Chapter 6

Virtuality, teams and trust

"'Men work together,'I told him from the heart,

'Whether they work together or apart.'"

Robert Frost, The Tuft of Flowers

The Poetry of Robert Frost. Edward Connery Lathem, ed. (1979) Henry Holt.

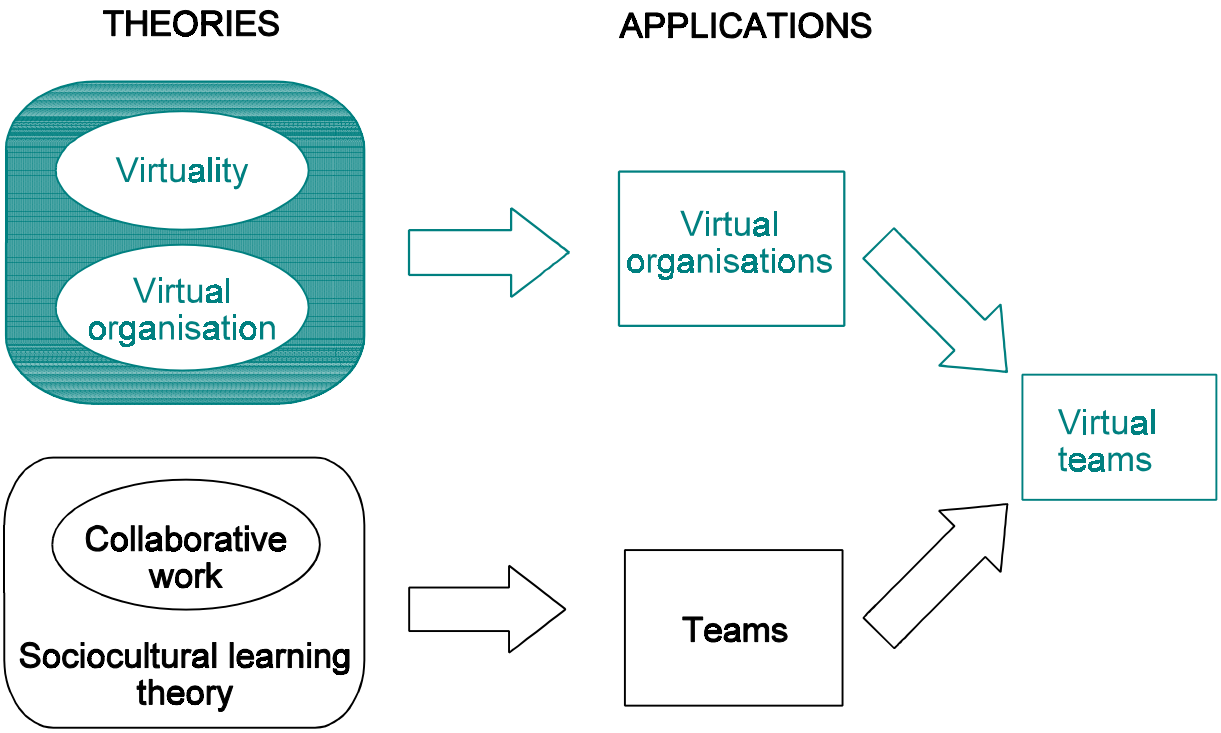

Figure 6.1: The contribution of theories of virtuality and collaborative learning to virtual teams

6.1 Introduction

There are numerous benefits resulting from collaborative work within a virtual team. However, there are also a variety of difficulties associated with this type of group work. If virtual teamwork is to be successful and take advantage of all the benefits, while avoiding the pitfalls, it is necessary to understand how virtual teams work, what affects them and what strategies can be employed to make optimum use of them. Issues such as the management of the team contribute to the teams' effectiveness but this thesis focusses on only one aspect, how teams share meaning and get involved in discourse with one another. In Chapter 5, communication using e-mail was discussed in terms of the type or richness of the information that can be communicated and suggestions were made regarding how the general use of e-mail could be improved. In this chapter, the subject is explored from the point of view of how dispersed teams

work together and what factors affect them and the role of computer-mediated communication in this teamwork.

Where group work takes place in a virtual environment, it is important to understand the impact of virtuality on the lifeworld and the processes involved in virtual organisation. It is similarly important to understand the development of virtual organisation as a form of metamanagement and the impact such organisation can have on society, as well as the challenges it poses and the opportunities it presents. The concepts of virtuality and virtual organisation are explored in Section 6.3 and in Section 6.4. This provides a theoretical basis for the “virtual” aspect of virtual teams.

It is also important to understand group work generally, both in its co-operative and collaborative forms. The discussion in Chapter 3 around sociocultural learning theories is important in this regard, as it adds to an understanding of how groups work and how people can learn behaviours that will impact on their ability to work in a team. This theory is applied in Computer Supported Cooperative Work (CSCW) and Computer Supported Cooperative Learning (CSCL). These areas of application not discussed in detail of this chapter as the value of collaborative team work is generally accepted and the research undertaken did not rely on Decision Support Systems or more sophisticated groupware.

The way in which the theories of virtuality and sociocultural learning interact and the application areas affected are illustrated in Figure 6.1. As is indicated in that diagram virtual organisations are associated both with the theories of virtuality and with virtual teams. Nevertheless, virtual organisations as a business model are discussed only briefly here, as the unit of analysis of the research undertaken for this thesis is at the level of the team and not the organisation. The emphasis in this chapter is, therefore, on virtual teams and the factors which influence their effectiveness. Questions of culture and diversity impact on how groups work together and it is necessary to appreciate how this is emphasised in the virtual environment.

Finally, trust is an important element in the effectiveness of any joint work and particularly so in the virtual context. It is therefore necessary to understand how trust impacts on group work and how trust can be developed. Trust was discussed in the context of modernity in Chapter 4. It is discussed again in detail here, from the perspective of building trust in teams in a working environment, that is, from a more pragmatic point of view.

Understanding these elements of virtual team work are important in any context where dispersed teams work together. However, they are especially important in the learning context, as students need to be prepared for a work environment in which virtual teamwork is becoming increasingly common. Students not only need to be introduced to the technology which supports such work,

they also need to be made consciously aware of the various factors which influence the effectiveness of virtual teams and need to be taught strategies which will permit them to make optimal use of this environment. This can be taught in various courses and in different degree programmes. For example, in a description of a postgraduate management course it is included as one of the three MBA treasures. These were given as, " ... *an intellectual curiosity, and* ***ability to work in teams*** (my emphasis) *and resilience to handle sustained pressure* ..." [UCT News, 2001: 40]. Chapter 5 addressed this question in part by indicating what students should be taught about communicating using electronic media but the discussion given in this chapter focusses more on the social issues than the communication and media issues.

6.2 Co-operative work

De Villiers [1995] says,

> "... *there is general agreement that co-operative methods which incorporate group goals and individual accountability accelerate learning considerably. These methods also have a positive effect on a wide array of effective outcomes such as intergroup relations, acceptance of mainstream learners and self-esteem.*"

Co-operative work is a more general term referring to any type of group work. It includes collaborative work, where students interact and work together on a single or integrated task, and co-ordinated work, where the students divide up the work, each complete a section and then combine the parts in some fairly loose way.

Learning theories, and in particular sociocognitive and sociocultural learning theories, were discussed in Chapter 3, Section 3.6. As was pointed out in that discussion, both of these theories propose that learning is primarily a social process that takes place when the learner is interacting with others. A key principle of constructivist learning theories, of which the aforementioned are both examples, is active learning. The learner must actively participate in the learning process. Associated with this is situated cognition, which says that the learner will build up a mental model using elements obtained from the social environment in which he is located, as well as elements from the knowledge and experience he already has.

Collaborative work requires students to work together in small groups or teams to achieve a clearly defined goal. Each team member will contribute unique insights, skills and personal attributes and will gain from those of fellow team members. Thus the team will achieve more than the separate individuals can. Learning occurs as an interactive and social process while the team members work together as individuals, construct meaning during the process of questioning each other's understanding and elaborate on ideas being shared in the group.

> "*Groups solving case studies are likely to experience process gains such as stimulation, synergy, more information and learning.*" [Nunamaker et al., 1991]

For the collaboration to be successful, each learner must:

- clearly understand the team goal,
- communicate effectively both with respect to ideas and feelings,
- actively and effectively participate in the team's work,
- contribute to the group's decision making process,
- handle conflict constructively,
- bond with the other team members,
- solve problems, and
- share power, influence and leadership.

[De Villiers, 1995]

The advantages observed in collaborative work in an educational environment have been seen to be equally useful and evident in certain work environments. The original purpose of using a project team to complete a task that was too much work for one person or that needed the specialist skills of several different people has been extended. The team stimulates, motivates and vitalises the individual team members, that is, it generates synergies. Knowledge is one of the resources or assets of any organisation and learning and problem solving must occur within organisations. The similarities between the activities in the classroom and those in the office are important. Collaborative work within an organisation can be seen as a form of collaborative learning and hence the activities given above for learners are equally necessary for members of collaborative work teams.

Teams consisting of members from different organisations are also becoming more common, particularly within virtual organisations. Issues concerning teams that do not share space or place are discussed in Section 6.7.

Advantages and disadvantages of computer-mediated communication were discussed in Chapter 5. Just as collaborative learning and collaborative work are similar in many respects, Computer Supported Co-operative Work and Computer Supported Co-operative Learning have common roots and can use much of the same software (Groupware, Group Decision Support tools), technology (videoconferencing, online chat, et cetera) and methods.

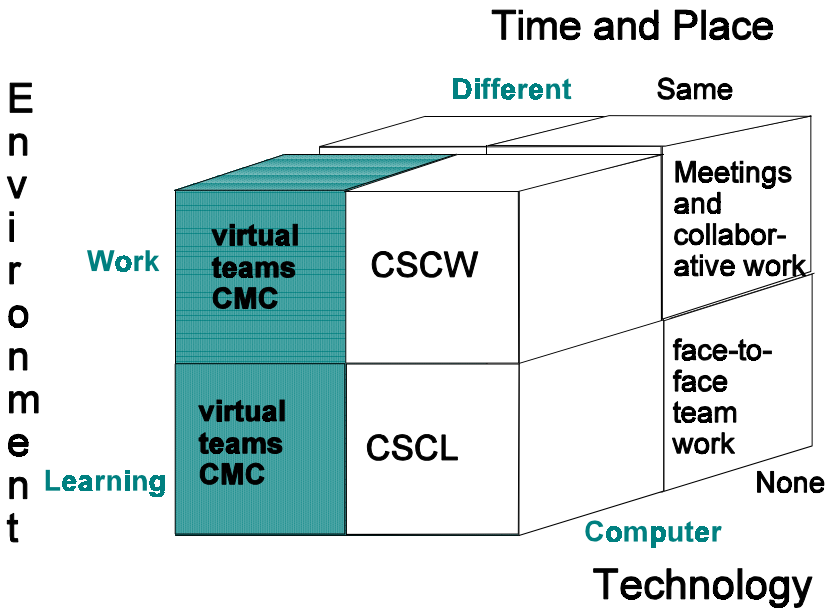

Figure 6.2: The systems used by teams

Figure 6.2 highlights the conceptual position of virtual teams using computer-mediated communication in the familiar time/place communication framework [Turban & Aronson, 1998] but adds a technology dimension. Hence, virtual teams are appropriate in both work and learning environments where they occupy different space, communicate asynchronously (different time) and use computer technology to do so.

Since the value of collaborative work is generally accepted, a detailed account of the theory and research in the field is not given in this thesis.

6.3 Virtuality

Virtuality, or the defining characteristic of virtual organisations, virtual communities and virtual teams has been described by a number of authors to encompass a number of related ideas. These will be used in Sections 6.5 and 6.6 of this chapter to explain what is meant by the terms ‘virtual organisation’ and ‘a virtual team’.

One interpretation of the concept of virtuality is that a virtual entity seems to be the actual entity but is not [Shao, Liao & Wang, 1998]. For example, virtual memory appears to be, or acts as though it is, a large amount of main memory, but is in fact the manifestation of the use of a technique where the operating system uses secondary storage to supplement main memory.

Anyone interacting with virtual reality would experience it as though it was the real world, but it is, of course, only a limited and quite crude copy. There is, therefore, an association of virtuality with simulation.

A different interpretation is discernable in the case of virtual social structures, such as virtual communities, virtual organisations and virtual teams. Here it is not so much that the people do not really work together but that they do so in an unusual way. The end result is supposed to be the same, as though the participants made up a traditional team, organisation or community. The idea that virtuality allows the same ends to be achieved as before, but by means that are not traditional, has evolved, and now implies the use of technology, and in particular telecommunications, in attaining those ends. Definitions of the various types of virtual organisation refer to the use of Information Technology and this is usually intended to mean communication by means of networks, usually the Internet.

Associated with these definitions is a perception that a virtual organisation, virtual factory, virtual community or virtual team is ephemeral, as its parts are not all located in anyone physical place and the social group does not exist in a tangible way. The physical presence is substituted with virtual presence [Skyrme, 1998]. This, in turn, implies that the composition of these structures is dynamic and therefore they have the ability to respond to the requirements of the moment and can reallocate resources as requirements change. They can also be dissolved when they have served their purpose. This temporary or unstable structure can affect the degree of commitment that people feel towards the virtual entity.

Another aspect of virtuality is that the virtual entity has more capabilities and power than it inherently possesses [Christie & Levary, 1998]. This may be a result of the synergy inherited from collaboration [Holland, 1998] or may arise from the optimal use of resources. For example, virtual memory allows the computer to function as though it had a larger main memory than is actually the case and is, therefore, more powerful. A virtual team can derive the benefits of collaborative work without having to travel to meetings or all being available at the same time. Partners in a virtual organisation can share resources.

Virtuality, when applied to social structures, implies that the organisation is dispersed. Virtuality, therefore, crosses the barriers of space and in so doing causes a change in the way that the organisation functions in terms of time [Introna, 1998]. Virtual teams, for example, will communicate asynchronously much of the time, as they are not all working in the same time zone and, therefore, are generally not all working at the same time. This means that different groups may be active through the full 24 hours of the day, resulting in maximum productivity. Virtuality, therefore, implies a restructuring of the way people work with respect to fundamental dimensions (when, where and how).

Turoff [1997] considers the concept of virtuality from a rather different angle. He defines virtuality as the property of a computer system which allows it to influence the real world by making it

"... behave according to the template dictated by the virtual systems [operating inside the computer]." This argument is consistent with that of Giddens' structuration theory [Giddens, 1984] in terms of the duality of structure (the system affects the lifeworld and the lifeworld affects the system) and also recognises and warns of the possibility of the system colonising the lifeworld which is one of the concerns raised by Habermas.

Turoff stresses that the representation of reality within a computer system is not the "real thing" but a new reality that differs in important ways from the original. Our understanding of processes, be they physical or social, depends largely on any mental model we have adopted. The model has an overriding influence over how we interact with the system. Virtual reality systems are experimental simulations that resemble the real world only superficially. A simplified representation may assist us by making the actual situation easier to understand. A model acts as a filter allowing us to concentrate on the elements that are considered important while ignoring other aspects. This is acceptable when virtual reality systems are used as games or models of the physical world, as long as we remain aware of their limitations, but an oversimplified or incorrect model can mean that all interaction with the system is inappropriate. This is serious when parts of social systems are automated or when computer systems interact closely with social systems. For example, an entirely computerised state pension system can cause severe hardship if the realities of the difficulties that the elderly and disabled may face in accessing the system are not recognised and catered for. If reality is interpreted in terms of the model created by the system, instead of the system reflecting 'real life' as much as possible, the system colonises the lifeworld. Not only does technology have a direct impact on the lifeworld, it tends to influence the human perspective so strongly that only those objectives that are considered to be technologically achievable are every considered [Sotto, 1997].

"*Today we are consciously or unconsciously designing social systems.*" Turoff [1997]

Participants in a distributed virtual environment are in fact "negotiating reality" as they have the option of simply accepting what they are told or of challenging it by asking for supporting evidence. They do not have the normal supporting social structures or additional information, such as involuntary body language cues that we interpret subconsciously, that reduce risk in a traditional organisation. They must, therefore, be more conscious of the need to challenge statements and confirm that there is shared meaning rather than assume that information is correct. The feasibility of challenging truth claims and reaching consensus in an electronic or virtual environment is central to this thesis.

Turoff [1997] also points out that computers not only enable users to create "*models of reality but [give us] the ability to make any model appear real*." This pseudo reality is inclined to persuade us that the computerised system is valid and really does reflect reality.

Turoff's view of virtuality, and the warnings that it holds, acts as a counterbalance to the very optimistic, more instrumental views of virtuality that were given earlier in this section. The goals of Critical Social Theory require that these concerns be considered when research is carried out that involves social structures.

6.4 Virtual Organisation Theory

Mowshowitz defines virtual organisation as metamanagement, which results in the appropriate assignment or reassignment of concrete satisfiers to the abstract requirements of a task [Mowshowitz, 1999]. This is explained as follows: Virtual organisation is a switching process used to match suppliers (the satisfier) with a clearly specified requirement. It is necessary to make goals explicit and, as this is possible only for goal-oriented tasks, virtual organisation is limited to tasks of this sort. This switching process is typical of a search using a search engine on the Internet where the search criterion is the requirement and the list of sites retrieved represent the satisfiers. However, this process need not occur in an automated or computerised environment. A further step of selecting one from the list of potential satisfier is also required,that is, the actual connection or linking of the customer to the supplier must occur. Querying a database is another example of virtual organisation according to this definition. It is essential that a clear specification of the demand or requirement is made separately from descriptions of all the suppliers.

The process has two additional stages, one which specifies, maintains and occasionally alters the procedures or algorithms used when satisfiers are identified and a particular satisfier is chosen. The process of developing new search algorithms that will speed up a search of the Internet is an example of this stage. The second is at a higher level, where the goals are reviewed that were used to decide on these switch linking procedures. For example, Introna and Nissenbaum [2000] discuss the politics of search engines and gives examples of the criteria used to determine the comparative relevance of sites identified in a search and other criteria which are commonly used to determine whether sites that are less relevant will be displayed within the first references listed.

Using an Internet search engine as an example, the alternative criteria evaluated during the last stage of metamanagement (that is, review satisficing criteria by reflection on goals) could be to:

- Allow owners of sites to pay for a top position.

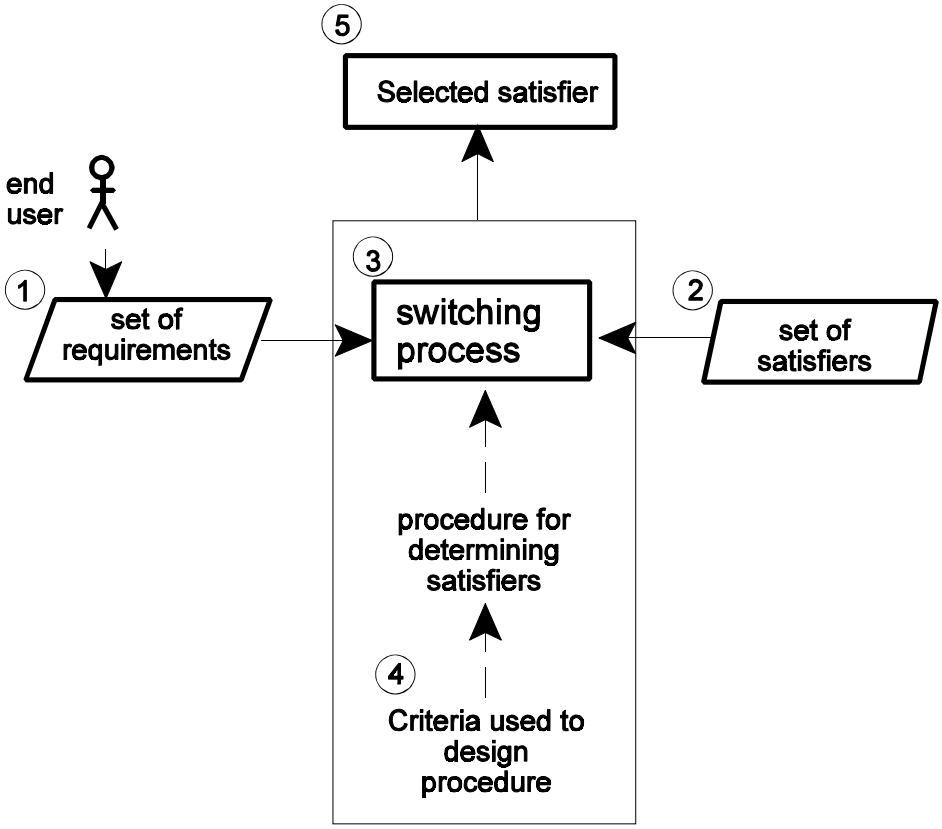

Figure 6.3: Five major responsibilities in managing a virtual task (derived from Mowshowitz, 1998])

- Use the number of links from other sites to this one to determine its relevance and hence position in the list.
- Analyse the choices made by other users of the Internet who seem similar to this user in order to try to provide a selection of sites which will be of interest to this particular user.

The five major responsibilities of metamanagement, or the management of a virtually organised task, [Mowshowitz, 1999] are illustrated in Figure 6.3. Central to this concept of virtual organisation is the fact that sets of requirements, suppliers or satisfiers, procedures and criteria (shown as 1, 2, 3 and 4 in Figure 6.3) change continuously. These categories of information must be maintained and altered separately. The switching occurs as an isolated event (shown as 5 in Figure 6.3). This allows better service, as appropriate new solutions can be obtained at any time.

Although switching need not be according to formal, quantitative or algorithmic system, [Mowshowitz, 1997] it is more difficult to accomplish in an environment where computers are not

used. It is difficult to allow for a subjective point of view and is much easier if relationships can be based on explicit agreements. This view of virtual organisation does not cater well for ripple effects, or interdependent functions. It sees transaction cost simply in instrumental or mechanistic terms of matching requirements with satisfiers but has no concept of relationships or trust or the cost of creating relationships.

6.5 Virtual organisations

6.5.1 Introduction

There are four factors that have given rise to virtual organisations. These are

- globalization,
- the spread of information technology,
- the birth of the information economy, and
- the dismantling of hierarchy.

All these forces cause and affect each other [Introna, 1998; Skryme,1998].

Globalization has had at least two influences on organisations. The customers and the contributors may be anywhere in the world. The need to reach global markets and utilise global resources in order to be competitive is one of the challenges facing any organisation that has even moderate ambitions. Contributors may belong to the same organisation (as is the case with regional offices or divisions producing part of the produce), they may be suppliers, they may be outside organisations who are partners in producing the product or they may be individuals who have specialised knowledge and contribute as team members.

The development and spread of information technology have made it possible for organisations to become more responsive to customers by allowing easier access to information about their products and services, providing faster access to and delivery of services and by offering products and services which more closely match the customer's needs. The development of new technologies has, however, resulted in a need for the individual producers to keep abreast of new developments and to keep informed as to what the competition is doing. The world economy is so aggressive that even those organisations who do not seek international markets must defend their national markets from other global players.

The birth of the information economy means that much of the trade which now takes place is not an exchange of physical goods but of information and services. These are the ideal products to

trade over the Internet and hence this form of economy has both encouraged the development of networked markets and been stimulated by their growth.

The virtual organisation ideally consists of autonomous participants and democratic relationships should balance power between the individuals participating in virtual teams or partner organisations. These teams are self-managed and hence the number of levels of management can be reduced. In addition, individuals can communicate with more senior managers directly via e-mail. The empowerment of the individual worker, the reduction of bureaucracy in favour of more flexible and democratic management and a view of employees as committed, accountable and trustworthy, are ideals which are closely allied with concepts such as the virtual office and virtual teams. The more liberal politics and social mores of the second half of the twentieth century support these goals and naturally encourage this type of management structure. The evolution of the technology should not lock in partners nor should others be locked out [Steinfield et al, 1995]. However, this ideal of trust and egalitarianism is not always borne out in practice [Wilson, 1999; Chesbrough & Teece, 1996; Handy, 1995].

6.5.2 Definition of "a Virtual Organisation"

Virtual organisations use virtual organisation. The working group 4 of Project ACHIEVE [ACHIEVE, 1998] define a virtual organisation as one which strongly exhibits any *one* of the following characteristics:

- Geographic dispersion
- Empowerment, a move away from hierarchic management structures
- A dynamic nature, responds to change
- Interdependence

The definition by Travica [1997], given below, is concise and covers most of the characteristics commonly considered to be relevant. However, not all researchers or teachers in this field would agree that the partnership must be involved in a production process. Some speak more broadly of a partial mission overlap or achieving a collective goal.

> *"VO refers to a temporary or permanent collection of geographically dispersed individuals, groups, organisational units - which do not belong to the same organisation- or entire organisations that depend on electronic linking in order to complete the production process."* [Travica, 1997]

Combining these two definitions, a virtual organisation can be defined as follows:

A virtual organisation is a temporary or permanent collection of interdependent, geographically dispersed, individuals or groups, from within the same organisation or from different organisations, that depend on electronic linking in order to achieve a collective goal.

The correspondence between an organisation which is said to be virtual and virtual organisation theory arises, therefore from the following significant characteristics.

- The use of a switching process to select a satisfier from a set of satisfiers at the time that a service is required although those satisfiers may be geographically separate. Electronic linking enables the communication of the set of requirements and the delivery of service by the selected satisfier.
- The set of satisfiers may change as the composition of the virtual organisation is not fixed.
- The two previous characteristics enhance the dynamic nature of the virtual organisation.
- The interdependence is indicated by the need to obtain services from different groups using this switching process.
- The hierarchical management structure is replaced to some extent by the meta-management offered by the virtual form of organisation.

6.5.3 Success factors

The most successful virtual organisations are those where the different groups or organisations can work fairly independently on complementary tasks and communicate with each other through clearly identified channels [Chesbrough & Teece, 1996]. In other words, these organisations are more co-ordinating than collaborative. Another factor increasing the chance of success is having a stable and small set of partners in the organisation [Magretta, 1998].

Further success factors associated with virtual organisations are

- an organisation culture that accepts technology,
- a highly decentralised organisation, and
- a change-oriented organisation [Burn & Barnett, 1999].

Some authors measure the degree of virtuality of a virtual organisation according to how successfully the organisation breaks the barriers of time and space by delivering products and services at any time and anywhere [Sieber, 1998]. As the wealth of other factors involved has indicated, this is too simplistic.

6.6 Virtual teams

6.6.1 Introduction

> " *The basic building block of virtual organizations is a virtual team*." [Jarvenpaa & Shaw, 1998]

> *"A virtual organization thrives only in the environment of teamwork."* [Christie & Levary, 1998]

A virtual team is a temporary or permanent collection of a small number of interdependent, geographically dispersed, individuals that have a common goal and depend on electronic linking in order to collaborate and achieve it. Thus the same four characteristics as were recognised for virtual organisations apply to virtual teams, namely,

- Geographic dispersion,
- Empowerment, a move away from hierarchic management structures,
- A dynamic nature, responds to change,
- Interdependence.

Therefore, the concepts of virtual organisation apply as much to virtual teams as to virtual organisations.

> *" ...communication and collaboration will become activities integrated with, and natural components of, all aspects of daily, electronically-mediated, work"* [Manheim & Watson-Manheim, 1999]

A virtual team is usually involved at the strategic level (for example, with planning for non-routine work, such as analysis or design and with work that requires decisions to be made). Virtual teams should be involved in close, collaborative work rather than loosely co-ordinated work. It is important that team members communicate well with one another and can reach consensus. Thus, it is important that team members have interpersonal skills and personal cyberskills including e-mail techniques [Skyrme, 1998]. As was explained in Chapter 5, these can be learned to some extent and it is necessary that staff are given an opportunity to gain them and practice before they are needed in a stressful, "real life" situation [Coleman & Schiller, 1999].

> "*... simply supporting communication and collaboration with these basic technologies [e-mail, realtime chats, other types of groupware, workflow management systems etc] is NOT by itself sufficient ... additional software and training and education are required*." [Manheim & Watson-Manheim, 1999]

As is the case with virtual organisations, there is no formal management structure or organogram for a virtual team, although different members may play particular roles in the team because of their specialist knowledge (relating to the core competences of partners in virtual organisations). One member of the virtual team may assume the role of team leader or this role may be taken by different members at different times but a leader is seldom formally appointed. Virtual teams, because of their democratic and flexible nature, rely very little on rules and regulations [Majchrzak et al., 2000]. Thus there is lack of structure of all types and this needs to be balanced with trust. Trust limits the need for structure but exclusive reliance on trust is dangerous [Sabherwal, 1999]. Forms of trust will be discussed in detail in Section 6.8.

The members of the team usually represent the different partners in a virtual organisation **but virtual teams may also exist outside virtual organisations**. Members of any community of practice, for example, medical practioners in family practices or history professors, might create virtual teams. If the team members have joined the team as individuals, without the involvement of the organisations to which they belong, there is no corresponding virtual organisation.

Virtual teams are often used in software development. This may be out-sourced with the developers at one location and the end users elsewhere, or developers may work from their own homes, or different team members may be located at different branches of the same organisation, possibly in different countries [Boland & Citurs, 2001; Kimble et al, 2000; Sabherwal, 1999; Tellioglu & Wagner, 1999]. Virtual teams are, however, found in all sectors including law firms, insurance companies, medical services, computer hardware manufacturers and advertising agencies [Kimble et al., 2000; Ogilvie, 1994].

A grey area exists in the case where staff members are allowed to work from home. This telecommuting does not mean that the staff member is necessarily a member of a virtual team. The level of communication between the staff member and others, the sense of working together on a common project, whether the team has a recognised membership (even though the composition of the team may change) and the media used for communication, all determine whether this is a virtual team or not. Similarly, virtual organisations do not have to have virtual teams. Communication between the different organisations might be routine and formal, such as by means of EDI, online orders and progress reports that are generated entirely by an information system. All strategic planning and decision making that requires the participation of representatives from all the organisations might take place face to face. All product design might

take place within individual organisations, by collocated teams. Thus, the key words in the definition given at the start of this section are “common goal”, “collaboration”, “dispersed” and “electronic linking”.

6.6.2 Effectiveness of virtual teams

Kimble et al. [2000] believe that, “*Today only a small proportion of virtual teams reach a level of performance that goes beyond what the individuals concerned could achieve independently.”*

But other authors have different opinions. For example, in discussing the use of virtual teams in software development Tellioglu and Wagner [1999] say,

> “*... much of this work is done by multiple, often distributed, groups ... There also may be much geographical as well as cultural space between those groups. Although they may not be connected in ways that help create a shared understanding, they manage to develop a reasonably coherent and stable product...*” [Tellioglu & Wagner, 1999]

The factors contributing to the success of the team can be classified as those to do with the environment, the organisations, the interpersonal issues and the individuals.

6.6.2.1 Environmental factors

The environmental issues are general factors linked to time and space, such as the difficulties which the medium intrinsically presents with respect to carrying rich information across space and time. This was discussed in Chapter 5.

> “*Many of the barriers ... derive from the lack of understanding of the new geography of information systems*. “ [Kimble et al., 2000]

Differences in culture are related to geographic separation. Thus place difference, rather than space difference, is relevant. That is, the differences to do with cultural norms, infrastructure, and other local circumstances, remain significant although the number of kilometres separating the participants is of ever decreasing importance. The geography of information systems is made more complex by the fact that there are two spaces within which information systems operate, the physical space and the electronic space, and the rules governing the two are fundamentally different. For example, if you share a physical space you are likely to share at least some aspects of culture, you will probably have a language that you both understand, you will have access to much the same infrastructure and people and you are likely to communicate synchronously. On the other hand, if you share an electronic space none of these assumptions

can be made. There are also electronic places within the electronic space, such as chat rooms, in which a person can invent any number of different personal identities [Kimble et al., 2000; Chester & Gwynne, 1998].

6.6.2.2 Organisational factors

The general issues identified as being environmental often have local or organisational manifestations. At the local level, the fact that different localities have different infrastructure is a problem that is related to geographic separation. In an office environment, we are accustomed to having certain equipment like photocopiers, fax machines, powerful computers on which the required version of the required software is loaded, the services of a secretary, even possibly assistance in translation. All members of a collocated team would have access to these and would know that other team members also have these facilities. If a virtual team member is working from a home office, some of these may not be available. Just as confusing will be situations where the different team members use incompatible technology. Something as trivial as a printer setup that differs at various sites can result in carefully formatted reports printing incorrectly, resulting in wasted time, irritation and even friction between the team members.

All the members of a virtual team need to have equal access to reliable communications technology in order to exchange information quickly. Whereas we will wait patiently for a physical facility to open at the start of business in the morning or after a weekend, we are very impatient if an online service, which is meant to be available 24 hours a day, is not immediately accessible for any reason. Since this technology is both complex and dependent on other layers of technology, such as servers and ISPs that are not entirely controlled by the individual, team, or virtual organisation, reliability becomes a key issue and frustration levels can be high.

> *"Effective virtual working requires seamless interoperability and knowledge flows between people, processes and information repositories, wherever they are located ...*" [Skyrme, 1998]

Differences in culture are noticeable between nations but there are also differences between the cultures of organisations. These different norms can be the root of serious misunderstandings. Simple issues such as the appropriate form of address for more senior staff or how strict an organisation is regarding use of equipment for private purposes, can become significant areas of conflict.

> "*... actual practice depends on context (of people, knowledge, and the nature of the task) and is cultured (in the sense of being shaped by beliefs, commitments, styles, and power relations)*." [Tellioglu & Wagner, 1999]

Management of virtual teams requires an entirely new philosophy and approach. The self-managed nature of the team is a consequence of the distance between participants and the character of the media used for communication. For example, if e-mail is used as the primary means of communicating, the individual has control over when he will read messages, when he will reply and what issues he will address. Direct supervision is impossible. Handy [1995] addresses the issue directly and says "... *we will have to rediscover how to run organizations based more on trust than on control. Virtuality requires trust to make it work. Technology on its own is not enough."* [Handy, 1995] Trust must be developed at all levels (manager-manager, manager-worker, worker-worker, customer-organisation) and hence it is necessary for managers and employees to have new skills and changed expectations [Christie & Levary, 1998].

Wilson [1999] addresses issues of surveillance and control over staff in virtual organisations which can arise when this trust is not present or where these issues are distorted.

> "*Personal relationships become a legitimate target for manipulative action by the promoters of corporate culturism and 'organisational change' where the concepts of mutual trust between individuals and commitment to a work group are used to influence the behaviour of individual [sic]. This is done by providing strong and systematic incentives to obey company rules, to develop work habits of predictability and dependability, and to internalise the enterprise's goals and values.*" [Wilson, 1999]

There are two contrasting philosophical points of view concerning the way in which advanced computer systems affect the organisation with respect to issues of trust and risk. The first is that advanced computer systems will be used to control virtual organisations as they will regulate reality. This was discussed in Section 6.3. This can, in extreme case, lead to loss of individual choice. Another aspect is that rigid systems will favour hierarchical virtual organisations where participants are locked into the relationship and the organisation is dominated by the most powerful partner. More flexible systems will favour market-based virtual organisations allowing the much more democratic model of equitable, mutually beneficial partnerships that may change continually. A third aspect was discussed in Chapter 4, Section 4.3.5.1, regarding embedded systems. Here, the system may be trusted by the clients and end users, rather than only, or even primarily, the individuals involved in designing, developing, operating or maintaining it. Hence the people behind the system become faceless servants, and personalise commitment and responsibility may decrease. These different ways in which the computerised system can restrict the individual are all versions of the system colonising the lifeworld.

The more optimistic scenario is that information systems allow much greater variety of informed choice and permit people and organisations to react quickly and appropriately in a very dynamic world. The type of information system used will determine the type of virtual organisation.

6.6.2.3 Interpersonal issues

In Section 6.2, collaboration was identified as one of the key issues concerning teams. Collaboration requires mutual understanding, reciprocity and trust [Skyrme, 1998]. It is a cornerstone of the sociocultural model of learning and is equally important for knowledge sharing in organisations [Coleman & Schiller, 1999]. However, it is unlikely to be popular in a virtual environment unless an effort is made to ensure that it does not entail excessive extra work. It needs to be part of the accepted routine and benefits should be immediately visible [Coleman & Schiller, 1999].

Trust between team members is a very important factor and this will be discussed in Section 6.8.

6.6.2.4 Individual factors

The individual's commitment to the virtual team and the "cyber skills" and interpersonal skills he has will be critical factors regarding the success of the virtual team. In virtual teams there is a reduced sense of reality, identity [Kimble et al., 2000], permanence and cohesion. This is in part due to the fact that team members do not see each other face to face, partly because interaction is often delayed, partly because of the dynamic nature of the team and partly because of the democratic management philosophy that is an essential part of virtual teams. The first two aspects were discussed in Chapter 5, Section 5.4. The dynamic nature of the team affects the composition of the team with respect to team members. During the life of the team, members may leave and new members may join. During the working time of an individual he may belong to various virtual teams, each having different team members. In addition, the team's tasks and the information upon which they make decisions may alter continuously. This variability in team structure and in task is an essential part of the virtual team concept and is intended to enable the organisations to respond quickly to changing customer requirements. However, as Kimble et al. [2000] point out, structural changes create an environment of instability for employees.

It is essential to obtain the support and commitment of individuals. Lewis [1998] says that, " *... membership of a team depends fundamentally on individuals' desire to participate whatever their personal motivations may be*. " This can be achieved in part by ensuring that the team's missions and goals are compatible with the individuals' aspirations [Skyrme, 1997]. This is consistent with the need for a common goal that was identified in Section 6.6.1 as one of the defining characteristics of a virtual team. One way of achieving this is by allowing team members to participate in identifying the goals. This is done by offering the individual membership in the organisation, that is, a share in the governance of the team and the right to participate in making major decisions about the policies, strategies and operation of the organisation as they affect the

team and task. This contributes to providing virtual team members with a sense of belonging, even if that community were largely a virtual one [Handy, 1995].

The cliché “Nothing succeeds like success” is true. Research has shown that initial failures undermine the team spirit and are difficult to counter. Training, provision of support and infrastructure and providing alternative ways for communicating are obvious requirements for minimising early problems. Most researchers recommend that virtual teams meet in person at least once a month to renew personal bonds.

6.6.3 Virtual teams in education

All the usual benefits of asynchronous communication apply as much at a residential university as in distance education, such as,

- It is non-invasive, and hence it is not necessary to disturb a teacher or coworker when he is busy.
- It is available outside normal hours, so a problem or idea can be explained when it is current and a degree of closure is reached, and the learner can go on with something else.
- A record is created automatically.
- Reflexivity and new knowledge creation are possible.
- It is an aid to learning by apprentices. [Lewis, 1998]

There are four main reasons for introducing virtual teamwork at a residential university, each of which is discussed separately below.

6.6.3.1 To provide students with skills that will be relevant in their careers

Virtual teams are becoming increasingly common in a work environment so this experience is good preparation for a future career. This is why students, when given a choice, often decide to work in virtual teams. Although the following two quotations refer to teamwork and not to virtual teamwork, they remain relevant in this context.

> “*.... the global workplace is calling for collaboration, teamwork, and a multidisciplinary perspective ...*” [Hitch, 2000]

> “*Therefore techniques that create and build team working and decision-making attributes in academic situations are essential in providing students with relevant career-based skills. (Morgan and Ramirez, 1983, p.8)*” [Doyle & Brown, 2000]

The difficulty in communicating effectively using a less rich medium, combined with the need to become familiar with the technology, makes it even more appropriate to assist students in obtaining the necessary skills for doing collaborative work.

6.6.3.2 In order to enhance collaborative learning

As mentioned in Chapter 5, particularly Section 5.2.5, there are a number of advantages that can be gained from using computer-mediated communication. These are as relevant in collaborative learning as in any other teamwork. All teamwork is intended to achieve improved performance, that is, achieve group process gains [Nunamaker et al., 1991]. Examples of these are synergy, pooling information, objectively evaluating each other's ideas and stimulation of new and relevant ideas. Common problems encountered in face-to-face teamwork are: interrupting one another (this can result in ideas not being completed, or being followed through), dominating the conversation, lack of participation out of shyness or fear of ridicule, ideas are not recorded (group process losses) [Nunamaker et al., 1991]. Thus, any supporting software and methodologies should attempt to assist in increasing group process gains and minimise group process losses.

Benbunan-Fich and Hiltz [1999] note the advantages and disadvantages of asynchronous learning networks (ALN) shown in Table 6.1.

Table 6.1: Advantages and disadvantages of asynchronous learning networks [Adapted from Benbunan-Fich & Hiltz, 1999]

Advantages	Disadvantages
Enhances teamwork.	Procrastination
Minimises common problems encountered in teamwork.	Frustration due to delays waiting for others to communicate
Allows in-depth reflection on topics.	Pressure to meet deadlines
Assists in arriving at higher quality decisions.	Impersonal medium
Permits integration of external expertise.	Lack of incentives for participation

The research results support the claim that the benefits are in fact realised, since ALN-supported participants (individuals and groups) were found to have submitted better work than the face-to-face groups [Benbunan-Fich & Hiltz, 1999]. Online participants submitted longer reports, with virtual teams submitting considerably longer reports than any of the other groups. However, they found that virtual teams reported the lowest level of process satisfaction. Students can get assistance and support from classmates and from their teachers without necessarily being in a virtual team [Clifton, 1999].

6.6.3.3 In order to facilitate team logistics

Major reasons for group work being unsatisfactory in tertiary education are the difficulties students have in finding a suitable time and place to meet, even though these students are on the same campus for a large part of every day. Universities do not usually have meeting rooms available for students to use for teamwork. If a scheduled lecture period is set aside for this work, since all the students are supposed to be available at this time, the presence of several teams in one venue at the same time makes it difficult to communicate effectively over the noise and makes for many distractions. The use of virtual teams is ideal for eliminating these problems.

6.6.3.4 Class size provides yet another incentive

All classes should be relatively small especially for first year students [Clifton, 1999] but this is an unobtainable ideal and, as a result, the opportunities that the student has to participate actively in the class are considerably reduced. Hence, the option of teamwork becomes attractive.

A major disadvantage of the use of virtual teams at a residential university is that alternative ways of communicating exist and are quite easy to access. Learning to use the medium effectively, technological barriers and other frustrations may seem to make CMC a difficult option. Clifton [1999] recommends that as a general educational principle the teacher should " ... *insist on the desired changes as conditions for approval, when students are anxious and angry they should be neither rewarded nor punished*." Thus, it may be necessary to make this option compulsory and to insist on evidence that meaningful use has been made of the medium for discourse.

6.7 Culture

> "*Hanna (1998) claims that neither language nor distance are barriers to access when using new technologies, but cultural norms and patterns represent formidable obstacles to learning across political and cultural boundaries.*" [Beller & Or, 1998]

Hofstede [1997] proposed four dimensions according to which the cultures of different countries could be assessed. These are the power distance index (PDI), individual to collectivist (IDV), masculine to feminine (MAS) and uncertainty avoidance index (UAI). His research, using these indices, showed that different societies "see" social issues differently. He takes care to stress

that individuals do not necessarily share the prejudices (in Gadamer's sense) of their societies and are not totally predetermined or "stuck" in those mind sets.

This is relevant to South African society: It is commonly accepted that different groups were quite deliberately kept apart socially and originate from totally different cultures and hence, if Hofstede's findings are accepted, they can be expected to score differently on the four scales. This is significant as this might affect learning styles and specifically the preferences and effectiveness of different team members. Issues regarding diversity were addressed specifically by Thomas [2000]. The quantitative research portion of the research undertaken for this thesis made particular reference to the home languages of the students as an indicator of diverse cultures. This part of the research is discussed in Chapter 7.

Social culture is only one aspect of the cultures that affect team work. Communities of practice have a culture of their own, in which terminology, other aspects of communication and mutual recognition all play a role [Seely Brown & Duguid, 1996]. This did not affect the research as the team members were all junior students studying similar subjects. They could, therefore, be considered to be from the same community of practice.

Organisational culture also affects dispersed teams. In the case of this research, the students were all members of the same organisation (the university) although many had only become members recently.

6.8 Trust

6.8.1 Introduction

Trust is defined by Mayer, Davis and Schoorman [1995: 712], quoted by Jarvenpaa and Shaw [1998], as the "*willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action, important to the trustor, irrespective of the ability to monitor or control that other party*."

Trust is essential in all teams but will be discussed particularly from the point of view of teams who do not meet regularly in person, that is, virtual teams. Much of what is said applies equally to face-to-face teams.

> "*Although trust is important in any team, it is more essential in a virtual team*." [Ishaya & Macaulay, 1999]

Trust is based on rational evaluations (cognitive), more subjective influences (affective) and evidence obtained by observation (behaviour). These coincide to some extent with the objective, subjective and inter-subjective worldviews discussed in Chapter 2. Any member of the team may act in a way that benefits his own interests or may choose to put the interests of the team, and therefore in most cases the organisation, first. There are two aspects of trust based on individual autonomy. Firstly, the individual working in a team must make decisions, explicitly or implicitly, concerning his own behaviour and how opportunistic that will be. In other words how trustworthy he will be and whether he will seek to gain personal advantage or attempt to promote the common good. Secondly, the individual must decide how trustworthy the other members of the team are. Hence, both expectations and goodwill are essential elements of trust [Ishaya & Macaulay, 1999]. These decisions are adjusted over time and affect each other. If the individual decides at some point that the other team members are untrustworthy, he will be less inclined to strive for common advantage and may decide to put his own interests first.

6.8.2 Forms of trust

The following forms of trust have been identified [Jarvenpaa & Shaw, 1998] :

- Deterrence-based trust or calculus-based trust - here the individuals do what they say they will do because they recognise that the consequences of defaulting will be more severe than they consider to be worthwhile.
- Knowledge-based trust - the individuals trust each other as they know each other sufficiently well to be able to predict each other's behaviour and have shared experience.
- Identification-based trust - the individuals are convinced that they have similar intentions and goals.
- Swift trust - the amount of time available does not allow for trust to be built up in the normal way and it must be assumed.

Initial behaviour is often influenced by calculative processes [Jarvenpaa & Shaw, 1998] which are associated with deterrence-based trust. The participant will weigh up the benefits of working towards the common goals of the group against his individual needs. He includes a consideration of the penalties for not co-operating, such as damaged reputation, or more concrete considerations such as lost marks. The likelihood of opportunistic behaviour diminishes with time, particularly because the longer anyone is involved in a work group the more he has invested and hence the more it is worthwhile to continue. In addition, with time there is a greater likelihood that the individual will have become familiar with the other participants and will possibly identify with them in terms of empathy and common values. Hence their good opinion becomes more important. Deterrence-based trust is, therefore, involved with the decision as to whether you will be trustworthy.

The second form of trust, knowledge-based trust, has two processes associated with it. Predictability ensures that uncertainty is reduced, as the participants have a reasonable idea of the patterns of behaviour, such as work habits, that they can expect from one another. The second facet, capability, or performance-based or action-based trust, refers to the perception as to whether the person can in fact fulfill promises and tends to depend on the past actions of that person. Both of these can best be ascertained with time. A curriculum vitae is not always detailed or reliable enough to elicit trust. This type of trust can be encouraged by drawing attention to successes by celebrating them [Sabherwal, 1999]. This form of trust is primarily based on a assessment of the trustworthiness of the other participants.

Similarly, identification-based trust takes time to be confirmed as people exchange information about themselves but the knowledge that a team member comes from a similar background or publically endorses similar values can help bridge this. Social dialogue tends to confirm identification-based trust. Once again, this is related to the trustworthiness of team mates.

Swift trust refers to the type of trust that is assumed in work groups that have very little time to develop the normal forms of trust. Swift trust implies no knowledge of team members' individual identities or norms [Ishaya & Macaulay, 1999]. The participants tend to assume that team members are similar to others with whom they have worked. Trust will depend on the task-related behaviour of the team members (that is, performance-based trust). The more responsive and active a team member is, the greater the trust that is placed in him. The perceptions of the personal characteristics of team members and an individual's feeling of identification and closeness to the other team members might become exaggerated, as in fact the team avoids discussing things that separate them and focus only on what they have in common. Swift trust develops very quickly while the team are working together. Since this form of trust is based on assumptions about coworkers rather than real information it is more closely concerned with decisions about your own behaviour (whether to be trustworthy) than that of others.

Another way in which swift trust is established is by a transference of trust from a trusted third party. Not only do the members of work groups depend on each another in a personal way to ensure that a task can be accomplished, they also rely on the institution(s) within whose patronage the group functions for support. The members draw on their conceptions of the ethics and value systems (collective norms) of the institution. Thus, trust in work groups is based not only on interpersonal trust but on the degree to which it is believed that the institution can control the group and the reputation of the institution or its representative who controls the group. Transferred trust is assumed before the team members start working together. It can be modified by swift trust or by the other forms of trust.

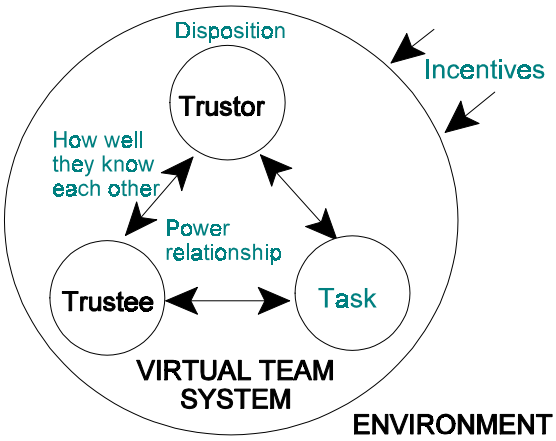

Figure 6.4: Virtual team system

Holland [1998] gives the following as antecedents of trust which influence not only how you will behave in a team but how you will interpret the behaviour of other team members.

- The disposition of the individual,
- How well the team members know each other,
- The power relationships between the trustor and trustee,
- The task being undertaken, and
- The incentives that are provided.

The relationships between these are illustrated in Figure 6.4. Factors from all three worldviews are included in the antecedents of trust. The disposition of the trustor depends only on him and is, therefore, entirely subjective. The relationship between the trustor and trustee, including how well they know each other and the power relationship between them, is intersubjective. The factors to do with the particular task and influences in the form of incentives are largely external or objective.

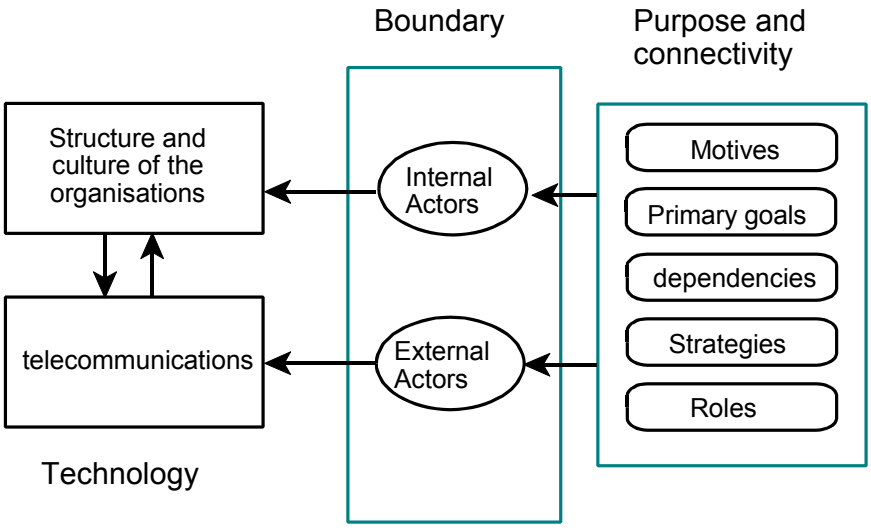

Figure 6.5: Factors affecting trust

Holland [1998] includes two further factors that are related to the task, namely the perceived risks and how important the outcome is. These depend to some extent on the individual, as each individual has personal circumstances that might make it particularly important that the project succeeds and similarly may have risk factors that apply specifically to him. These two factors also depend on the outside world. The project may be funded by sponsors external to the organisation, might be dependent on input which is totally outside the control of the team, may be located in a very complex and risky environment, or might be very important to someone in a position of authority. Figure 6.5 depicts these factors.

6.8.3 How trustworthy you will be

As with all issues relating to trust, the decision as to how to behave within a team depends on subjective, intersubjective and objective factors. Personal disposition, beliefs and background are, as pointed out above, important subjective factors. An example of personality or disposition is how highly the individual values the good opinion of others. Personal beliefs also determine the individual's attitude towards moral duty. For example, the individual's belief as to whether he should put the organisations' interests above his own will determine the amount of time he would spend on the task and how persistent and conscientious he would be. Not only moral perspectives are involved, accepted social norms and an understanding of what society and the organisation expect, will strongly influence behaviour [Ishaya & Macaulay, 1999]. The IDV measure of how individualistic the culture is [Hofstede, 1997], is relevant here. Thus these subjective decisions may be value-based or norm-based.

An intersubjective factor would be an assessment of whether team members share common values. An initial judgement as to the trustworthiness of the other team members will influence the decision as to how trustworthy the individual should be [Sabherwal, 1999].

Social norms are often not strong enough to entirely control social actors' behaviour [Ishaya & Macaulay, 1999]. Rational perspectives play an important part in these decisions. Calculus-based trust involves an assessment of the benefits that can be gained by acting in a trustworthy manner compared with those that would be gained by acting in an untrustworthy way. This is influenced by, amongst other things, the expected duration of the relationship. It cannot be calculated precisely, as there is always insufficient information. All these factors together will determine whether self-interest should be suspended in favour of a collective orientation.

6.8.4 How trustworthy you consider others to be

As work on the task progresses, the degree of success and the behaviour of the coworkers will influence perceptions as to their trustworthiness and modify the original antecedents of trust. Action-based trust is determined by performance, response time and hence, perceived ability [Kimble et al., 2000]. Action-based trust may be objective but the perception of success can be coloured by previous views as to the competence and trustworthiness of coworkers.

The factors to do with social attributes, namely, who you are (disposition), how well the trustee is known and the power relationships between the trustor and trustee, are social-based trust [Kimble et al., 2000]. Social-based trust depends largely on subjective and intersubjective factors which will be observed rather than measured.

6.8.5 Time, trust, and information

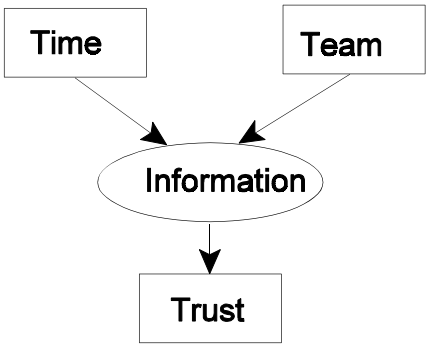

Figure 6.6: Time, trust, teams and information

All forms of trust, except swift trust and transferred trust, require information about the other team members in order to become established. This takes time. The information must also be refreshed regularly, that is, contact must be maintained or the trust will erode. The trust development process may be speeded up by the use of shared information systems because they enable detailed knowledge of team members' operational performances to be gained [Holland, 1998]. Hence, action-based trust is promoted and it is possible that this form of trust may be relied upon more than in the past where information was less complete, timeous and was perceived as being less accurate. This is one area where the system might be influencing the lifeworld.

The relationship between information and trust is also evident in both knowledge-based trust and identification-based trust as these depend on more personal information about team members. The time taken to obtain information affects both the performance of and the trust developed by virtual teams. Communication delays are unavoidable in a dispersed environment. This is particularly significant because the virtual team usually works to deadlines which makes rapid response still more critical. Thus, there is a three-way relationship between virtual teams, time and trust. Information is a linking factor as it plays a role in building trust and in the functioning in the team from the point of view of performance, which in turn affects action-based trust. The relationships between time, trust, virtual teams and information are illustrated in Figure 6.6.

Table 6.2 lists ways in which time, trust and information affect the team's functioning. All three of these factors are not always involved and hence those that are considered to be relevant are indicated in each case.

Table 6.2: Virtual teams relationship to time, trust and information

Ways in which some or all of the factors affect virtual teams' functioning	Factors		
	Time	Trust	Inform-ation
The team must be able to respond quickly to information concerning changing requirements and hence needs to be flexible.	U		U
The length of the prior relationship between team members and the amount of information they have about each other affects knowledge-based trust.	U	U	U

Ways in which some or all of the factors affect virtual teams' functioning	Factors		
	Time	Trust	Inform-ation
The duration of the team may be shorter than normal, and may be unpredictable. Thus short term gains are valued above long term ones which may not be realised. Opportunistic behaviour results from placing short term gains above long term ones.	U	U	
Calculus-based trust (or deterrence-based trust) takes into account the amount of time already invested in building trust and the expected length of the future relationships in order to decide whether it is important to protect reputation and relationships or not.	U	U	
Swift trust is motivated entirely by the shortage of time and a lack of information.	U	U	U
In a virtual team trust tends to degrade over time. Face-to-face meetings are needed to reinstate it by increasing accessibility of information.	U	U	U
Transferred trust also erodes over time and needs to be replaced by personalised forms of trust.	U	U	
In projects where there is time pressure, opportunities to socialise are reduced, reducing opportunities to learn more about each other at a personal level. Hence identity-based trust is more difficult to develop.	U	U	U
Action-based trust is promoted by fast and frequent feedback.	U	U	U
Delays in communication mean it will take longer to reach decisions, develop norms, et cetera.	U		U
Since it is easier to lose trust than to gain it, it is important to start immediately to build trust.	U	U	
"*over time the teams were adversely impacted by the diversity in their membership*" [Jarvenpaa & Shaw, 1998]	U	U	

> "*Regardless of how committed and well-meaning people are initially, they tend to lose their commitment, suffer from role overload and role ambiguity over time which in turn increases free loading, absenteeism, and other negative behaviours, all of which translates into lower project performance*." [Jarvenpaa & Shaw, 1998]

6.8.6 Ways of improving trust

Broken trust forms a cycle of distrust and this in turn undermines future performance. Teams

> "*... start with an initial level of trust, this may strengthen, but all the time it is being compared with actual performance evidence. If the evidence indicates misplaced trust it typically takes time (the prevailing paradigm is preserved) until a break point (gestalt switch). Trust is a social capital. It is difficult to regain trust."* Introna [1998]

The cycle can change from virtuous to vicious and vice versa. Reasons for the changes include complacency, adding or reducing structure, the additional or reduced attention of key people, changes in leadership such as a new project manager and incorporating identity-enhancing activities (celebrating the achievement of goals, and private confrontations) [Sabherwal, 1999]. Ishaya and Macaulay [1999] say that not only does trust emerge but it can be deliberately fostered. The process of developing trust in a face-to-face environment differs from that in a virtual environment. These authors suggest that there are five stages in the process and that at each stage there are structural ways of promoting trust. All of the actions involve providing team members with relevant information. These are shown in Table 6.3.

Table 6.3: Stages in the developments of trust (adapted from Ishaya & Macaulay [1999])

Stage		Type of trust	Roots	Actions
1	Transparent	Swift trust (deferred trust)	Task oriented, based on stereotyping, based on assumptions	Provide information regarding the task.
2	Calculus	Deterrence	Rewards and punishment	Establish monitoring structures such as role assignments and reporting mechanisms.
3	Predictive	Knowledge-based	Information about previous experience and qualifications of team members	Can be built by having a preliminary test of abilities.
4	Competence	Action-based	Performance, response time	Allow for the joint celebration of milestones and successes, demonstrating sections completed, soliciting feedback and open discussion regarding process and procedures.
5	Intensive	Identification-based	Identification with common goals and values	Express commitment and appreciation.

Characteristics of virtual teams in which trust seemed to be high are described by Jarvenpaa, Knoll and Leidner [1998]. These include a high level of participation by team members. In their research, this was found in teams where team members volunteered for tasks, took initiative and met commitments. Team members took care to keep each other informed about progress. Successful teams limited the amount of time spent on socializing with each other via e-mail but they were very careful how they worded subjective or potentially divisive e-mails. They were very positive about each other's work and generally supportive. They maintained an upbeat, enthusiastic tone in messages. They spent little time on negotiating procedures and formal structures. Leadership roles rotated, indicating that they considered one another to be equals. Free loaders were handled openly and quickly. Communication with the project leader was

equally uninhibited, so if there was uncertainty about anything the matter was addressed immediately. Overall these team members were very task-oriented and confident. Obviously these characteristics are associated with high achievers in general, so the abilities of team members, as well as their attitudes towards work, are of primary importance in success. Performance-based trust (or action-based trust) derives from these success-oriented factors.

Two key common elements which can be recognised in the characteristics identified by Jarvenpaa et al [1998] are exchanging sufficient information and being aware of time. Having identified these characteristics as contributing towards success, potential team members can be trained to work in this way. This agrees with the relationships emphasised in Figure 6.6 and Table 6.2.

Sabherwal [1999] emphasises that there has to be a balance between structure, in the form of monitoring performance, and social aspects of trust. He suggests that there needs to be "... *a direct (written) contract and a psychological contract based on trus*t." Excessive structural controls can hurt performance as they eat up time. They can also undermine trust as the team member interprets them as an expression of distrust.

Ishaya and Macaulay, [1999] have more practical advice which virtual team members can be given. They have classified these into activities which indicate integrity, ability, openness, benevolence and expectations. These are given in Table 6.4.

Table 6.4: Constructive behaviours for members of virtual teams (Adapted from Ishaya and Macaulay [1999])

Dimensions	Behaviours
Integrity	Being honest, being straightforward, keeping promises, being faithful and true, timely response, being reliable
Ability	Demonstrating personal knowledge and competence, demonstrating individual and group skills, sharing individual experiences
Openness	Informing members, sharing ideas freely, giving feedback, apologising publicly
Benevolence	Being helpful, being supportive, being friendly, being humble, praising others
Expectations	Expressing one's expectations, compromising on individual expectations, being fair in one's expectations, being consistent

Certain bad strategies will destroy trust, for example, flaming or expressing criticism in a personalised way, making unreasonable demands, ignoring requests, failure to meet commitments. The influence of the medium on communications behaviour was discussed in Chapter 5, particularly in Section 5.4.

> "... *high tech has to be balanced by high touch to built high trust organizations.*" [Handy, 1995].

As mentioned in Chapter 5, Tolmie and Boyle [2000] recommend that groups meet in person in order to get to know each other, and hence initiate knowledge-based trust and ideally identification-based trust before embarking on online interaction. This can assist a sense of belonging to a community instead of to a place. *"Without a sense of belonging, virtuality looks like a very precarious state... .*" [Handy, 1995].

6.9 Conclusion

The main purpose of this chapter was to explore the nature of virtual teams and the factors which impact on their success. Virtual teams are considered to be important work units within virtual organisations. However, there is an extremely high risk that these teams will not be successful because they engage work at a high cognitive level which requires collaboration rather than co-ordination. Not only is the type of work innovative (non-routine) but the team is composed of people who might have different social cultures and communities of practice and no previous relationships with each other.

It is very important to develop bonds and create a sense of commitment within the team. Trust is the most important element in creating those bonds. Whether trust can be established and maintained within a virtual team will depend on the individuals involved and the amount of time the team will be working together and the amount of information shared between team members.

The factors impacting on the success of virtual teams are relevant in both a business and learning environment. However, in the business environment, there is not a great deal of time available to learn the skills necessary to maintain a successful virtual team. It is therefore important that, in addition to learning how best to communicate via electronic media, students learn the skills required to participate successfully in a virtual team.

The action research undertaken for this thesis is described in the next three chapters. In this research the e-mail messages of students working together in virtual teams are examined and compared with the audio recordings of the discussions of the face-to-face teams. This extensive qualitative analysis (Chapter 9) includes the factors affecting trust (depicted in Figure 6.4 and Figure 6.5 of this chapter) and the stages of trust summarised in Table 6.3 of this chapter.