. There is an urgent need for conducting systematic and rigorous evaluation research to further improve the understanding of the impact and effectiveness of these new learning environments.” [Beller & Or, 1998]

There is also a need to do research on the use of virtual teams, both in education and in virtual organisations, as there is a lack of experience and knowledge in this area. The value of virtual organisations has been questioned [Chesbrough & Teece, 1996], the difficulty of managing dispersed teams has been noted [Handy, 1995] and the possibility of actually collaborating via a lean medium has been queried [Introna, 2001; 1998]. Thus, there are several different lines of research that could be followed. In this thesis the emphasis is specifically on the construction and reconstruction of meaning via e-mail and this is largely independent of the organisational context*. The research is therefore equally relevant to an educational environment and a business environment. The unit of analysis is the individual and the team, not the organisation.

“... one aspect of structuration that Giddens has repeatedly stressed as central to his concerns, and in which IS play an increasingly important role, is issues of time-space distancing. For example the use of IS to support the globalisation of organisations, especially those such as professional service organisations for whom their product is the intangible expertise of their members, provides what would appear to be a particularly fruitful site for the exploration of these issues.” [Jones, 1999]

It is specifically in this context that this thesis refers to the writings of Anthony Giddens. Structuration theory as a whole is referred to on occasions but the thesis is not specifically oriented around the concepts making up structuration theory. Nevertheless the intention is to remain true to the central tenets of structuration theory, avoiding all suggestion of determinism, and seeing the human participants as intelligent actors but recognising that unforeseen events can influence outcomes.

Since the intention of this study is to examine how successfully meaning can be reconstructed from e-mail messages, it is essential that the concepts of “information” and “meaning” are examined in detail. In order to do so definitions obtained from a number of different sources are given in Chapter 3 before an attempt is made to arrive at some understanding of basic concepts, namely, data, information, meaning, understanding, knowledge, wisdom and insight, interpretation and learning and appropriation. In Chapter 5, various aspects of computer-mediated communication are discussed. Information Richness Theory, extensions to that theory, and other social definition theories in the context of communication richness are discussed in that context. The topic of the use of the Internet in education, or telematics in education is discussed in the last section of Chapter 5.

*It is important to emphasise that in this thesis, meaning is constructed and shared at the level of the individual and not that of the organisation. Boland [1996] raises concerns about the use of Structuration Theory in studies on shared meaning within organisations as he says meaning cannot be fixed even in policy. This particular problem is not applicable here.

In Chapter 6, Hofstede's [1997] work on cultures in organisations is mentioned as the multicultural nature of South African society is an important factor in this study. The fieldwork undertaken as part of this research involved group work by students and the relationships within the groups is considered a factor requiring attention. Organisational and social culture is one factor. Another is the ability of the team to develop trust within the relationship. Hence, the topic of development of trust in virtual teams is also discussed in Chapter 6.

This variety of different aspects could justifiably lead to the comment that they are not all handled in sufficient depth, that the thesis is fragmented, too long or lacks focus. An attempt has been made to produce a logical and cohesive body of work in which the contribution of all of these aspects has been clearly identified.

1.3 Definition of problem and research questions

The study took place in a multicultural, education environment, using telematic (web-based) teaching. This was an ideal research environment in which to carry out **critical, interpretive, action research to illustrate whether e-mail can be used successfully by students working together on tasks and projects which require them to construct meaning within culturally homogeneous groups**. In order to see whether meaning and individual interpretations can be communicated, the topic of the communication must be more than just factual. It must reflect the point of view of the originator of the message in a fairly subtle way and have an intention to construct a common understanding and potentially also allow for a new view to emerge which is shared by the team. In other words, there should be an opportunity to do collaborative work as a team.

A number of sub-questions were identified and these have been grouped according to the generic research questions for processed-based research proposed by Roode [1993]. (The list of sub-questions and a summary of the findings related to them, or alternatively, references to the associated discussion, are provided in the final chapter of the thesis.) The What is? questions explore the fundamental nature or essence of the research problem. Many of the answers to these questions were found during the literature survey. Nevertheless, this process did lead to some original thinking as different ideas from different sources were compared. In particular a classification of different types of information was devised. The How does? questions were answered by directly observing the phenomena and describing them. Answers to these questions were obtained from both the quantitative and qualitative parts of the research. The Why is? questions explain and determine relationships. The analysis and interpretation of both the quantitative and qualitative data provided insight with respect to these questions. The

final group of questions, the How Should? questions, are answered by means of conclusions reached from the research.

Whetten [1989] explains that the factors that are logically considered as parts of the explanation are essential elements of a complete theory, and that both comprehensiveness and parsimony are required. The long list of sub-questions is contrary to the goal of parsimony. Unfortunately in such a complex topic it is impossible to eliminate factors with any certainty.

1.4

A Road Map to the thesis

The Internet and in particular e-mail is an example of technology that is commonly used in the society of the early 21st century to replace other communications media. This is because it is so convenient (quick, cheap, easy, ubiquitous). This e-mail communication has made virtual teams possible and business-to-business use of the Internet has made virtual organisations possible. One new manifestation of this form of organisation is the use of the Internet in tertiary education. The “*globalising impact of the media*” [Giddens, 1990: 77] began with newspapers and the advent of the Internet has accelerated globalisation to an extent that is having a massive effect on world trade, economics and many other aspects of life including education. The empirical research done in this thesis, and described and analysed in chapters 7, 8 and 9, focusses in particular on the use of dispersed collaborative teams (or virtual teams) within education.

In probing the effectiveness of the use of e-mail as a medium for team collaboration we need to explore underlying concepts and theory. At the most pragmatic level various extensions of the original theory of information richness and issues associated with computer-mediated communication in general need to be explored. This is done in Chapter 5. Concepts more directly associated with collaboration and in particular virtual teams are discussed in Chapter 6. Fundamental concepts regarding information, meaning and learning are discussed in Chapter 3.

As pointed out above, the Internet is the major technology underlying globalisation. Giddens says, “*Modernity is inherently globalising*” [Giddens, 1990: 63]. Globalisation has as its underlying concepts the distancing of time and space. Hence modernity, globalisation and time and space are discussed in Chapter 4, depending to a large extent on the work of Anthony Giddens. This section contributes to the thesis as a whole by introducing some particular characteristics of radicalised modernity, namely trust and the reflexive project of the self, which are referred to in the final depiction of the role of information in collaborative teamwork (Chapter 9, Figures 9.7, 9.8 and 9.9). Concerns regarding technology and globalisation raised by Giddens are particularly relevant in a discussion on computer-mediated communication.

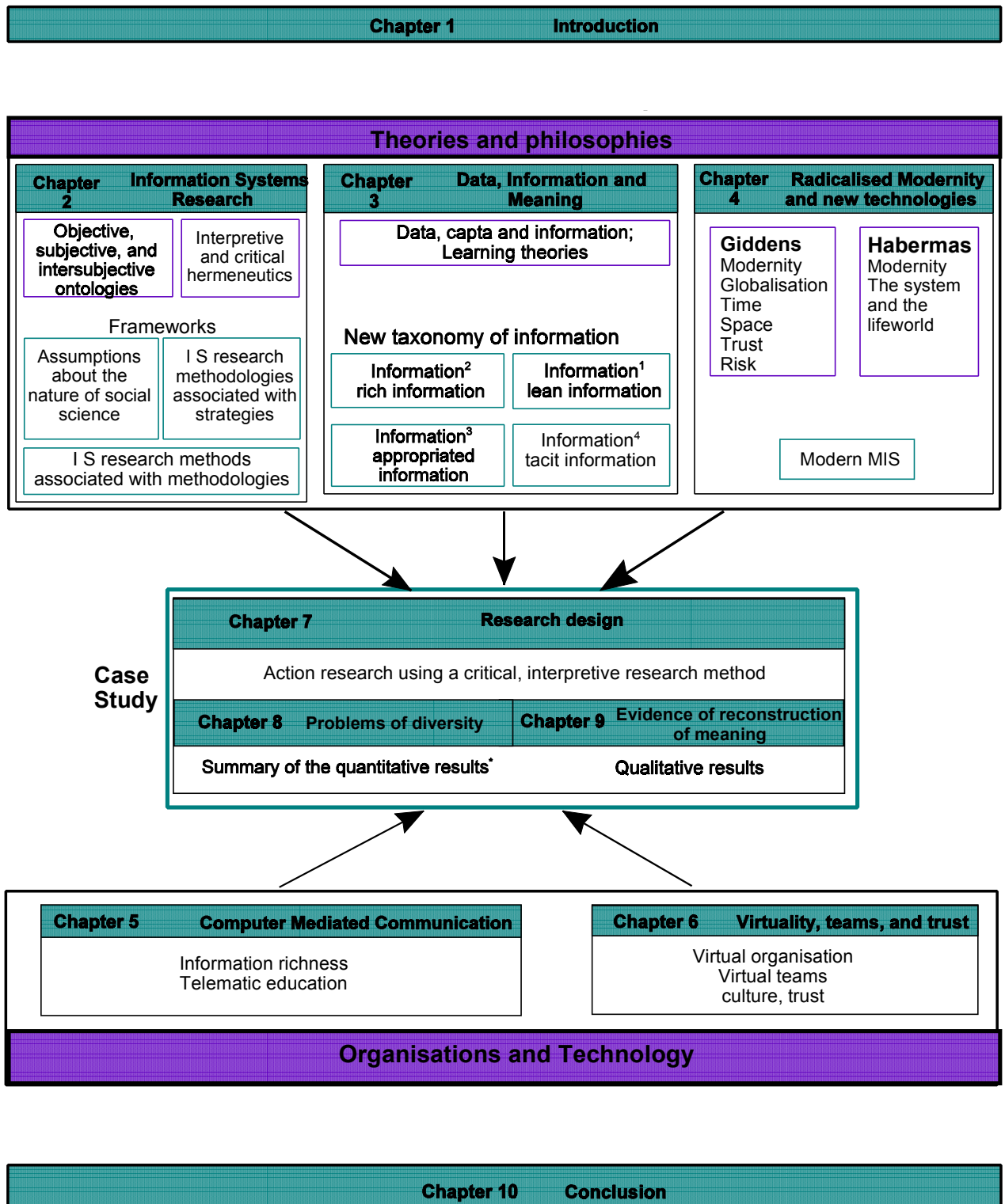


Figure 1.1: A road map of the thesis

A second relevant aspect of this topic is the ‘one-sided rationalisation’ of modern society (or radicalised modernity). An over-emphasis on efficiency and effectiveness has tended towards the reification or commodification of human life. Habermas has discussed this problem in detail in *The Theory of Communicative Action*, vol II, *Lifeworld and System: A Critique of Functionalist Reason* [1987]. The Theory of Communicative Action is referred to in two different ways in the analysis of the research presented here. The different forms of communicative action are used in analysing the team communications and the concepts of the ‘colonisation’ of the lifeworld by the system are related to the research. This is introduced in Chapter 2.

Thus this thesis is built up by examining the social philosophy of Habermas, namely the Theory of Communicative Action, together with concepts of globalisation (space and time) and the effect this has on trust and risk discussed by Giddens. The particular role played by technology in late or radicalised modernity is discussed with respect to the system and lifeworld and globalisation. More specifically computer-mediated communication is examined as it used by virtual teams in a dispersed teaching environment. The consequences of this type of communication in the context of collaboration is studied in depth with particular reference to the types of communicative action, communicative coherence, richness of information and aspects related to trust. The overall structure of the thesis is illustrated in the road map in Figure 1.1.

The thesis can be considered to consist of five parts:

- The introduction (Chapter 1)
- A theoretical and philosophical part
More general theories, including definitions of various views of ontology, and epistemology were examined in this part.
Chapter 2: This chapter defines and discusses ontology and epistemology. It includes a model of the relationship between forms of rationality and the worlds to which they apply, methodologies, research methods, Information System research is discussed and three new research frameworks* proposed. Finally a choice of research paradigm, based on the frameworks, is made.
Chapter 3: Data, information, meaning, and learning are discussed. This led to a new classification of Information types.
Chapter 4: Radicalised modernity and new technologies are studied. The interaction between time, space, modernity and information systems is examined with reference to Habermas and Giddens.
- An organisational and technological part

*The model and the research frameworks are described in more detail in Section 1.5, The outcomes.

Theories and research findings related more specifically to technologies were examined in this part.

Chapter 5: Different views of information richness are studied and a discussion of web-based education follows.

Chapter 6: Virtuality, virtual teams, culture, and trust are discussed. Factors affecting trust are identified and team activities are analysed with respect to time, trust and information.

- The action research which was done is described.

Chapter 7: The research design is described.

Chapter 8: A summary is provided of the quantitative data which was analysed with respect to diversity (different cultures). (The quantitative research is described and discussed in detail in a separate paper which has not been submitted as part of this thesis.) This provides an understanding of the context within which the research was undertaken.

Chapter 9: The qualitative data is analysed with respect to reconstruction of meaning. The model from Chapter 2 is used and two new models are created.

- Chapter 10: The conclusion including an overall model of the factors influencing the construction of meaning when text is communicated electronically.

1.5

The outcomes

A variety of outputs have resulted from this research. The What? questions resulted in the classification of types of information. The Why? questions were divided into two groups, those which were related to cultural diversity and those concerned with reconstruction of meaning. The findings constituted the output from this aspect of the research.

The How? questions resulted in the construction and use of three different diagrams highlighting the relationships of key factors.

- The first diagram (Figure 2.1) uses Habermas' Theory of Communicative Action and is a representation of the relationships between forms of rationality and the worlds to which they apply. This was developed in Chapter 2 and applied in Chapter 9.
- The second is derived from the first and is a very simple representation of the interaction between rationalities and intentional behaviour and is used to characterise the communication of different teams. This was developed in and applied in Chapter 9 (Figures 9.3, 9.4, 9.5, and 9.6).
- The third is a graphic overall representation (depiction) of the role of information in collaborative teamwork. This was developed in and applied in Chapter 9 (Figures 9.7, 9.8, and 9.9).

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- Finally an overall model is produced in the last chapter (Figure 10.1) in which the interplay of the key factors on the reconstruction of meaning is shown.

A number of subsidiary diagrams have been created which indicate relationships between elements, particularly those to do with trust (Chapter 6). All of these outputs contribute to the final suggestions concerning how virtual teams should be constructed and managed in a learning environment, that is, answering the How Should? Series of research questions.

1.6 Explanation of key terms and concepts

1.6.1 Virtual teams

In this thesis, therefore, a particular type of dispersed group, known as a virtual team, is studied. Virtual teams can be described as “... a self-managed knowledge work team, with distributed expertise, that forms and disbands to address a specific organisational goal” (Kristof et al. [1995] quoted by Jarvenpaa & Shaw, [1998]). Virtual teams are common in virtual organisations and may be considered to be essential in such organisations.

“The basic building block of virtual organizations is a virtual team.” [Jarvenpaa & Shaw, 1998]

Nevertheless, as these two authors note, virtual teams are also used in many organisations that are not virtual. Virtual teams should be involved in close collaborative rather than loosely coordinated work.

“Geographically dispersed, cross-functional teams are increasingly espoused for enhancing learning and innovation, especially in research and development activities.” [Sole & Applegate, 2000]

1.6.2 Collaboration

In this thesis collaboration will be understood as a very close form of cooperation in which team members work together on a single or integrated task and jointly construct meaning [Thomas, 2000].

The value of collaborative work, both in an educational environment and in a work environment, is generally accepted. Central to the idea of collaboration is the fact that the participants jointly construct a solution by working together closely and sharing meaning. This is in contrast with co-ordinated work where the participants divide the work and each team member completes one part. As virtual organisations are becoming a frequently encountered type of organisation, research is increasingly being focussed on dispersed collaborative groups made up of participants from the geographically separate parts of the organisation.

1.6.3 Co-operation

Co-operative work is a broader concept which includes tight collaboration and loose co-ordination [De Villiers, 1995]. This is in contrast with Introna's definition. Introna [1998] defines co-operation as that which "... happens when people engage in the production of a work as if 'one mind or body.' Where there activities fuse together in a way that make the suggestion of separation seem incomprehensible." What Introna refers to as co-operation will be referred to as collaboration throughout this thesis.

Computer-supported co-operative work (CSCW) and computer-supported co-operative learning (CSCL) focus on the development and adoption of technology to assist groups working or learning together.

1.6.4 Sociocultural learning

The sociocultural model of learning, a form of constructivist learning, recognises the importance of students working together in teams and actively participating in collaborative learning. This helps students to relate information obtained from outside sources to their own cultures and lifeworlds. This research explores the feasibility and efficacy of e-mail, which is a communications technology commonly available to students, in collaborative learning. This provides a genuine and appropriate example of an attempt to "reconstruct meaning, where text is communicated electronically".

1.7 The underlying epistemology

This research adopts an inter-subjective or social ontology. The works of two social scientists, Habermas and Giddens, have been studied in some depth. Habermas has been studied for two reasons. Firstly, his philosophy of societal rationalisation is based on his theory of communicative rationality. This emphasis on the role of rational discourse in society is closely

associated with meaning and shared meaning and these concepts are central to this thesis. Secondly, Habermas has examined and criticized modern society and, in particular, the role of the “system” (consisting of the economic and administrative systems which are involved in material reproduction) and its influence on the lifeworld. He believes that this influence results in a serious distortion which can bring about the breakdown of interpersonal relationships. Thus, an investigation into the role of technology in the process of personal communication can be usefully informed by his critique of the interaction of the system and lifeworld.

Giddens’ explanation concerning the distancing of time and space also contributes to the theoretical framework within which this study was conducted. Giddens refers to the society of our time as late modernity, post-modern society and finally as radicalised modernity and states that the way in which time and space are viewed and reinvented have an important effect on our society.

A sociocultural model of learning is adopted which is consistent with both the ontology and the Theory of Communicative Action. The influences of social factors on the use of technology (that is, social theories of technology adoption) are recognised.

Orlikowski and Baroudi [1991] refer to the type of research that is conducted here as being concerned with the social processes surrounding Information Systems. In the case of this thesis, the social processes examined are:

- How information technology should be introduced into organisations (in this case a university);
- Computer-mediated support of communication (here this is e-mail); power shifts generated by technology; (A teacher-centred, lecturing approach is modified by including a learner-centred, collaborative component, which can be supported by technology in the form of groupware and communications software. Here we will be referring only to the role of e-mail.)
- This relates to a broader issue, namely, the effect of the widespread use of technology on individuals, organisations and society in general, and this is discussed with reference to Habermas and Giddens.

The research method used, is interpretive action research in which the underlying context is explored in detail. No attempt has been made to search for universal laws. Data is presented directly from field notes and the researcher’s experiences, interpretations and observations of participants.

1.8 Limitations and restrictions

How people share meaning, or how one person can reconstruct the content of a message so as to understand it and can build on that understanding by including insights from his own experience, is a fundamental feature of human existence. This process (or ability) is the essential business of teamwork. It is, in a sense, unknowable and is also the domain of philosophers, psychologists and educators. The actual research component of this thesis is limited in its scope to the role that one form of technology (and here the way in which the technology is used must be included), namely e-mail, plays in this process. A formal study of text analysis, discourse analysis and speech act theory was considered to be beyond the scope of this thesis.

1.9 The inclusion of the research frameworks

Chapter 2 includes an extensive review of philosophies of science, epistemology, research paradigms and research methodologies culminating in a series of research frameworks. The first of these frameworks identifies different assumptions concerning human nature, and associates them with Habermas' classification of validity claims. The second links research methodologies to research strategies and the final one associates the different methodologies with research methods. This review could be considered to be unnecessarily detailed, to cover too wide a scope and to repeat material that has been discussed widely elsewhere. It proved to be useful for the following reasons.

- It was important to identify an ontology upon which this study could be founded, and to build ideas from that base. Socially constructed reality and the basic concept of shared reality were identified as being appropriate. Starting from the most basic philosophical level helped the researcher understand the work of Habermas and Giddens and this eventually formed a solid, theoretical (epistemological), foundation for the study. The representation of the relationships between forms of rationality and the worlds to which they apply, which was developed in Chapter 2, was applied in Chapter 8 when analysing the research results.
- The frameworks provide a summary of the review undertaken and provide links between the different levels of thinking about research and methodologies and methods for carrying it out. This assisted in selecting methodologies and research methods which were appropriate for and consistent with the underlying epistemologies.

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- This research includes a number of different aspects associated with different disciplines. The multifaceted nature of the research meant that methodological pluralism was advisable. It was necessary, therefore, to examine a variety of approaches and research methods. The choice of research methodologies emerged from the process of developing the research frameworks and the research plan in total was developed using the research framework.
 - Although an intersubjective view of reality is adopted for this research, the basic concepts of data, information, and meaning, which are explored in detail in Chapter 3, are also considered from objective and subjective points of view so the three views identified in the first framework are used to analyse these fundamental concepts.
 - The development of the framework ensured that the theoretical framework and assumptions were clearly stated from the beginning as Orlikowski and Baroudi [1991] advise. The section explaining the choice of paradigm for the research (Section 2.8) refers directly to the three frameworks.

1.10 The interdisciplinary nature of the research

The topic proposed for this dissertation is intrinsically multidisciplinary. It is of interest in the discipline of Information Systems because it is concerned with the adoption of information technology and its use within an organisation. There are, however, also aspects which involve education, psychology, organisational change, communication science and sociology. There is an additional link to the Information Systems discipline as the research was carried out as part of teaching students Informatics (or Information Systems). The interaction between Information Systems and other disciplines, particularly the social sciences, both in research [Klein, Hirschheim & Nissen, 1991; Landry & Banville, 1992] and in systems development [Dahlbom & Mathiassen, 1995], is widely recognised. Interdisciplinary scholarship, bridging the humanities and social sciences, is a fundamental part of the new scholarship emanating from various European intellectual developments since the middle of the 20th century, including critical theory, postmodernism, feminist theory and cultural studies [Agger, 1998: 10]. Agger says that “*the critique of positivism overlaps and informs the critique of disciplinarity*” [Agger, 1998: 10].

1.11

Conclusion

This research investigates a topic that is of interest to educationalists, managers of virtual organisations, and also those concerned with organisations that are dispersed and have employees working together but not from the same locality. The topic is informed by theories

originating from a variety of disciplines. This complex interaction of interests has made it necessary to study research approaches carefully in order to choose appropriate and pluralist research methodologies. It has also necessitated investigating material and theories from the various associated fields of interest.

The Theory of Communicative Action, developed by Jürgen Habermas, has been identified as the basis upon which the research builds and this is supported by concepts of information, time, space, modernity, globalisation, virtuality, trust and culture. The work of Anthony Giddens was consulted extensively regarding modernity, globalisation, time, space, and trust. Although structuration theory is referred to, the thesis does not focus on it or attempt to build on it in any way.