

Chapter 10

Conclusion

10.1

Introduction

Sharing complex information and reconstructing meaning lies at the core of education, particular at university level. The Internet was adopted with unprecedented speed and enthusiasm and the idea that it could also be incorporated into education quickly followed. The World Wide Web can be, and is, used widely in education as a form of electronic notice board, a medium easily accessible from anywhere at any time on which unambiguous 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. Educators now generally believe in the value of students being actively involved in constructing their own knowledge. The sociocultural model of learning recognises the importance of students working together in teams, and actively participating in collaborative learning, as this helps students to relate information obtained from outside sources to their own cultures and lifeworlds. This research explored the feasibility and efficacy of using e-mail as the main medium of communication in collaborative work. Its purpose was, therefore, to see whether the existing use of web-based or telematic education could be extended to include collaborative learning.

Collaborative work by dispersed teams is, however, not only of interest in distance education. Globalisation has meant that globally dispersed teams are becoming increasingly common in the work environment as well. Hence the research is relevant not only to distance education but also to virtual organisations.

The research involved action research, during which a interpretive, investigation was undertaken in order to determine whether e-mail can be used successfully, by university students working together within culturally homogeneous teams, on tasks and projects which require them to share meaning. During this type of process not only is there a need to understand what the other team members mean (reconstructing meaning), but also to build on and advance meaning further (constructing meaning).

This final chapter assumes two roles. In it a model of collaboration systems is presented which finally links the concepts discussed throughout the thesis. The research is also evaluated with respect to the research paradigm selected in Chapter 2.

10.2

Background

The environment in which this study was undertaken was a university in South Africa in the 21st century. South African society consists of many different cultures, which are coming together for the first time as equals, and within the “traditionally white” universities in South Africa there are now a healthy mixture of students from all language groups. Of the students who participated in the research being reported on here 52% were Afrikaans-speaking, 21.5% were English-speaking, 22.3% speak one of the other nine official languages of South Africa, and 4% speak some other language at home. Our multicultural society has proved to be more adaptable than many predicted, and there are few signs of racial tension in the lecture rooms. Students at South African universities, from various different backgrounds with respect to education, language, culture, politics and household composition are presently all being taught in much the same way, although, at some universities, there are student support programmes to assist students whose educational background is assessed as being inadequate.

In general, the norms, culture, and underlying values that are taken for granted in teaching Information Systems in South Africa are predominantly Western and the academic tradition is derived from the British and North American university cultures. Citizens of the USA write the majority of textbooks used, from an American point of view, and hence using examples from American business and assuming familiarity with an American way of life. Of course these are not really foreign to our students, and local examples would not differ in any fundamental way, but there is some distancing in the sense that students are not personally familiar with the environment.

Many, if not most, South African students come from a distinctly authoritarian educational background, where not only is critical thinking never permitted, but in fact rote learning is frequently encouraged. Many students have very little confidence in their ability to form their own opinion let alone to defend it. We are faced, therefore, with the problem that students are not accustomed to relating what they learn to their own lifeworld, or using their own experience, to judge the validity or applicability of what they learn. This is compounded by the first two problems identified, namely that the personal experience of individual students differs widely in many respects and is also not reflected in the study material.

It is important to include collaborative learning into the tertiary education of these students in order to address the problem indicated. This encourages the students to actively participate, to relate the material presented in books and lectures to their own lifeworlds and to become more

critical in a constructive way. It also provides them with practice in communicating and expressing ideas in their own words in a non-threatening environment.

10.3 The virtual team collaboration system

A collaboration system is an information processing system within which reconstruction of meaning occurs between team members. The representation of the system given in Figure 10.1 is not a classic systems diagram with input, output, process and a feedback loop. Instead the reconstruction of meaning can be visualised as an organic process during which information of various types is communicated and appropriated to build shared meaning (constructed reality). In a collaboration system for a virtual team who communicate via e-mail, the information available can be classified as Information¹ (or lean information) that is produced as reports from computer programs, narrative text which is communicated electronically (Information²), individually appropriated information (Information³) and tacit information (Information⁴). (Pictures and sound files can be attached but this is rarely done and was not considered in this thesis.) Only Information¹ and Information² can be converted into digital form and be communicated electronically and only Information³ and Information⁴ is appropriated by the team members.

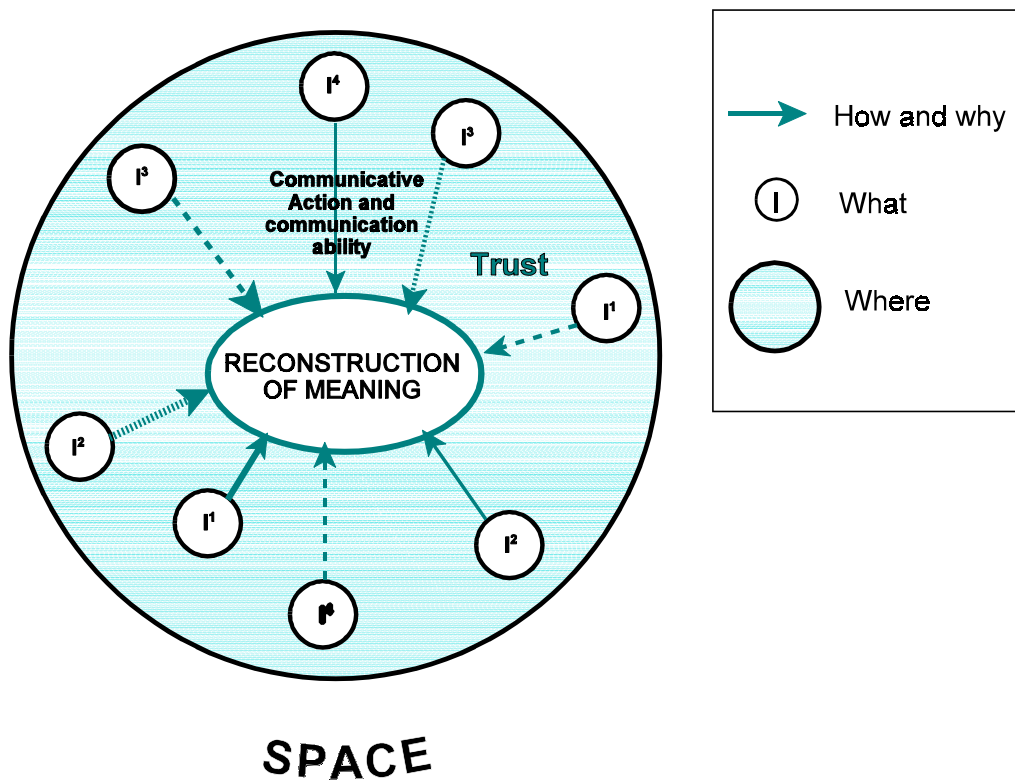


Figure 10.1: The collaboration system

Some additional, implicit information can be communicated by non-verbal and non-textual means. The concept of implicit information introduced in Section 9.3 of Chapter 9 completes the range of action types introduced in Chapter 3 as it is information which is unintentional. Although it is external, unappropriated information, it is related to tacit information in the sense that it is not explicit and is shown in the model as a form of Information⁴. This classification is concerned with the form of the information but also with aspects of its content (*what*) and represented in Figure 10.1 by the small circles with I¹, I², I³ and I⁴.

The boundary of the collaboration system is seen in terms of proximity of space. The more closely bound the system is in terms of space, the more effectively the participants can communicate. The analogy is that the individual pieces of information can more easily contribute to the reconstruction of meaning if they are contained in a bounded system. This aspect of the system is involved with *where* communication occurs and is represented by the outer circle. Thus this model recognises that co-located teams have the least amount of trouble communicating.

Time is frequently associated with space but physical distance no longer implies a time delay and communicative cohesiveness is dictated only partly by time. It is difficult to compensate for lost spontaneity but forgotten facts can be retrieved if the medium allows them to be recorded and greater comprehension can be gained with more time. Hence the role of time in communication is multi-faceted and it is not included as a factor in the virtual team collaboration system.

Physical distance does mean that the communicators are dependent on telecommunication technologies to transmit the information. The intrinsic natures of these technologies limit the type of information that can be communicated and hence it is necessary for the user to learn techniques to compensate for a loss of information. These skills, together with different kinds of communicative action, promote communicative rationality. In Chapter 9, the term communication ability was proposed to embrace the idea that the ability to communicate rich information, including equivocal and implicit information, depends on the skill of the person as well as the intrinsic properties of the medium. The skills, both technical and social, of the team members using the communication medium contribute to the 'energy' propelling the information. This 'energy', made up of communicative action and communication ability (technology use skills), is depicted in the model as arrows. A solid arrow represents highly effective communication. The greater the 'energy' the richer the information and more likely it is to assist in the construction of new meaning and the building of shared understanding. The 'energy' is, therefore, concerned with *how* the information is communicated and is represented by the arrows.

The richness of the message when it is received will also depend on the interpreting ability of the receiver and this also has technology related aspects. The receiver, therefore, also needs to develop skills to allow him to make maximum use of the medium. The discursive form or form of communicative action is related to the intention of the speaker [Ngwenyama & Lee, 1997] and this means that this aspect of the model can also be labelled *why*. The arrows, therefore, represent both *how* and *why*.

Communicative rationality, and to a lesser extent functional rationality, are seen to thrive when trust is strong. Thus, the model shows trust as the permeating or surrounding atmosphere within the system. In Chapter 6 the relationships between teams, time, trust and information were discussed. Trust is seen to reduce psychological distance. Disembedded systems, including the communications systems required by virtual teams, will only be used if some form of trust exists even if it is only a form of transferred trust. These concepts are related to the relationships between those reconstructing meaning and hence, *to whom* the information is communicated.

This virtual team collaboration system model is consistent with the depiction of the role of information in collaborative teamwork (Figures 9.7, 9.8 and 9.9) but has a different emphasis as it includes the different types of information and includes space as a significant factor. The two representations together conclude the abstraction of the concepts considered in this thesis.

10.4 Evaluation of the research outcomes

This research set out to investigate the reconstruction (or possibly a better term might be the co-construction or joint construction) of meaning between members of virtual teams. This goal was not ultimately obtained and the data ends up being more about the process of co-ordinating behaviour for completing the problem. The unexpected reluctance of the students who were the subjects of the research to work in virtual teams combined with the difficulty the teams had in embracing the concept of the joint construction of meaning via e-mail made the original goal impossible to achieve.

10.5 Evaluation of the research with respect to the research paradigm selected

10.5.1 Was this an interpretive study?

Klein and Myers [1999] have proposed a set of principles for conducting and evaluating interpretive field studies in Information Systems. This thesis can be evaluated against these.

The research carried out was intended to be pluralistic. This is in response to the need to include views of a complex and multi-faceted research area obtained from different sources and in various forms. These can be obtained by using a variety of methods to collect information [Banville & Landry, 1992; Kaplan & Duchon, 1988; Klein H K, Hirschheim R & Nissen H, 1991; Jarvenpaa S L, 1991; Trauth & Jessup, 2000]. Ben Agger [Agger, 1998: 19 and : 37] calls for “polyvocality”, in other words a combination of qualitative and quantitative research.

The quantitative data was gathered using questionnaires, recording the numbers of students selecting the different options at different times, numbers of contributions to discussions, et cetera. The focus of the study was, however, on determining how well the virtual teams succeeded in working together and in particular, how successful they appropriated and personalised information regarding general Information Systems principles. Hence, the content of the discussions was studied in detail with the intent of seeing how rich these discussions were and whether they facilitated learning.

Interpretative research has been defined as follows:

“It does not define dependent and independent variables, but focuses on the complexity of human sense making as the situation emerges; it attempts to understand phenomena through the meanings that people assign to them” [Klein & Myers, 1999]

“... aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context.” [Walsham, 1993]

*“The **interpretive understanding** is how an observing researcher (for instance, an anthropologist or an organisation scientist) understands these human subjects to understand themselves and the world around them.” [Lee, 1994]*

The research undertaken qualifies as interpretive research according to these definitions.

10.5.2 Was this a field study?

The study was carried out by investigating how students perform tasks in real life, that is, in their studies and not in laboratory experiments where tasks are being simulated. The study affected a significant part of the assigned work the students did for a university course. The researcher was closely involved with the students, the lecturers and the department for the duration of the course. This may, therefore, be described as being either an ethnographic or an in-depth case study. Klein and Myers [1999] say that the only difference is *“the length of time that the investigator is required to spend in the field and the extent to which the researcher immerses himself or herself in the life of the social group under study”*. Detailed, observational evidence is a characteristic of ethnographic studies whereas case studies do not depend solely on participant-observer data [Yin, 1989]. In this case the researcher collected data as an observer as well as via questionnaires. It is debatable whether she was a genuine participant as she played only a limited role in the collaborative teamwork other than setting the assignments and arranging the recordings.

This is also an example of action research of the field study mode [Stowell et al, 1997: 174] as it was initiated by the researcher. The focus was, therefore, on exploring research ideas, but it is hoped that the students who participated in the field study also benefited and that the institutional memory of the host university will retain information obtained and will benefit from the insights obtained. The researcher and hosting organisation had no noticeable conflicting interests. However, complacency in this regard should be avoided. The researcher attempted to highlight issues where conflicting interests of any stakeholders may possibly have been overlooked in the past. The effect of language on the students' learning and the difficulties that some students have in finding suitable team members are examples of this. The research investigated ideas that were formulated as a result of critical evaluation of literature and practice.

The action was theory led. The sub-goal of guiding the host institution can be interpreted as making the findings available to the university, and in particular the department responsible for the adoption of telematic learning in the university. These groups might subsequently be able to build on the findings. The research qualifies as action research as it addresses a perceived real-world problem situation of considerable complexity. It also aimed to address the concern that

“many academic IS methodologies ... have not been tested or evaluated by applying them in demanding cases” [Stowell et al, 1997:164].

The research can be assessed with respect to a number of further criteria identified by Stowell et al. [1997].

- Obtain willing collaborators and plan for possible changes in participation and support individual collaborators during the research.

The students were allowed to choose which study option they wanted to use and they were permitted to change their minds. In addition, as pointed out in Chapter 7, the opinions of the other lecturers were taken seriously and the research design was adapted in order to ensure that the students were not disadvantaged. As a result of the changes made to the research design (refer to Section 7.7.3 in Chapter 7) it was difficult to obtain clearly differentiated sets of results and large samples.

- Ensure that the domain is an appropriate one.

An extensive literature study into web-based teaching, virtual teams and virtual organisations was carried out. The domain appeared to be appropriate but the eventual results showed that students at a residential university are not convinced of the usefulness of virtual team work.

- Plan by focussing on the approach used rather than predicting outcomes.

Detailed planning was undertaken. The outcomes were not at all those that were expected. The significance of the underlying theory emerged only after the results were studied and interpreted.

- Plan how various research methodologies will be used and in particular, how data will be collected, rigorous documentation must be maintained and an awareness of the process of interaction and continuous reflection must be ensured.

Chapter 2 and Chapter 7 explain in detail what was done, both from the point of view of deciding on an approach (Chapter 2) and deciding on practical issues (Chapter 7). The strategy of recording team interaction and interviews and storing these in electronic format on CDROM permitted repeated reflection.

- Avoid false expectations on the part of the organisation and individual students.

A concerted effort was made to inform students and lecturers of the intentions, procedures and progress of the research. No complaints were received regarding false expectations.

- Have a strategy for dealing with possible outcomes.

Flexibility was built into the research design from the start. The paucity of virtual teams was compensated for by adding the interviews with lecturers and students.

- Balance research needs and host organisation's needs.

This was taken very seriously.

- The initial aim depends on the initial theory but this may be amended in the light of subsequent events.

As pointed out in Section 7.7.3, changes were made which had a significant impact on the research in order to achieve the mutual understanding, consensus and cooperation identified as necessary for intersubjective research methodologies.

As students were subjects participating in their real roles as students and not in artificial roles (such as emulating the activities of managers) Introna and Whitley's criticism [1999] of laboratory research in IS does not apply.

10.5.3 How was the fundamental principle of the hermeneutic circle applied?

The hermeneutic circle means that whenever text is interpreted both the parts and the whole must be considered. Each sentence is interpreted taking the meaning of the whole text into account and conversely, the meaning of each individual sentence influences how the entire text is interpreted. The principle of the hermeneutic circle can be applied more widely so that each individual text is interpreted in context and the context is re-interpreted in the light of that text. In terms of e-mail, each message is interpreted taking previous messages into account and also taking into account the wider context of the circumstances, culture, organisation and the task that is being worked on. Each message in turn affects how the broader context is interpreted. The hermeneutic principle was particularly relevant in identifying examples of strategic communicative action and implicit information.

The principle of the hermeneutic circle affected many aspects of the research, not only at the level of interpreting e-mail messages between the students in the telematic groups. These other aspects will be examined as part of the discussions on the principles which follow.

10.5.4 How was the principle of contextualisation applied?

This study is rooted in the recognition of the circumstances in which university education finds itself at this time. The fact that students with high potential, but very different previous educational backgrounds, are taught together is the first element of the context of this study. The second element is the affect of new technology on communication in general and the influence this is expected to have on education. Taking the local, cultural context and the global, technological context into account is, therefore, essential.

Seen in terms of the hermeneutic circle, the way that culture, pre-existing relationships (or the lack of these) and technology affected the content of individual e-mail messages was examined, as was the way that these messages allowed trust to be created or maintained within a team. The effect of these two factors (culture and technology) on the students' task outcomes cannot be measured in a positivist way as there are numerous other contributing factors.

10.5.5 How was the principle of interaction between researcher and subject applied?

The lecturer was largely an observer and facilitator. The role of the researcher was discussed in Section 9.9.12 in Chapter 9.

If we consider the hermeneutic circle again, the way in which the researcher interprets what the research subjects are saying and doing is the relevant focus. The results are "seen" in the light of her own preconceived ideas, in the light of the opinions of other lecturers in similar environments and in comparison with what published texts on related topics and research. These interpretations were used to identify and re-evaluate preconceived ideas concerning the viability of virtual teamwork at the university level involved in this research. The discussions with the lecturers used as consultants (Section 9.7 of Chapter 9) assisted in this process. This circle was traversed repeatedly during analysis of the research results in order to reach conclusions that seemed to be justified.

10.5.6 Was there potential for abstraction and generalisation?

Walsham [1995] discusses the problem of contributing to theory by generalising from case studies. In this case the intention was to obtain results that could not only be used as guidelines generally in telematic education, but that would apply to the global world of practice, that of virtual teams in virtual organisations. The concrete suggestions made are in fact uncontroversial and not very innovative. They tend to add weight to existing opinion rather than contribute entirely new insights.

Abstraction and generalisation were undertaken using Habermas' Theory of Communicative Action and Giddens' ideas concerning radicalised modernity. Giddens' concepts of the consequences of modernity emphasise the importance of time and space in the structuring of social relations and the use of e-mail was related to these concepts. The depiction of the reconstruction and construction of meaning presented in Section 9.8 of Chapter 9, and the virtual team collaboration system presented in Section 10.3 of this chapter showed that abstraction was possible.

According to Whetten [1989] a contribution to theory development should include factors that

"... logically should be considered as part of the explanation of the social or individual phenomena of interest..." (what), identify how they are related (how) and "... the underlying psychological, economic, or social dynamics that justify the selection of factors and the proposed causal relationships" (why). [Whetten, 1989]

Contextual limits (*who, where and when*) must then be placed on the propositions generated. Whetten advises that few scholars will generate an entirely new theory but will attempt to refine an existing body of work. In this case the research has built on the communication richness theories in computer-mediated communication but has presented them in the light of the Theory of Communicative Action (and in so doing extended the work of Ngwenyama and Lee [1997]) and radicalised modernity. Thus the *why* aspect of theory development has been focussed on.

"This is probably the most fruitful, but also the most difficult avenue of theory development. It commonly involves borrowing a perspective from other fields" [Whetten, 1989]

10.5.7 Were multiple interpretations investigated?

Since three options were incorporated in the study, namely, lecturing, co-present work groups and telematic work groups, as well as the fact that different groups will intentionally reflect different cultures, there is no doubt that multiple interpretations were investigated at the level of the individual student and the teams.

The hermeneutic circle was considered by looking at interpretations of the discourse of individual groups and then combined interpretations of all the teams selecting a particular study option and finally comparing the discourses of the teams who chose different study options. As is appropriate in interpretive research conclusions were in terms of narrative descriptions rather than as hypotheses that could be proved or disproved.

10.5.8 How was the principle of suspicion applied?

One of the most important intentions of this research was to allow students to find their own ways of appropriating university level material in a fulfilling and effective way. The issues of communication, meaning, culture and learning are all difficult to look at objectively as every individual interpretation is heavily impregnated with prejudice and not without political slants. These issues are all about power and hence emancipation. It is possible that the students concerned viewed this study with scepticism and even suspicion. It is partly for this reason that the study was designed to allow the students to choose for themselves which study option to follow, and to allow them to select team members according to their own criteria.

10.6

Conclusion

10.6.1 General

The technology for communicating with distant co-workers, lecturers with students and vice versa exists, is widely available and is accepted as a convenient tool and this is the source of the problem. It is too easy to use. Insufficient reflection and research is being used to guide the rush towards using Information and Communications Technology in situations that may have significant and subtle side effects on every aspect of modern life.

Organisations, be they large multinationals or new, small companies dedicated to e-commerce, have adopted organisation structures with fewer levels of management and less formal reporting procedures. Faster turnaround in terms of product development, quicker response to market conditions and improvements both in terms of speed and other aspects of service are features of the new economic model. This promises greater profits but also increased risks.

Universities, which have guarded their reputations jealously and are aware that their reputations are an essential part of what they sell, (that is, a vital ingredient in competitive advantage [Seely Brown & Duguid, 1996]), appear to be rushing to embrace telematic education as a significant part of their core business. These organisations have recognised the challenge that the Internet has presented and seem to believe that if they delay in responding they might never be able to catch up with their competitors. This parallels the move to other forms of e-commerce many of which have proved less successful than was initially predicted.

Many students at South African universities are studying in surroundings that they find foreign and threatening from a social and an educational point of view. Immense financial sacrifices and psychological investments have often been made by these students and their families. They and their families have high expectations of the institutions to which they have at last succeeded in gaining entrance. If the education system fails them it would represent an enormous loss of youthful energy, trust, hope and goodwill as well as the future loss to the economy of the re-investment of knowledge and skill.

This research ultimately is intended to highlight what the key concerns in education should be (the construction and reconstruction of meaning) and to explore the potential of a commonly available technology in collaborative learning.

10.6.2 Contribution made

The contribution made by this thesis stems largely from insights derived from analysing the discussions of teams who were involved in collaboration from the perspective of the Theory of Communicative Action. The analysis also takes into account some of the important issues raised by Giddens regarding modernity, namely the importance of trust and the need for reflexivity. Since the number of virtual teams whose discussions could be examined was small the primary contribution made by this thesis is in proposing a method of interpretive analysis and demonstrating its application rather than presenting strongly supported research results. The five dimensions used in the analysis, namely, communicative actions, communicative coherence, trust, implicit meaning and reconstructed meaning focus attention on the collaborative process and hence the outcome rather than the technology.

The role that technology plays is important and the researcher highlights differences between the ways that similar teams, working on the same task but using different communications media, collaborate and the resulting differences in outcomes. It seems certain that modern society will use information technology to an increasing extent in communication in future and, although much of this communication is via technologies allowing audio and visual communication, the use of e-mail and the provision of more static text-based information on the Internet seems unlikely to decrease. An important point made in the research is that, if e-mail is already being used for collaboration and is likely to continue to be used extensively for this purpose, it is important to investigate in detail how it is used and how people can be taught to use it more effectively. The findings indicate that implicit information can be communicated in a variety of ways using e-mail. Some information that is non-verbal and frequently unintentional is significant. Information richness has been extended by a number of recognised researchers to reflect the fact that a number of factors beyond the intrinsic nature of the medium determine the richness of the information communicated. This research highlights an aspect of information that these researchers may indeed have intended but which was not emphasised or referred to explicitly in their work.

Associated with the finding regarding implicit information in e-mails is the theoretical discussion in Chapter 3 in which information was classified. This is considered to be a significant contribution made by the thesis.

The fact that the subjects used were teams of first year university students, studying Informatics and collaborating on assignments, and that these students were fairly naive with respect to using e-mail as a means of communicating was an important limiting factor in the research. It is difficult to generalise from this context to one where virtual teams are required to collaborate on a task in a distributed working environment. The incentives for collaborating via e-mail differ considerably in such groups as does the maturity of the people who would collaborate. Hence this research can contribute only in terms of fairly broad suggestions with respect to virtual teams in virtual organisations in general.

On the other hand the research results have very specific significance for residential universities which have already acquired the infrastructure for web-based teaching and incorporate some features already in the tuition of on-campus students. It seems clear from the findings that despite there being some genuine reasons for proposing the use of e-mail for collaborative learning it is not at all easy to achieve success. The students themselves would need to have incentives to work in this way and would need considerable preparation and practice before any real collaborative learning could be achieved.

10.6.3 Future research

A number of interesting possibilities exist for future work. Studying the discourse of teams working on design or other creative work in dispersed organisations would provide a rich research field. A particularly interesting option is to study the online discussions of dispersed end-users involved in the development of information systems using computer-mediated collaboration.

The research could also usefully be continued at a university presenting courses exclusively as distance education. One of the most serious limitations at South African distance universities where face to face tutoring at regional offices is very limited is the difficulty in doing any collaborative work. These students would probably see more reason for participating in virtual teams and are also more accustomed to using text as a means of communication.

Further work can also be done in extending the methodology developed for analysing collaborative discourse. It is hoped that opportunities will become available so that the interpretive research can continue in investigating virtual teamwork from the perspective of constructing meaning.