Aspects of Technology mediated interaction and its impact on Higher Education

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Abstract

This thesis primarily focuses on the use of computer supported collaborative learning (CSCL) within a campus-based higher education (HE) context. The research is principally concerned with investigating factors that impact the integration of network-based learning environments within the face-to-face context of learning for adult undergraduates. The primary research questions underpinning this thesis are:

- What are the major factors that influence the use of Asynchronous Computer Conferencing (ACC) within a campus-based HE context?
- Can a pedagogically sound foundation be formulated to underpin and justify the design of a "mixed mode" context for supporting learning?
- What guidelines can support the successful integration of ACC within a campus-based HE environment?

This thesis reports on research undertaken via a series of heuristically developed fieldwork studies that have integrated the use of ACC within a campus-based HE context using a blended learning (teacher mediated and technology mediated) approach to module delivery. Such fieldwork studies have been undertaken in order to identify patterns of interactions. These have been mapped to such factors as backgrounds, group behaviour and learning styles, in order to gauge their respective influence on learning. Research findings have then underpinned the proposed guidelines for implementation that are based on an effective, pedagogically justified pattern for supporting CSCL through the integrated use of ACC within a campus-based HE environment.

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Preface

Context

The prime focus of this thesis is concerned with the use of computer supported collaborative learning (CSCL) in a campus-based higher education (HE) context. The research is, therefore, principally concerned with investigating factors that impact the integration of network-based learning environments within the face-to-face context of learning for adult undergraduates. More specifically this has meant investigating a "mixed mode" (teacher mediated and technology mediated) or "blended" approach to learning with particular regard to the use of asynchronous computer conferencing within a Virtual Learning Environment (VLE) for computer supported collaborative learning (CSCL) "as an emerging paradigm of educational technology" (Lipponen, 2002).

The underpinning rationale for investigating the use of this particular technology stems from research findings. For example, Ragan, 1999; Ringstaff, Yocam and Marsh, 1996; Gunwardena, et al, 1997, have all noted that "the utilisation of the medium (computer conferencing) in education has in many respects outstripped the development of theory on which to base such utilisation" (Ragan, 1999). It was in order to address such reported gap, between theory and practice, that the primary research questions underpinning this thesis were formulated:

- What are the major factors that influence the use of Asynchronous Computer Conferencing (ACC) within a campus-based HE context?

- Can a pedagogically sound foundation be formulated to underpin and justify the design of a "mixed mode" context for supporting learning?

- What guidelines can support the successful integration of ACC within a campus-based HE environment?

The answers to each of these questions will be based on an investigation into the nature of learning and educational systems, of self-organizing groups and of collaborative learning within a traditional university environment with undergraduate students.

Research Methodology

The main research strategy is heuristic in nature and is based on an Action Research (AR) methodology defined as "research into practice, by practitioners for practitioners" (Grundy and Kemmiss, 1988). This particular methodology "requires researchers to conduct an integrative response study in authentic contexts using mixed methods and multiple data sources". (Grundy and Kemmiss, 1988).

Particular reasons for using the Action Research approach are that:

- It provides a framework for grounding investigations into the use of CSCL amongst undergraduates in a campus-based HE context because, by its very nature, it requires researchers to draw from existing literature as well as to develop heuristic fieldwork studies in order to produce a set of design principles.

Action Research is therefore an appropriate methodology for this particular piece of research because:

- The research will be practical and will be undertaken by a practitioner teaching various cohorts of undergraduate students.

- Using AR within a social research context means that the research is not only interpretative but that it is participative and collaborative. As such, the researcher is not considered to be an "outside expert conducting an enquiry with 'subjects' but a co-worker doing research with and for the people concerned with the practical problem and its actual improvement." (Zuber-Skerritt, 1992; Grundy and Kemmiss, 1988).

- The context will be authentic and responses will be gained from multiple sources using a variety of methods.

- Results and insights gained from such research will not only contribute to advancement of knowledge in the field but are likely to "lead to practical improvements during and after the research process". (Zuber-Skerritt, 1992)

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Glossary of Terms

ACC	Asynchronous Computer Conferencing – text based, threaded discussions conducted electronically via bulletin boards within a Virtual Learning Environment
Androgogy	"The art and science of helping adults learn". (Connor, 1996) The term currently defines an alternative to pedagogy and refers to learner-focused education for people of all ages.
AR	Action Research – a qualitative approach that seeks insight rather than statistical analysis. Subsequently leads to practical improvements during and after the research process.
Blended learning/mixed mode learning	Teacher mediated and technology mediated learning combined
Blackboard	A Web-based Virtual Learning Environment
BSCW	Basic Support for Collaborative Working – a Web-based application for supporting text-based discussion threads
CSCL	Computer Supported Collaborative Learning
CRASP	A framework for Action Research - Critical (and self-critical) collaborative enquiry by Reflective practitioners being Accountable and making the results of their enquiry public. Self–evaluating their practice and engaged in Participative problem-solving and continuing professional development
DMU	De Montfort University
F2F	Face to Face communication
FwS	Fieldwork studies

HE	Higher Education
LSI	Learning Styles Inventory. An instrument devised by Honey and Mumford (1986) for measuring learning styles
MBTI	Myers-Brigg Type Indictor – Scores on the MBTI indicate a person's preferences on each of four dimensions.
MJT	Moral Judgement Test. An evaluative instrument developed by Lind (2001) to measure moral judgement development
MLE	Managed Learning Environment - A system that may include a VLE, but usually includes administrative tools giving access to such things as student records and management information systems that contribute to learning and teaching management (e.g. timetables).
Network based learning environments	Learning environments that are supported by the use of networking technology such as the Internet
ICT	Information Communication Technologies
Transaction Analysis	A technique to determine the different communication patterns evident in group discussions
UK	United Kingdom
USA	United States of America
VLE	Virtual Learning Environment - A system (usually web-based) which manages online course material and provides multiple teaching tools, (e.g. conferencing and e-mail facilities, a calendar, quizzes, note-taking area) all in a common application.
WebCT	A Web-based Virtual Learning Environment

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The process – a "roadmap" to the Chapters

Chapter 1 – Introduction - is based on existing literature. It is largely concerned with giving an outline of the variety of factors that are prompting the adoption of technology for supporting the learning experience. The Chapter gives an understanding of the particular research questions to be addressed

Chapter 2 – Methodology - follows on from the conclusions of Chapter 1 to determine the most relevant methodology for conducting the research. It then defines and justifies the various evaluative instruments used in the fieldwork studies that were heuristically developed.

Chapter 3 – Literature Review - investigates the various issues within the "problem domain" of the campus-based context of Higher Education (HE) itself. It considers educational philosophy and the various models of learning, CSCL and the technologies that support learning, group behaviour in collaborative learning and learning styles.

Chapter 4 – Findings – details the various fieldwork studies that were incrementally developed and conducted as part of this research. Overall these were aimed at identifying some of the factors influencing the behaviour and self-organizing characteristics of the groups of learners involved. The Chapter concludes with a synthesis of findings from each of the fieldwork studies conducted.

Chapter 5 – Conclusions and Recommendations - summarises the conclusions and recommendations from the preceding chapters. It provides a generalised learning model for implementation of Asynchronous Computer Conferencing (ACC) with campus based undergraduates as well as detailed guidance on the impact of using ACC within a predominantly campus based context of learning. Finally a critique of the approach undertaken is given together with ideas for further research.

Chapter 1 – Introduction

1.0. Introduction

This Chapter details factors that have impacted the development of network-based learning environments in order to provide a basis for this thesis as well as to fulfil the identified need expressed within the literature for such research to be undertaken (for example, see: Blake and Rapanotti, 2001; Ragan, 1999; Ringstaff, Yocam and Marsh, 1996; and Gunwardena, et al, 1997). However, in order to provide further focus for this particular investigation the use of computer conferencing (as a particular technology) to support the learning experience of campus-based undergraduate students was selected. Again, the fact that such research was required was further borne out by the fact that, as Ragan (1999) notes, "the utilisation of the medium (computer conferencing) in education has in many respects outstripped the development of theory on which to base such utilisation".

It was, therefore, to address these issues as well as to identify the variety of factors that impact the use of computer conferencing within a campus-based HE context that this particular research was undertaken.

1.1. Background to the problem

The way technology has been implemented within the educational context has, as with any innovation to practice, been stimulated by a variety of both positive and negative

factors. For example, with specific regard to implementing network-based learning environments into Higher Education (HE), the factors that have been identified from the literature are:

- Rapid expansion of networking capabilities (e.g. Mason, 1998)
- Concern over the widening gap between technology and pedagogy (e.g. Wintlev-Jensen, 2000; Daradoumis and Marquès, 2000)
- Improved access to the technology through increased provision and functionality (e.g. Brittain and Liber, 1999)
- Professional uncertainty and differing academic orientations towards learning (e.g. Currier, Brown and Ekmekioglu, 2001; Annand, 1997; Land, 2000)
- Political "push" provided by government initiatives to encourage e-commerce, technology use in education and the like (e.g. JISC, 1995; Dearing, 1997)
- Implementation and integration difficulties – institutional readiness (e.g. Twigg, 1999)
- Technological "pull" provided by the ever increasing expectations to use the growing functionality provided by the Internet for supporting education (e.g. JISC, 1995; Dearing, 1997)
- Limitations of understanding regarding the impact of technology on the learning experience (e.g. Lipponen, 2002; Phipps and Merisotis, 1999)

Two of the major, positive factors encouraging adoption have been, of course, the rapid expansion of networking capabilities and growing potential of access to such facilities. As a consequence there have, over the past few years, been a number of government initiatives that have clearly been aimed at capitalising on such potential through

stimulating an exponential growth in the interest to develop technological resources to facilitate and enhance the learning experience within HE. For example, the JISC Technology Applications Programme (JTAP) was first formed in 1995 with the objective to "identify, investigate and promote the timely use of key technologies". JISC then proposed, in its Five Year Strategy 1996-2001 (JISC, 1996), that "... in the future higher education will be capitalising on these investments by delivering more teaching and learning by electronic means within an institution and between institutions on a regional, national and even international basis". More recently, JISC have produced a number of further influential reports that have led to the development of Managed Learning Environments (MLEs) and Virtual Learning Environments (VLEs) within the HE sector.

In addition to the JISC initiatives, the recent Dearing report (1997) has been of further significant influence in that it stated that "the innovative application of .... communication and information technology holds out much promise for improving the quality, flexibility and effectiveness of higher education." (NCIHE, 1997). That such a vision is being realised can now be seen in the increasing development and deployment of network-based learning technologies that mean that students and tutors may now access vast information resources, may communicate with experts in many fields, and may work collaboratively with others regardless of time or place.

Such "pull" of the technology coupled with the "political push" currently prevalent in the UK, has, therefore, encouraged educational institutions to experiment increasingly

with tools which promote collaborative working which, in turn, are perceived to help in the development of more autonomous, responsible learners.

However, as recently noted, "being swept forward by the constant waves of technological innovation is simply not a satisfactory solution to the fundamental problems facing educators and teachers today. It is necessary to stand back and re-examine the relevance of current mainstream activities in the light of new thinking." (Wintlev-Jensen, 2000). There is, for example, "a growing concern amongst pedagogists regarding the widening gap between educational theories and existing learning environments, the development of which is driven mainly by technological advances rather than educational objectives" (Wintlev-Jensen, 2000). Thus, as Kellner (1999) notes "A technological revolution is going on, it will have massive effects, and it is of utmost importance to us concerning how we will actually use the new technologies – or whether they and the forces that control them will themselves use us in their projects."

The challenge for technologists and educators in HE is then highly complex. They not only need to be aware of some of the constraints and/or opportunities that are manifested by use of the technology itself but they then need to take into account the variety of issues related to the appropriate use of these new technologies in order to protect both the integrity of degree awards, as well as the learning experience in general. For example, educationalists are increasingly required to become "facilitators" as well as competent, responsible users of the technology and the various information resources. They do, therefore, need both a pragmatic and educational justification for using particular media to support the learning experience for students who may well

have a variety of learning styles and expectations that may or may not align with their own. Thus, as Lipponen (2002) notes "the social infrastructure is primary to the technical infrastructure". It was, therefore, to improve practice in the integration of network-based learning environments within the face-to-face (F2F) HE context as well as to address these other educational issues that this particular research has been undertaken.

1.2. Aims of the study

The primary aim of this research has been to systematically improve practice through gaining a greater understanding of how the learner, the learning task and a particular technology (asynchronous computer conferencing) interact within a campus-based HE environment. It has, therefore, been principally concerned with investigating factors that impact the integration of network-based learning environments within the face-to-face (F2F) context of learning for adult undergraduates. As such the particular focus of the study has involved investigating a "mixed mode" or "blended" (teacher mediated and technology mediated) approach to learning with specific regard to the use of asynchronous computer conferencing within a Virtual Learning Environment (VLE) for computer supported collaborative learning (CSCL) "as an emerging paradigm of educational technology" (Lipponen, 2002). As a consequence the specific research questions addressed have been:

- What are the major factors that influence the use of Asynchronous Computer Conferencing (ACC) within a campus-based HE context?

- Can a pedagogically sound foundation be formulated to underpin and justify the design of a "mixed mode" context for supporting learning?

- What guidelines can support the successful integration of ACC within a campus-based HE environment?

1.3. Conclusions from this Chapter

Based on the identified research questions it was concluded that the following range of activity be undertaken:

- Determining an appropriate methodology for addressing the specified research questions. (See Chapter 2)
- Conducting a literature critique related to the various aspects of CSCL such as theories of learning, current CSCL research, and available technologies. (See Chapter 3)
- Developing a generalised learning model for implementation arising from the literature review. Such a model has been aimed at justifying, in pedagogical terms, the use of ACC within a campus-based HE context for supporting module delivery. (See Chapter 5)
- Conducting a longitudinal study via a series of fieldwork studies using ACC within a campus-based HE context using a blended learning approach to module delivery. Such fieldwork studies were undertaken in order to identify patterns of

interactions, mapped to such factors as backgrounds, group behaviour and learning styles, in order to gauge their respective influence on learning. (See Chapter 4)

- Proposing a strategy, based on identified theoretical and pedagogical foundations, for integrating ACC into module design. (See Chapter 4)
- Implementing the proposed strategy for integrating ACC within module delivery. (See Chapter 4)
- Performing an incremental analysis of fieldwork studies using a variety of evaluative techniques. (See Chapter 4)
- Synthesizing findings from the fieldwork studies to produce a generalised learning model for implementation of ACC within a campus based HE context. (See Chapter 4)
- Producing detailed guidance on the impact of using ACC within a predominantly campus based HE context of learning. (See Chapter 5)

Results of this research have made a sound and original contribution in defining an effective pattern for supporting CSCL through the integrated use of ACC within a campus-based HE environment. As such, this research has served to influence and improve current practice. Additionally it has made a significant contribution to knowledge in the field through production of a number of refereed conference/journal and seminar papers (See Appendix G, pp246-249).

Chapter 2 – Methodology

2.0 Research Approach

Having identified the specific research questions to be addressed, this Chapter briefly explores the range of research methodologies that are available and then justifies the particular approach that has been adopted as the framework for this thesis.

The research methodology that might be undertaken for any investigation into an educational context can range from the scientific, objectivist methods through to the very subjective, phenomenological approaches which each produce either quantitative or qualitative data sets as a consequence. For example, "quantitative researchers collect facts and study the relationship of one set of facts to another. They measure, using scientific techniques that are likely to produce quantified and, if possible, generalizable conclusions" (Bell, 1993). However, in education and the social sciences in general, such quantitative experimentation is extremely difficult to undertake as "large groups are needed if the many variations and ambiguities involved in human behaviour are to be controlled" (Bell, 1993). In addition such large-scale experiments are not only liable to result in questionable conclusions they are likely to be very expensive to undertake. On the other hand, researchers adopting a qualitative perspective are more concerned to understand individuals' perceptions of the world. They seek insight rather than statistical analysis" (Bell, 1993)

The underpinning belief of such qualitative approaches is, therefore, that the realities of the research setting and the people in it are "phenomena" that can only be superficially touched by research. Therefore, such research will only describe actions within a specific setting and will not then seek to control the possibility of a rich array of variables. Rather, "the researcher looks deeply into behaviour within specific social settings rather than at broad populations." (Holliday, 2002). Thus, as a consequence of adopting a qualitative, practical Action Research (AR) approach "the results and insights gained from the research are not only of theoretical importance to the advancement of knowledge in the field, but also lead to practical improvements during and after the research process". Zuber-Skerritt (1992),

Given the overall aim (to systematically improve practice) as well as the nature of the area to be researched (complex, discursive) a qualitative approach was then deemed to be appropriate for more detailed investigation.

Such further investigation then suggested that the ethnographic, AR approaches, based on the interpretative and critical paradigms, are more appropriate when undertaking "research into practice, by practitioners for practitioners" (Grundy and Kemmiss, 1988). As Jones (1998) notes ethnography is "illuminative evaluation useful for long-term and longitudinal studies of programmes. It concentrates on accounting for the observed setting rather than comparison between settings. Ethnographic evaluation can also investigate the user's point of view. It can help in forms of participative design eliciting the point of view of those who will use the system, both educators and students. In particular, ethnography can draw out "tacit" knowledge, the taken for granted aspects of

work often overlooked. This is an iterative design process in which ethnographic research plays two roles. First, it is used to clarify requirements prior to the design of a new system. Then, it is used to provide continuous feedback for redesign and modification."

Another strength of using AR within a social research context is that, not only is it interpretative, but that it is participative and collaborative in as much as the researcher is not considered to be an "outside expert conducting an enquiry with 'subjects' but a co-worker doing research with and for the people concerned with the practical problem and its actual improvement." (Zuber-Skerritt, 1992; Grundy and Kemmiss, 1988). As a consequence, "social enquiry is not assumed to result in the researcher's positivist statements based on right or wrong answers to the research question, but in solutions based on the views and interpretations of the people involved in the enquiry." Zuber-Skerritt (1992). Thus, "the 'critical community' of participants not only search for practical improvements in their work within the given socio-political constraints, but also act as critical and self-critical change agents of those constraints. They change their environment and are changed in the process" Zuber-Skerritt (1992).

To adopt an AR approach that "requires researchers to conduct an integrative response study in authentic contexts using mixed methods and multiple data sources" (Zuber-Skerritt, 1992) was, therefore, entirely appropriate given the context and aims of this particular research project.

However, in order to provide a framework for such research Zuber-Skerritt (1992) have developed a working definition of AR known as the "CRASP model of action research" that involves:

- Critical (and self-critical) collaborative enquiry by
- Reflective practitioners being
- Accountable and making the results of their enquiry public
- Self-evaluating their practice and engaged in
- Participative problem-solving and continuing professional development."

This framework then links to the procedural model of AR proposed by Kemmis and McTaggart (1982) and the Lewinian experiential learning model developed by Kolb, (1984). Within this "Action Research Planner" model the four fundamental moments - to plan, to act, to observe, and to reflect - are linked dynamically in a cycle. This then provides a way of thinking systematically about what happens in the teaching practice, implementing action where improvements are considered to be possible and monitoring and evaluating the effects of the action for continuing future improvement. An ethnographic AR approach was, therefore, adopted which meant that a series of fieldwork studies were conducted that built on the findings of each study in an incremental, heuristic approach to development.

However, as this research was within the fields of both education and technology, the first stage of the project focussed on undertaking a literature review in order to develop a general map of current and influential educational theories. Such theories ranged from

the objectivist/behaviourist models of learning through to the more modern constructivist approaches.

Following this initial review of educational theory, a more detailed investigation was then undertaken into some of the technologies/tools that might be used to support and facilitate ACC (e.g. Basic Support for Collaborative Working (BSCW), Blackboard and WebCT). Such tools were subsequently used to conduct the series of fieldwork studies using each of these technologies with both staff (academic and technical) and final year, campus-based undergraduates studying selected modules related to computing (e.g. Innovative Trends in Information Systems, Computing and Ethics, and The Professional Context of ICT). The particular "test-bed" modules for the fieldwork studies were chosen because of their complex, discursive nature together with the fact that each of them required students to further develop and, more importantly, evidence their skills of critical analysis. Such fieldwork studies were then used to identify some of the factors (e.g. theories of learning, group working, and learning styles) that had potential relevance to, and impact upon, the use of ACC for supporting CSCL. As such the literature related to each of these factors was then researched in order to ground subsequent fieldwork study development within relevant theory.

Finally, following the CRASP approach, each fieldwork study was incrementally reflected upon and heuristically evaluated, in terms of the variable factors involved, using a selection of instruments identified as being appropriate from the literature review. More detail regarding the specific use of each of these instruments is given in Chapter 4 but, in brief these included:

2.1. Evaluative Instruments

2.1.1. Transaction analysis

According to research (e.g. Nurmela, Lehtinen and Palonen, 1999; Wortham, 1999; Nieminen, 1974; Freeman, 1978/79; Lotan, Cohen and Morphew, 1998) transaction analysis can be used as a useful framework for analysing human interaction and a number of approaches have been devised. Berne (1968), for example, proposes that each person comprises of three basic 'selves' – the parent, the adult and the child. Each of these 'selves' then has an impact upon the tone of communication used. This framework for analysis is, however, more useful for looking at interaction within one-to-one relationships. Thus, for evaluating transaction patterns within group activity, other techniques have been found to be of more relevance. For example, "because a communication network is a social network – a patterned set of connections linking actors to each other – the network approach is especially useful for CSCL studies" (Nurmela, et al, 1999).

As Nurmela, et al (1999) then point out, "using social network techniques permits analysis at both a group and an individual level and integrates the data on interpersonal relations (Haythornthwaite, Wellman and Mantei, 1995)". In order to represent the social structure as a network therefore a set of nodes and the ties connecting these nodes are illustrated (Wasserman and Faust, 1995; Scott, 1991).

From his research Freeman (1978/79) has defined 30 possible five-node transaction networks to represent relations between members in a group. Two of these transaction networks are described as being either a "star" network or an "all channel" network as illustrated below:

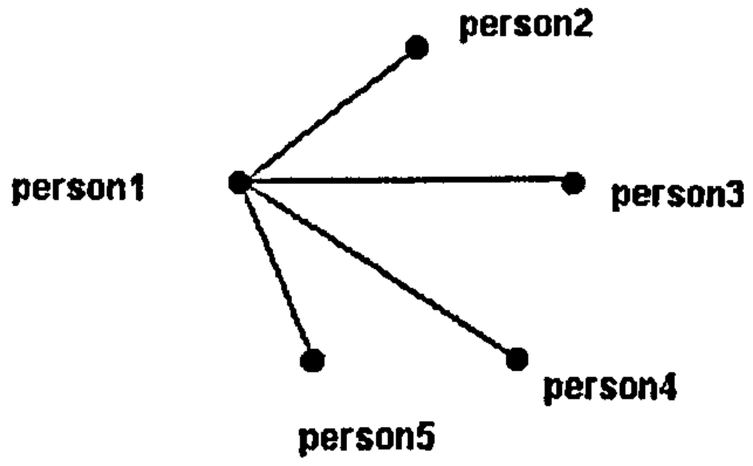

Figure 1 - The "star" network pattern (Freeman, 1978/79)

The five nodes below are fully-connected, or as Freeman (1978/79) described, "all-channel."

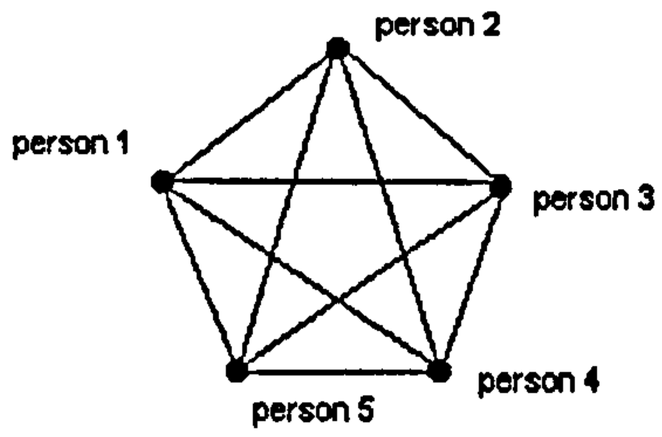

Figure 2 - The "all-channel" network pattern (Freeman, 1978/79).

Using adjacency measures identified by Wortham (1999) to construct a matrix it can be shown that the "all channel" network pattern "has a higher total degree of adjacency, and that the connections are equally distributed":

	p1	p2	p3	p4	p5	$C_D(P_A)$
p1	-	1	1	1	1	4
p2	1	-	1	1	1	4
p3	1	1	-	1	1	4
p4	1	1	1	-	1	4
p5	1	1	1	1	-	4

Table 1 – Matrix for Freeman's "all channel" network (Wortham, 1999)

Wortham (1999) then points out, "these representations of network interactions relate to theoretical approaches to learning". For example the "star" network pattern (Figure 1) can be seen to be "consistent with the transmission model of learning, where information flows almost exclusively from one resource. On the other hand, the "all-channel" or fully-connected model (Figure 2) is suggestive of some models of cooperative learning". Wortham then notes that both of these interaction models may "be consistent with dynamic models of participation, such as that proposed by Lave (1991) and Rogoff (1990). Here, learners have peripheral roles early on, but under guidance of an expert other (or others) gain increasingly legitimate roles in the social structure". (Wortham, 1999) This would, of course, relate to the cognitive apprenticeship model of scaffolding (Collins, et al, 1991). For example Wortham suggests that "possibly, in the initial stages (time 0) of an apprenticeship situation, the interaction patterns might more closely resemble a "star" representation–they would hold fewer degrees of adjacency. As time passes (time1, time2, etc), students' participation shifts from peripheral to central, degrees of adjacency would likewise increase". (Wortham, 1999)

Such social network technique of transaction analysis has therefore been used in fieldwork studies 2 - 7 to identify the patterns of interaction that actually took place within the conferencing environment with/without tutor intervention. Results from using this technique can be seen in Appendix E, pp195-219.

2.1.2. Group Behaviour

Initially the Belbin Self-Perception Inventory was used to see if there was any correlation between students' identified perception of their group behaviour and actual conference activity undertaken. In the final fieldwork study, however, the inventory was used to get the students to focus on group roles and for tutors to formulate "balanced" groups (see Appendix I for a copy of the Inventory). This Self-Perception Inventory was developed by Dr Meredith Belbin as a consequence of research that he was undertaking into management teams (Belbin, 1981). Such research led Belbin (1981) to determine that members of teams have two roles – the first one being the functional role and the second was what Belbin (1981) determined as being the Team role. In reaching his 8 classifications of team type Belbin (1981) originally used psychometric tests to relate observed team behaviour to measured psychological traits. The four principal factors isolated by these psychometric tests were – Intelligence, Dominance, Extroversion/Introversion and Stability/Anxiety. The balance of ratings an individual achieved on these four scales, plus scores on a number of subsidiary measures were then used to determine which team role they preferred (as well as their secondary preference). Each of the 8 team roles identified by Belbin (1981) were – Chairman, Shaper, Plant, Monitor/Evaluator, Company Worker, Resource Investigator, Team Worker, Finisher/Completer. Belbin (1981) gives descriptions of each of these roles that include typical features together with positive qualities and allowable weaknesses. Belbin's (1981) research indicated that identification of these team roles, based on Intelligence, Dominance, Extroversion/Introversion and Stability/Anxiety

factors, could then be used to construct balanced teams. As a consequence of this research work the Belbin (1981) Self-perception Inventory has been widely used in industry to construct management and work groups but this technique has not been widely used in developing learning groups because these are perceived to be of a different type. (e.g. Atherton, 2001)

Nevertheless, having previously used the Belbin (1981) Self-Perception Inventory in successfully constructing groups for a university induction exercise, it was decided to test out use of this particular instrument within fieldwork studies 4, 5, and 6. Such study was undertaken in order to determine whether or not there was any correlation between perceived Belbin (1981) types and evidenced conferencing activity. Use of this instrument was further developed in fieldwork study 7 in that tutors used the results of the inventory to construct the virtual groups. This subsequently prompted the students to reflect on group dynamics in developing their strategy for achieving the set task. Results from using the Belbin (1981) Self-Perception Inventory are reported in fieldwork studies 6 and 7.

2.1.3. Learning Styles

As Pilkington and Groat note "one commonly used instrument (Kolb's Learning Style Inventory (LSI); Kolb, 1976)" for indicating an individual's preferred learning style "has been the focus of much attention since it was first developed and serves to illustrate the difficulties of defining and measuring learning style". However, the "reliability of the LSI has been seriously questioned (Freedman and Stumpf, 1978)" and "the construct validity remains questionable". (Pilkington and Groat)

Nevertheless, as a consequence of some of the shortcomings of the LSI, Honey and Mumford (1986) have devised their own questionnaire for measuring learning style. This instrument, they claim, has high reliability stating "that its face validity has rarely been questioned by those who have completed it, although they admit that its construct validity is difficult to prove". (Pilkington and Groat).

Allinson and Hayes (1988) have, for example, failed to find evidence to support the construct validity of the four factors identified by Honey and Mumford and, amongst others, they have then cast doubt upon the "questionnaire's predictive value". (Pilkington and Groat).

Pilkington and Groat suggest, however, that "in both studies the interpretation of the data can be disputed and that "neither of the studies provides grounds for rejecting the LSI as a useful indicator of learning style. All that can be inferred is that more investigation is necessary". Therefore because "a consistent relationship between performance on the questionnaire and real learning behaviour might allow the development of more general teaching strategies" (Pilkington and Groat) together with the possible increased validity of the Honey and Mumford (1986) questionnaire it was this approach that was used in fieldwork study 6 in order to investigate whether there was any correlation between students' own perception of their learning style and findings from the questionnaire in order to develop implementation strategy. (See Appendix J, pp266-278).

The Honey and Mumford Learning Style Inventory itself seeks to categorize learners as having preferences for being Activist, Reflector, Theorist or Pragmatist in their approach to learning. The questionnaire consists of a set of 80 statements that requires a learner to either agree or disagree with them. Based on their positive responses to these questions the learners then calculate their particular preferences that can then be transferred onto a chart.

Thus, in fieldwork studies 3 and 5, students were asked to complete the LSI and to calculate their preferences. These were then discussed in the F2F situation and students were asked to reflect on how closely they felt that these related to their actual group discussion activity. As a consequence much debate took place regarding the different approaches that students could take to learning and many students acknowledged a similarity between the findings of the LSI and their own perceptions of how they and others approached learning.

2.1.4. Community of Inquiry Model

The Community of Inquiry Model (Garrison, 2001) has been employed in order to evaluate the activity that has taken place within the discussion area. The model itself was developed by Garrison, et al "as a framework for understanding how such a community of inquiry functions". As such the model "illustrates the interaction of its three essential elements: social presence, teaching presence, and cognitive presence" (Archer, Garrison, Anderson and Rourke, 2001).

As one of the objectives within this research was to evaluate whether or not the discussion area promoted "higher order" or "deep" learning it was the cognitive presence aspect that was particularly evaluated. "Cognitive presence is defined as the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (Garrison et al, 2000) and therefore reflects higher-order knowledge acquisition and application related to critical thinking. In order to evaluate cognitive presence all of the messages are, according to the model, coded up as being either a "Triggering" event (the initiation phase of inquiry), "Exploration" (a divergent phase), "Integration" (constructing shared meaning) or "Resolution" (resolving the issues or problem posed in the first phase).

The Garrison model (Garrison et al, 2000) was used in fieldwork studies 5, 6 and 7 to categorize each of the messages contributed by individual students in order to identify cognitive presence and the informal group roles that were being developed. This particular instrument was used because it provided a useful framework for gaining a more detailed insight into the different types of interaction that were being evidenced within the conferencing environment.

2.1.5. Moral Judgement Development

The Moral Judgement Development Test (MJT) (Lind, 2001) "has been constructed to assess subjects' moral judgement competence" and has been based on the work of Kohlberg (1964) and Habermas (1985, 1990). Such a test has been developed as there are many courses in many institutions worldwide that attempt to develop students'

moral reasoning ability in order to help them better deal with the moral questions that they may encounter in their professional lives. Assessing student performance is, however, then usually done by using a standard approach such as an examination or by getting learners to undertake specific tasks such as analysing moral dilemma case studies. Whether or not these assessment exercises actually tell us anything about the development of moral reasoning in the learner is, however, open to question.

Lawrence Kohlberg (1958, 1964, 1984) has, however, proposed one approach that might be used to measure moral reasoning. Such an approach is based on earlier work on the theory of moral development undertaken by Piaget (1965/1932).

Kohlberg (1963, 1970) similarly proposed that people progress through a series of stages in their moral reasoning development but, unlike Piaget, he believed intellectual development continued after the age of 12. This work eventually led to Kohlberg's six-stage model (See Table 2) upon which Lind later based his Moral Judgement Test.

LEVEL	STAGE	SOCIAL ORIENTATION	DESCRIPTION
Pre-conventional	1	Obedience and punishment	Fear of punishment
	2	Individualism and Exchange	Returning favours
Conventional	3	Good interpersonal relationships	Putting yourself in other's shoes
	4	Social Order	Avoiding societal breakdown
Post-conventional	5	Social contract and individual rights	Obeying the law and upholding rights such as liberty and life
	6	Universal Principles	Guided by principles of justice, human rights and human dignity

Table 2 - Kohlberg's Six Stages of Moral Judgement

Perhaps the major difference between Kohlberg's definition of moral judgement and that of Piaget was that Kohlberg defined morality in affective, cognitive and behavioural terms. In the affective domain the individual has moral ideals. These then guide moral behaviour. But for that moral behaviour to be morally mature, there needs to be developed reasoning competencies. Figure 3 below summarises this:

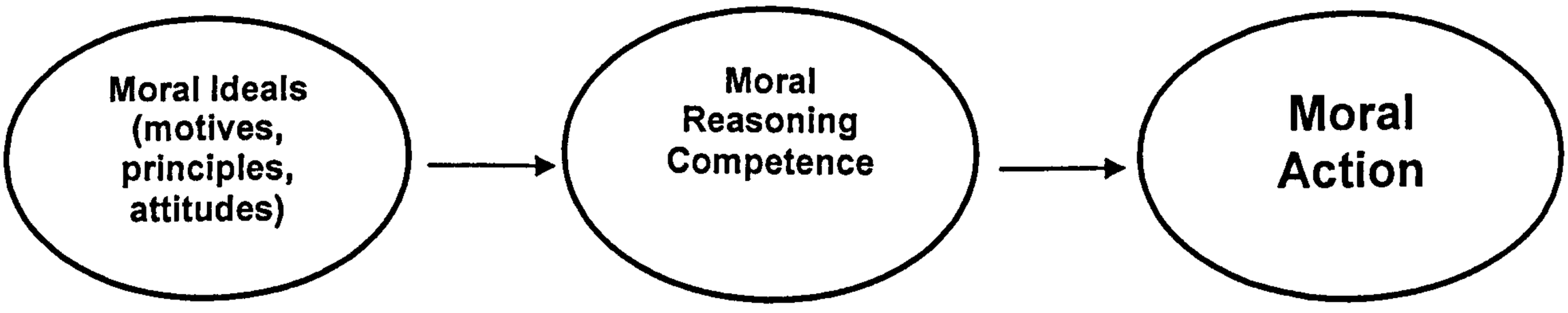

Figure 3 - Aspects of Moral Behaviour (after Lind 2002).

The relationship between these three aspects of morality led to the development by Kohlberg of criteria for the measurement of moral reasoning. He then designed the Moral Judgement Interview where subjects took part in an interview where they were asked to respond to moral dilemmas and then questioned on their responses.

As noted earlier Lind (1986) took this idea one stage further by developing the MJT where subjects were presented with moral dilemmas and a number of different responses (organised into pro and con statements). Each of these responses represent a different stage of Kohlberg's six-stage model and subjects are asked to rate their agreement with the response on a nine-point scale from -4 to +4.

The MJT was designed so that it satisfied the main postulates, as laid down by Kohlberg, for an adequate moral reasoning measurement tool. These include:

- The ability to measure both the cognitive and affective aspects of moral behaviour
- The inclusion of a moral task
- Non-fakeability (i.e. subjects should not be able to get scores higher than their moral reasoning competency)
- Sensitivity to change, measure the subject's own moral principles rather than imposing external moral expectations
- Equivalence of both pro and con arguments in terms of Kohlberg's six stages.

The MJT uses moral dilemmas defined as "a situation in which a person cannot make a decision without transgressing an important moral rule or principle" (Lind 2002) in order to assess the subjects' moral reasoning level. (See Appendix K, pp279-283).

Once all of the subject responses have been gained to the given moral dilemmas these are then scored using multivariate analysis of variance components to give the C-index. This C-index can vary from 1 to 100 with very low graded as between 1-9, low as 10-19, medium as 20-29, high as 30-49, very high as 40-49 and extraordinarily high as greater than 50 (full details of the scoring method can be found in Lind 2001).

However, because there are a number of factors that can influence how a particular subject might respond to the MJT at any given time, the test is designed to gauge the moral reasoning development of groups rather than individuals. It does this by

grouping each of the group member's scores and then the average for the whole group is calculated.

Whilst there are some known difficulties with the application of the Moral Judgement Test in pre-test and post-test situations over short periods of time this instrument was used in fieldwork studies 5 and 7 in order to test whether group moral development was evidenced. Evidence of moral development was, of course, important given the subject area of the modules being taught. Results from such pre- and post-tests were then analysed in order to facilitate comparisons between the multi-international work groups and those that were based on the one campus. Detailed results of the application of this instrument are reported in fieldwork studies 5 and 7.

2.1.6. Module Assessment Outcomes

Module Assessment Outcomes in terms of coursework and examination were used in all of the fieldwork studies. Initially the overall module assessment outcomes were mapped against transaction analysis in order to determine whether there was a correlation between such outcomes and contribution to the discussion board. In order to provide more detailed analysis further comparisons were then made between Coursework and Belbin Types, Exam Performance and Belbin types, as well as overall performance in each of these aspects of assessment across all of the fieldwork studies. Each of these comparisons were undertaken in order to provide quantitative analysis of the different factors that were evidenced within the fieldwork studies. See Appendix F, pp220-245 for detailed findings relating to each of these comparisons.

2.1.7 Questionnaires to gain qualitative staff and student feedback

Questionnaires were developed to gain qualitative staff and student feedback for each of the fieldwork studies undertaken. (See Appendix N, pp290-303) Questionnaires were used because they could be quickly and widely distributed electronically over a geographically dispersed community of learners and staff. Responses from each set of questionnaires were then analysed in order to inform incremental development of the fieldwork studies. (See Chapter 4). For example, the role of the tutor was changed to that of "e-moderator" in fieldwork study 2 as a consequence of staff feedback. Whilst this particular role was changed in subsequent fieldwork studies, further feedback led to a more structured approach being developed towards integrating the conferencing environment within module design. Such strategy can be seen in Appendix H, pp250-254.

2.1.8. Semi-Structured Interviews

Semi-structured interviews were conducted with both students and staff in order to evaluate opinions towards usage of the conferencing environment. Such instrument was, of course, used as part of the adopted Action Research approach to facilitate the participative and collaborative involvement of the various stakeholders in development of the fieldwork studies. Findings from such interviews then led to further development of the strategy for integration and implementation.

2.1.9. Summary and Justification

Reasons for experimenting with each of these evaluative instruments were that together they offered a range of opportunities for gaining collaborative participation of all of the stakeholders in developing the use of ACC within the campus-based HE context. For example, use of a learning styles analysis approach had, despite questions of validity, been found to be useful in enabling learners to discuss their learning characteristics with the team (Mumford, 1995).

Furthermore the usefulness of Transaction Analysis for research purposes has been well documented within the literature and the "Community of Inquiry Model" suggests that for deep and meaningful learning to take place, one must look at the interaction of three elements: teaching presence, social presence, and cognitive presence in the educational process.

The research group, which has proposed this model, argues that it is a framework that can be used to analyze the effectiveness of Computer Mediated Communication in "supporting critical thinking in higher education" (Archer et al, 2001). (See Chapter 4)

2.2. Conclusions from this Chapter

By undertaking a literature review it was determined that an Action Research approach using the CRASP framework was appropriate for the particular research questions to be addressed.

Subsequently, in adopting the AR approach, it was then determined that by employing various evaluative techniques within each of the incrementally developed fieldwork studies it would be possible to develop a series of data sets from which appropriate inferences could be made. Such inferences would, in turn, lead to conclusions being reached regarding actual usage of ACC in a campus-based HE context and these could then be used to inform incremental development of each of the subsequent fieldwork studies as detailed in Chapter 4.

Alternative approaches, including comparative studies involving controlled fieldwork studies, were subsequently researched and evaluated as detailed in fieldwork study 5.

Finally conclusions from both the literature review and the fieldwork studies (discussed in Chapter 4) subsequently lead to the development of a framework aimed at justifying, in pedagogical terms, the use of ACC within a campus-based HE context. This led, in turn, to a strategy for integrating ACC into module design being proposed (See Appendix H, pp250-254).

Chapter 3 – Literature Review

3.0. Introduction

This Chapter describes findings from relevant literature that has been reviewed in order to gain a more in-depth understanding of the "problem domain" - the educational context and collaborative learning in particular. Such review has been undertaken to gain a clear appreciation of some of the underpinning philosophies and theoretical models of learning therefore the following areas were identified as being of significant relevance:

- Educational philosophy and models of learning
- Institutional Factors
- Technologies for supporting learning
- Computer Supported Collaborative Learning
    - Synchronous
    - Asynchronous
- Group Behaviour
- Learning Styles

In general it should be noted that this thesis is focussed upon adult learners in a campus-based higher education (HE) context although, where appropriate, the boundaries have been extended to provide a more inclusive view of the field of education.

3.1. Educational philosophy and models of learning.

Initial review of the literature evidences the fact that the education system in the UK has, over the years, been significantly influenced by the work of a number of researchers and philosophers who have sought to guide educational thought and practice.

For example, early influences stemmed from the work of Skinner (1954) and other objectivist philosophers but latterly more liberal, divergent philosophies have contributed towards the widespread adoption of what is termed "a student-centred curriculum" that takes account of the more cognitive aspects of learning. (e.g. Piaget (1980) – cognitive constructivism, Vygotsky (1978) – social constructivism). As Vosniadou (1994) notes, "recent approaches to learning emphasise the active, constructive nature of the knowledge acquisition process wherein the learner is not a passive recipient of information but an active and constructive interpreter of meanings".

Thus, the ultimate goal of a constructivist approach is on learning how to construct knowledge appropriate to the situated task – similar to the idea of metacognition which is the higher order process of reflecting on our own thinking and problem solving processes. This has a powerful problem solving potential and, according to Cunningham, et al (1993), constructivist design is based on the following 7 principles:

Provide experience of the knowledge construction process
Provide experience in and appreciation of multiple perspectives
Embed learning in realistic and relevant contexts
Encourage ownership and voice in the learning process
Embed learning in social experience
Encourage the use of multiple modes of representation
Encourage self-awareness of the knowledge construction process

Table 3 – Seven principles of constructivist design (Cunningham et el, 1993)

However, one of the fundamental problems within the literature is, very often, to determine how the term "learning" itself is being defined. For example, it remains a fact that "learning" is frequently referred to as the learning process itself as well as being used to refer to "that which has been acquired by a learner".

Further difficulties then arise regarding definition of the learning process itself. For example, Sfard (1998) argues that there are two metaphors for learning – the "acquisition metaphor" and the "participation metaphor". In the first metaphor the act of learning may easily be perceived as being actively engaged in the acquisition of knowledge that, in turn, may be packaged and transmitted. This does, of course, lend itself very well to the "transmission" model of learning and teaching which still largely dominates modern day education. However, in the second metaphor the process seems to imply a more collaborative, participatory approach although this seems to neglect the fact that something (ie learning) must be acquired. Koschmann (1994) on the other

hand believes that such a dichotomy is too restrictive and proposes a "transaction metaphor" that encompasses both acquisition and participation.

A further issue then lies in the fact that "learning" may be perceived of as being either an individual or social activity. For example, Gifford and Enyedy (1999) do, in fact, argue against both the domain centred approach to learning (that they state reflects the transmission model of knowledge transfer) as well as learner-centred design (which they suggest is founded on the information processing model of cognition). Rather they propose what they term to be an "Activity Centred Design" model whose central tenets are that "Activity is mediated by cultural artefacts, that activity must be analysed at various levels and that internal activity (thinking) first occurs in the social plane (contextualised activity)". (Gifford and Enyedy. 1999)

Dewey (1901), Vygotsky (1978) and many other researchers have similarly argued that learning begins from a social context. For example, Vygotskian social theory proposes that learning occurs as a result of first participating in activities with others who scaffold the process. Learners then internalise and appropriate skills that then allow them to develop from a novice status to more expert. (Wertsch, 1985; Hoadley and Enyedy, 1999). However, Gifford and Enyedy (1999) further suggest that mediation changes the nature of the task and that "learning to participate in a cultural practice means moving from partial participation in that practice to full participation". Here again it seems that the actual definition of what constitutes "learning" remains contentious.

However, one of the more recent attempts to define the dimensions of the various learning theories has been undertaken by Leidner and Jarvenpaa (1995) who distinguish 5 different models of learning in relation to assumptions surrounding the learning process. Based on such assumptions Leidner and Jarvenpaa (1995) then develop a framework with axes labelled as - the realism of the context, the status of knowledge and control of the learning environment. Each of these models of learning are then placed within a framework as shown in Appendix B, p188.

Within Leidner and Jarvenpaa's (1995) framework, however, the focus is with "knowledge" which is, in itself, contentious. For example, numerous researchers and philosophers have pointed out that learning cannot simply be reduced to the acquisition of knowledge - learning is a much greater concept than this - skills, attitudes, concepts and other less potentially definable attributes may be acquired as a consequence of learning. (Piaget, 1980; Vygotsky, 1978)

A further criticism of Leidner and Jarvenpaa's (1995) framework, however, lies in their positioning of particular models of learning. For example, whilst much of the literature surrounding the Cognitive Information Processing model suggests a view of learning as a highly individualistic, autonomous, non-social activity (Lave, 1996) such a model has often derived from experiments in highly constrained, instructor-led environments. Thus, within such a model, the learner would not exercise the degree of control that Leidner and Jarvenpaa's (1995) framework suggests. A further criticism is that socio-culturalism may be misplaced within the framework as, by its very nature, the sharing

of knowledge and peer group control would be presumed to have significant influence upon the learning experience.

Nevertheless taking the 3 models of learning that Koschmann (1994) proposes and applying this to the Leidner and Jarvenpaa (1995) framework the following (Figure 4) might more usefully illustrate the dimensions of learning. Such model could then point to the potential for using networking technologies to facilitate the whole range of learning approaches including that of collaboration – a) Instructor interacting with the Peer group or b) Peer Group interaction (Social Constructivism, Socioculturalism):

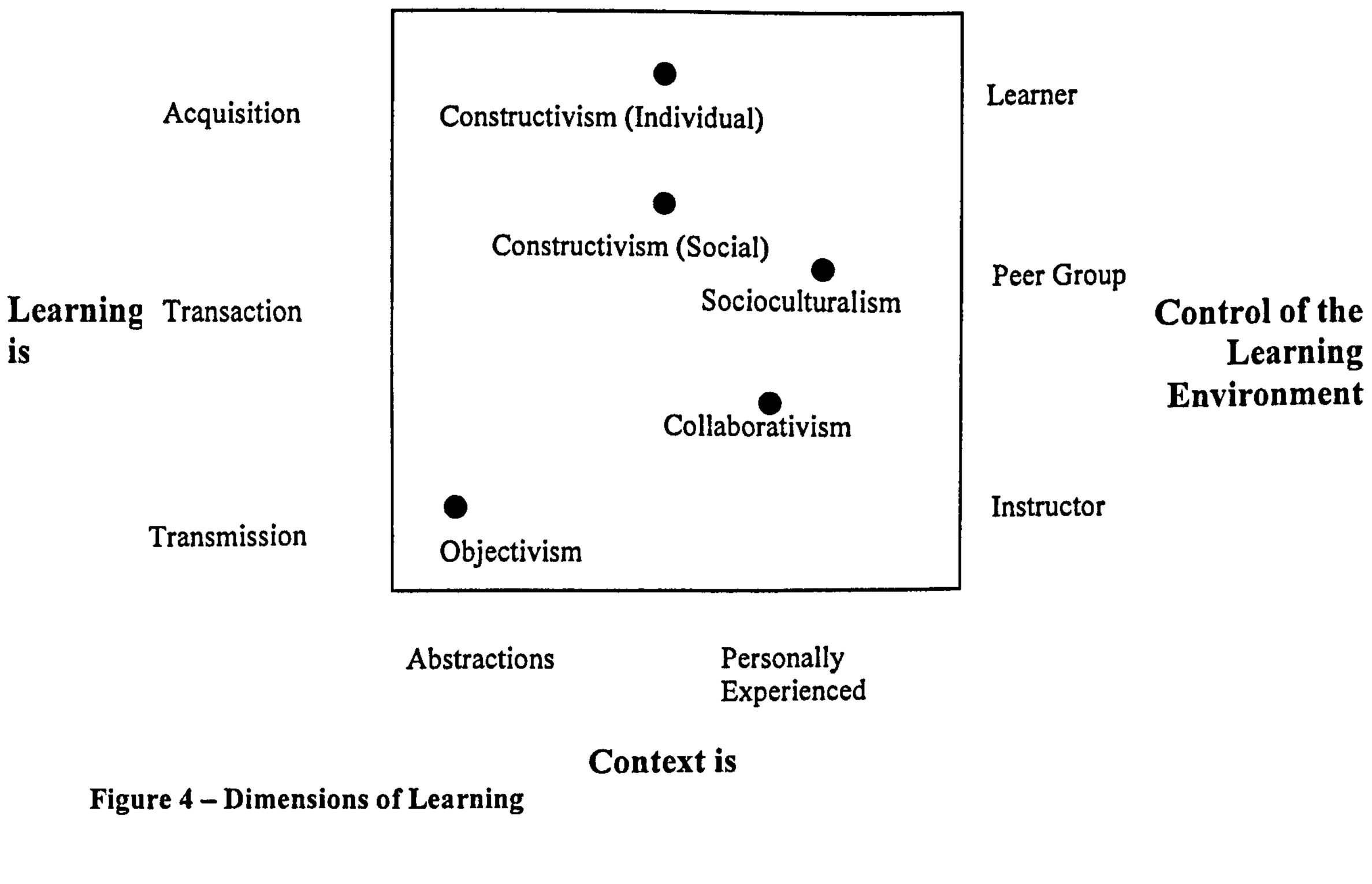

Figure 4 – Dimensions of Learning

The key issue is then based upon which technologies are implemented, why they are being used, how they are used and how they will be integrated with the face-to-face (F2F) activities within course design.

Thus, whilst the literature review reveals that very diverse opinions remain as to whether or not the term "learning" refers to the process or the outcome, it can clearly be seen that the use of networking technologies can support this variety. It proved useful, therefore, to try to distinguish between the different models in terms of their potential impact upon learning and teaching strategies as depicted in Figure 5 below:

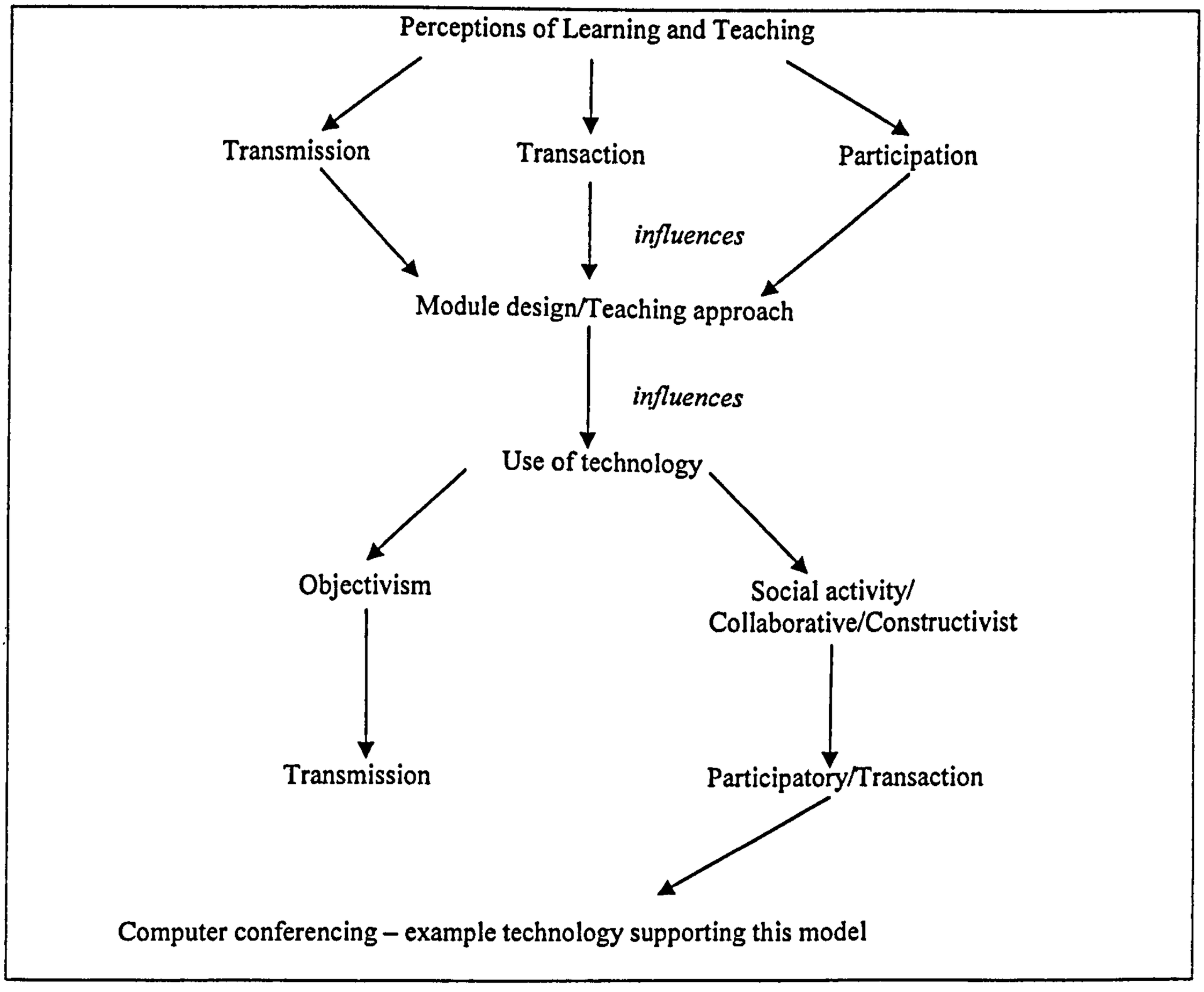

Figure 5 – Influences on Learning and Teaching Strategy

The use of computer conferencing within a learning and teaching strategy can, it seems, be pedagogically justified in as much as it can support the participatory/transaction models of learning. In addition, researchers have already identified the positive effects

of social interaction during learning (Crook, 1999; Dillenbourg, 1999) and that collaboration with other students has been shown to stimulate activity, make learning more realistic and to stimulate motivation (Harasim, 2000; Veerman, and Veldhuis-Diermanse, 2001). Bligh (1998), for example, concluded that discussion methods are more effective than didactic methods (eg. Lecture) for stimulating thought, for personal and social adjustment, and for changes of attitude and were hardly worse than the lecture for effectively transmitting information.

In support of this there is, in fact, a great deal of empirical research that reports the benefits and potential of networked learning (see Lehtinen, Hakkarainen, Lipponen, Rahikainen and Muukkonen, 1999 for a review; Daradoumis and Marquès, 2000; Hakkarainan, Järvelä, Lipponen and Lehtinen, 1998; Scardamalia, et al., 1994; Sinko and Lehtinen, 1999). However, other research has found, as Lipponen, (2002) notes, that "on a large scale, there is no solid evidence that collaboration through networks leads to excellent learning results. Stahl (in press) has even proposed that CSCL environments are mainly used for exchange of personal opinions, and for delivering surface knowledge, not for collaborative knowledge building."

Here again there is a conflict within the literature although such conclusions may, in fact, be related to how CSCL has been implemented and evaluated within the given context. Lehtinen, Hakkarainen, Lipponen, Rahikainen and Muukkonen, (1999), have, for example, noted that use of networked technologies has had positive effects in facilitating authentic learning, deeper conceptual insights and higher group performance, especially with regard to knowledge construction. Furthermore, the

literature review has suggested that learning might be further enhanced if collaboration can take place within a wider context across different locations and cultures (Leidner, et al, 1995; Campos, Laferrière, Harasim, 2001) and that dialogue is an important aspect of a rich learning experience, particularly in complex, discursive domains (e.g. Jeong and Chi, 1997; Ohlsson, 1995; Voss, 1990; Cohen, 1994; Laurillard, 1993; Roschelle, 1992).

Thus the strategic use of ACC technologies to support learning in a complex discursive context can be pedagogically justified particularly as one of the advantages of using ACC is the fact that the dialogue remains available to students for reflection over long periods of time. Research has, for example, suggested that "learning can occur not only through participation in dialogue but also through observing others participating in it", (Stenning, McKendree, Lee and Cox, 1999) (See Gokhale, 1995; Brown and Palincsar, 1989; Chi et al, 1989). Thus, by facilitating access to, and production of written dialogue in addition to more transient oral communication the tutor can, through judicial implementation, significantly add to the available resources for supporting the learning experience. "The Vicarious Learning" project, (Lee, et al., 1999; McKendree, et al, 1997/1998) has, in particular, reported that examples of dialogue have been an effective educational resource - "learning 'vicariously' from recorded dialogues gives students the opportunity to practice learning from someone else's experiences" and "from understanding someone else's argument". (Guzdial and Carroll, 2002). Mason (1992) however, cautions that in asynchronous discussions that the relative permanence of the text produced requires contributors to overcome greater barriers than in the F2F context and other research has identified a number of negative effects. For example, a) the

"free-rider" effect "(individual member or members of team off-loads cognitive responsibilities to the other members of the group, Kerr and Bruun, 1983; Salomon, 1993), b) "status sensitivity (high ability members may dominate the group work, Dembo and McAuliffe, 1987)" and c) "the sucker effect (to avoid the free-rider effect an active member of the group may expend less cognitive effort on team work, Kerr, 1983)." (Lipponen, 1999). Thus collaboration is not always favourable and teams do not always function as best they can (Salomon, 1997; Salomon and Globerson, 1987).

Nevertheless, further research on the social construction of knowledge indicates that a significant type of "collaborative configuration" is between a mature partner and a learner. The mature partner provides the principles that the learner assimilates over time through repeated social interactions. Such an approach may be exemplified by the Cognitive Apprenticeship theory developed by Collins et al, (1989), as well as in the Conversational Framework developed by Laurillard (1993). Both of these theories have subsequently had significant impact on the development of new learning environments, as "the main goal of these models is to avoid decontextualized presentation of information that often leads to inert knowledge". (Mandl, Gruber and Renkl, 1994). Thus Mandl, et al, quote the framework of Cognitive Apprenticeship (Collins et al, 1989), wherein "the learner is encultured by authentic (learning) activities and social interaction" which, they then propose, "points to the importance of two kinds of collaboration:

(a) Cooperation between teacher (expert) and student: the more competent partner provides modelling, coaching, and scaffolding.

(b) Cooperation between students: this allows free exchange of ideas between the learners and is, therefore, especially suited for deeper conceptual insights (Damon and Phelps, 1989)" (Mandl, Gruber and Renkl, 1994).

Within the first of these approaches, the teacher "scaffolds" the efforts of the learner by providing hints, comments and carrying the parts of the task the learners cannot yet handle in much the same way as a parent does with a child. Examples of techniques supporting this type of approach are: "scaffolding" (Wood, Bruner and Ross, 1976), "guided participation" (Rogoff, 1990) and the "construction zone" (Newman, Griffin and Cole, 1989)). The teacher then gradually removes their support – Wood, et al (1976) refer to this as the process of 'fading'. This forces the learner to become increasingly independent in their application of skills and knowledge. The final stage is for the learner to engage in independent problem solving in the domain. Central methods adopted within this approach – modelling, coaching and fading - are extended by articulation, reflection and exploration. "Articulation and reflection help students to gain greater conscious control of their problem solving processes, through making these processes more explicit" (Collins et al, 1989).

To some extent such approaches are reflected in the Conversational Framework developed by Laurillard (1993) as depicted in Figure 6 below:

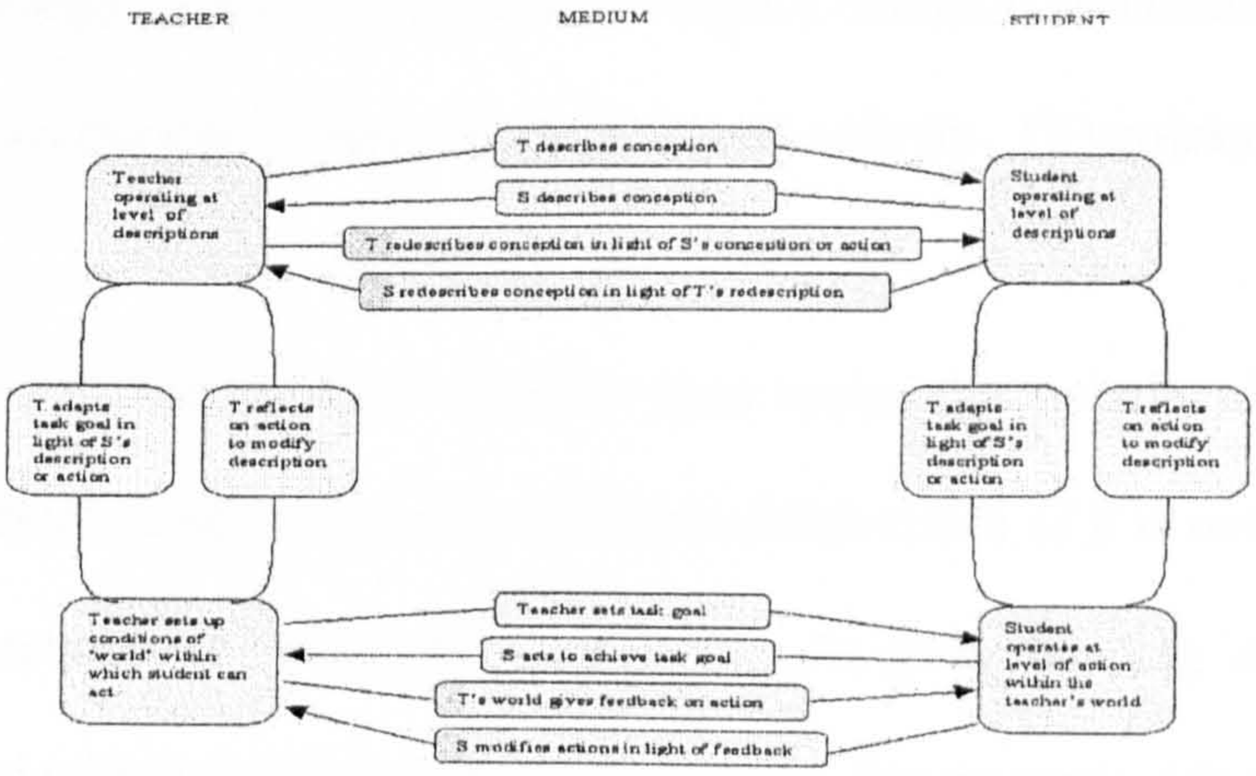

Figure 6 – Conversational Framework (Laurillard, 1993)

Within Laurillard's (1993) framework the tutor and the student are depicted as negotiating meaning and task objectives through one-to-one conversation. Thus, much of this dialogue (or conversation), at least in the initial stages, is expected to take place between the tutor "expert" and the student "novice". Socialisation then "occurs as a result of interaction with a 'reference group' consisting of peers, teachers and clients, which sets and enforces standards and forms a yardstick against which the novice may evaluate their own performance (Pavalko, 1971, p.89)" (Davies, 2001).

Duveen (1997) however states that, "the apprenticeship model applies only to well-structured social practices" arguing that "the model has been most successfully employed in situations where what is being acquired is a practical skill which depends on mastery of particular coordinations of actions, and it is the regulation of this coordination which is the focus of the expert's guidance of the novice's participation". A further problem then lies in the fact that, within the apprenticeship model, dialogues are simply perceived to provide the format for novices to adopt the discourse structure, goals, values and belief systems of their own culture. As Vygotsky notes, over time, the

community of learners gradually adopts a common voice and common knowledge base, a shared system of meaning, beliefs, and activity. (Vygotsky, 1978; Harasim, 2000).

However, research has, for many years shown that not all cultural knowledge has this 'concrete', objective quality and indeed that much of it is not only tacit but is interpretative in nature (Duveen, 1997). As such, meaning is constantly negotiated and refined within a community of discourse. For example, ideas and concepts that may be planted by experts, teachers and students are likely to migrate throughout the community via mutual appropriation (Newman, Griffin, and Cole, 1989). As Brufee (1993) then points out, collaboration is then "a reculturative process that helps students become members of knowledge communities whose common property is different from the common property of the knowledge communities they already belong to".

Thus, whilst increasingly objective, scientific modes of speculation, evidence and proof might become part of the common voice, successful enculturation into the community may subsequently lead participants to relinquish everyday versions of speech activities having to do with the physical and natural world and replace them with "discipline embedded special versions of the same activities" (O'Connor, 1997). For example, use of emoticons in email messages, acronyms in professional/scientific communities, abbreviations in text messaging might evidence particular manifestations of such changes in communicative behaviour.

Nevertheless a similar metaphor of 'apprenticeship' is that proposed by Vygotsky's Zone of Proximal Development (1978). As such the cognitive apprenticeship is

perceived to be a 'balanced' constructivist approach. The students are, as with Laurillard (1993), viewed as constructing their understanding within a supportive framework supplied by the teacher. However, Laurillard's (1993) framework is extended in Vygotsky's (1978) model in as much as the general constructivist themes of situated learning, authentic tasks and group collaboration are all supported, as is the appreciation of multiple perspectives.

An example of this type of approach may be seen in the more recent work of Salmon (2000) who advocates the role of e-moderators within the ACC environment. For example, whilst all of the necessary "learner-content, learner-instructor and learner-learner" interactions might be facilitated within an ACC environment it is, according to Ragan (1999) and Salmon (2000), the control of such interaction that is particularly important whatever the medium. As Ragan (1999) notes, "there is a need for frequent and meaningful interactions among the learners, with the instructional materials, and between the learner and the instructor".

Previous research does seem, in fact, to confirm this in finding that, much like face-to-face (F2F) situations, "well-moderated student interactions structured by frameworks that ask good questions and allow for the establishment of certain ground rules create perhaps the most productive of online communities," (Brown and Johnson-Shull, 2000). Beaudin (1999) then supports this approach when noting that "the online instructor is key to organizing interaction" and Lipponen (1999) further states that findings from their research supports teacher presence within a "virtual" environment. Thus, as Brown and Johnson-Shull (2000) note, "mindfully designed questions and guidelines

must create the parameters of communities previously circumscribed by walls, teacher posture, and the physical proximity of peers".

However, whilst moderation might be felt necessary, indeed unavoidable, in a predominantly distance-learning context, tutors undertaking the role of an "e-moderator" (Salmon, 2000) may be perceived to perpetuate models of learning illustrated by the "Cognitive Apprenticeship model" (Collins et al, 1989), or Laurillard's (1993) proposed "Conversational Framework". Such an approach may, however, not be appropriate in supporting adult learning within a campus-based HE context. For example, if the tutor acts as e-moderator, the opportunities for students to take greater responsibility for learning may be diminished. As Jacques notes, "the teacher who is an incurable helper, in satisfying one of his or her basic needs, may fail to develop the student's capacity for self-growth into greater autonomy and responsibility" (Jacques, 1995). This may not, of course, suit the requirements for adult learning as embodied within the concept of "Androgogy" (Knowles, 1978).

In addition, Veerman, Andriessen and Kanselaar, (1999) note that their "observations have shown that tutors challenging and countering their students immediately ends any discussion" and Beaudin (1999), reports that whilst "Hiltz does, in fact, suggest from her research that having a responsive moderator is key" that she then proposes that "the instructor does not necessarily need to be the moderator and Driscoll suggests that participants can be assigned the task". Thus as Jensen (1996) notes, "research has documented, over and over, when participants make the learning their own, when they get to talk about it their way, without being manipulated and controlled, learning

increases". An example to support this can be found in the work of Marris (1965) who found that, when staff were absent from groups, that students felt far less inhibited and frequently discussed their work with each other.

Kolb (1984) similarly proposed that learners learn best when they are active, take responsibility for their own learning and can relate and apply it to their own context. Thus the Lewinian experiential learning model (Figure 7) devised by Kolb (1984) has had significant influence.

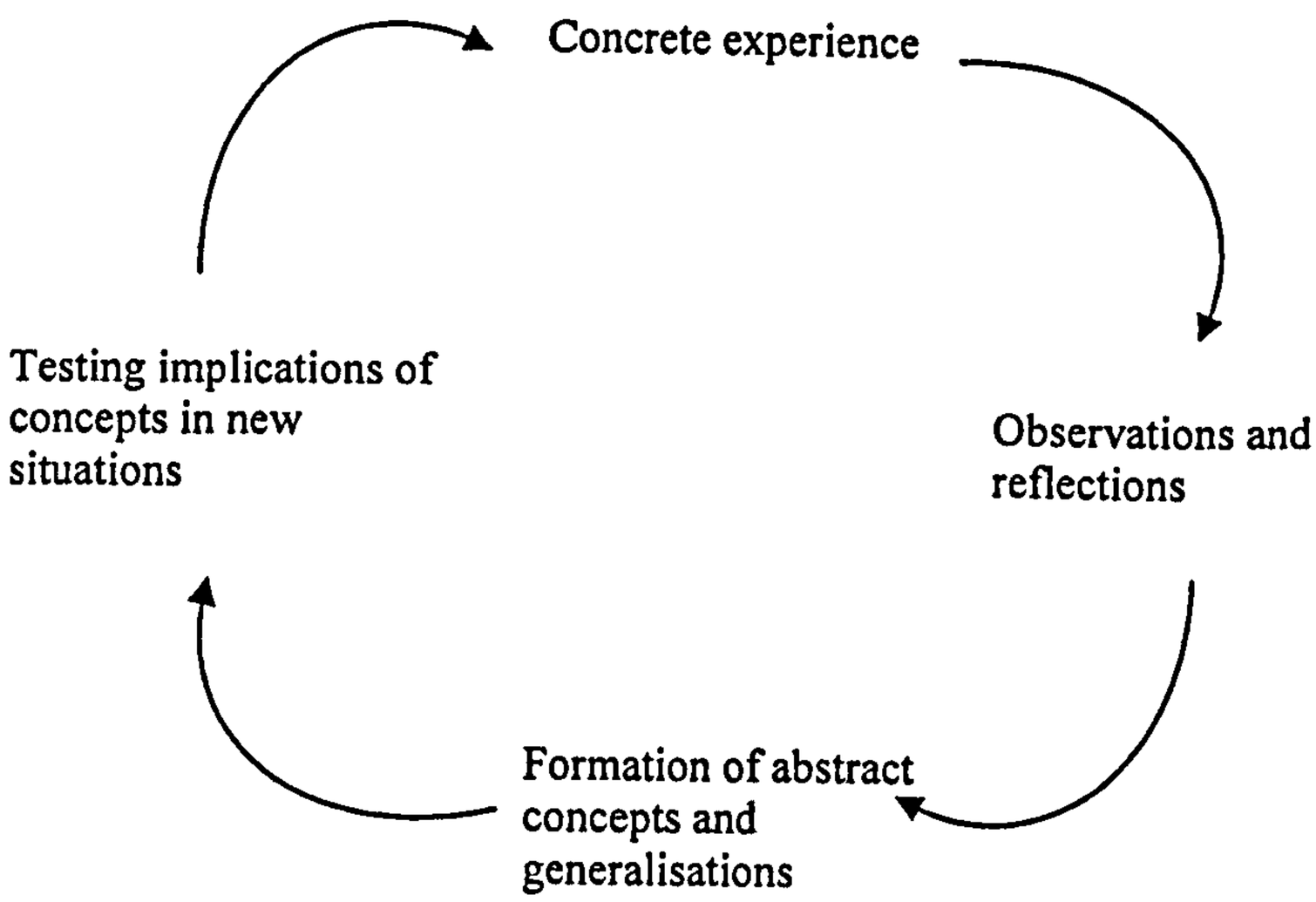

Figure 7 - The Lewinian experiential learning model (Kolb, 1984)

However, other research has found additional benefits arising from the use of text-based environments. For example, whilst students obviously lack certain physical and psychological cues (e.g. physical appearance, intonation, eye-contact) such absence can sometimes lead to democratizing effects. (Short, Williams and Christie, 1976; Kiesler, 1986; Rutter, 1987; Spears and Lea, 1992; Smith, 1994; Steeples, Unsworth, Bryson,

Goodyear, Riding, Fowell, Levy and Duffy, 1996). "Critical behaviour, therefore, is expected to be less biased towards a tutor or a dominant peer-student than in face-to-face discussion" (Veerman, Andriessen and Kanselaar , 1999).

It seems, therefore, that retaining the traditional teacher/student role based on the 'apprenticeship model' within a 'virtual' environment may not be appropriate for promoting a collaborative, learning-community approach similar to that proposed by Illich (1974) and Vygotsky (1978) although the presence of the tutor does not necessarily imply active participation in the discussion.

Thus, the conclusions that have been drawn from looking at the various ideologies and theories are that:

a) learning may be perceived of as being either

- Product – Acquisition of knowledge and skills as definable, measurable constructs to meet defined needs

and/or

- Process – the individual/social construction of reality through undertaking activities (with peers or with a mature partner (i.e. a tutor)) that might be collaborative, cooperative, or participative.

b) the ability to precisely determine whether learning is a) individual or social, or b) product, process (or both of these) remains elusive.

c) central to the community of learners' classroom is the assumption of shared discourse and common knowledge (Edwards and Mercer, 1987), although individual expertise is fostered as well. (Brown et al, 1993).

d) knowledge sharing is an important aspect of the learning environment that is externalised by interaction conducted either face-to-face, or mediated via a variety of available technologies (handwriting/print/telephone/ electronic mail/digital TV, ACC).

e) dialogue may go underground and become internalised as part of the thought processes of community members (Vygotsky, 1978).

f) the tutor, in implementing ACC within a campus-based HE context, must weigh up the advantages and disadvantages or risks involved in either nominating a participant as moderator, becoming one themselves or allowing one to emerge.

Thus it seems that the main principles that should then influence the design of any CSCL environments are that:

a) knowledge is interpretative and is both individually and socially constructed. Therefore opportunities need to be facilitated for individualised learning as well as multiple zones of proximal development that enable both co-operative (e.g Aronson,

1978) and collaborative learning (Lehtinen, Hakkarainen, Lipponen, Rahikainen, Muukkonen, 1999).

b) distributed expertise and individual specialisation are important factors within a learning environment.

c) discourse is important within learning communities for the development and appropriation of ideas because:

- meaning is both externalised and negotiated through discourse (research evidencing the cognitive value of externalisation through social interaction can be seen in the work of Collins, Brown and Holum, 1991; Lehtinen and Rui, 1997; Lehtinen and Repo, 1996; and Scardamalia and Bereiter, 1989)

- meaning is internalised and refined within individual thought processes (reflection) (Vygotsky, 1978).

d) the moderator role within the ACC environment needs to be considered carefully in facilitating greater autonomy of learning on the part of the student community within a campus-based HE context.

However, whilst the underlying philosophy for current implementations of CSCL are likely to be based on a variety of beliefs and concepts recent research has, as noted earlier, found that utilisation of networking technologies and collaborative software

tools can have both positive and negative effects. Furthermore, that academic orientation towards curriculum development, as well as institutional culture, can both influence implementation. As a consequence, further review was undertaken into institutional factors, technologies for supporting learning, CSCL and associated use of networking technologies in supporting this in order to gauge their respective influence.

3.2. Institutional Factors

When dealing with HE institutions it can clearly be seen that these are, generally speaking, highly complex organisations. Becher (1989) for example, stresses the complexity of universities as organisations and proposes that there are four main patterns or models of organisational behaviour that can be identified. These four main patterns or models he identifies as being "hierarchical, collegial, anarchical or political". The differences between each of these cultures depend on a range of factors that include such things as mission, authority, leadership style, traditions and external pressures. For example, the "hierarchical" culture is defined as being one that is "predicated on recognizable lines of command, predetermined bureaucratic procedures and clarity of role". (Land, 2001). Levels of management decision making within such organisations is then typically illustrated as below:

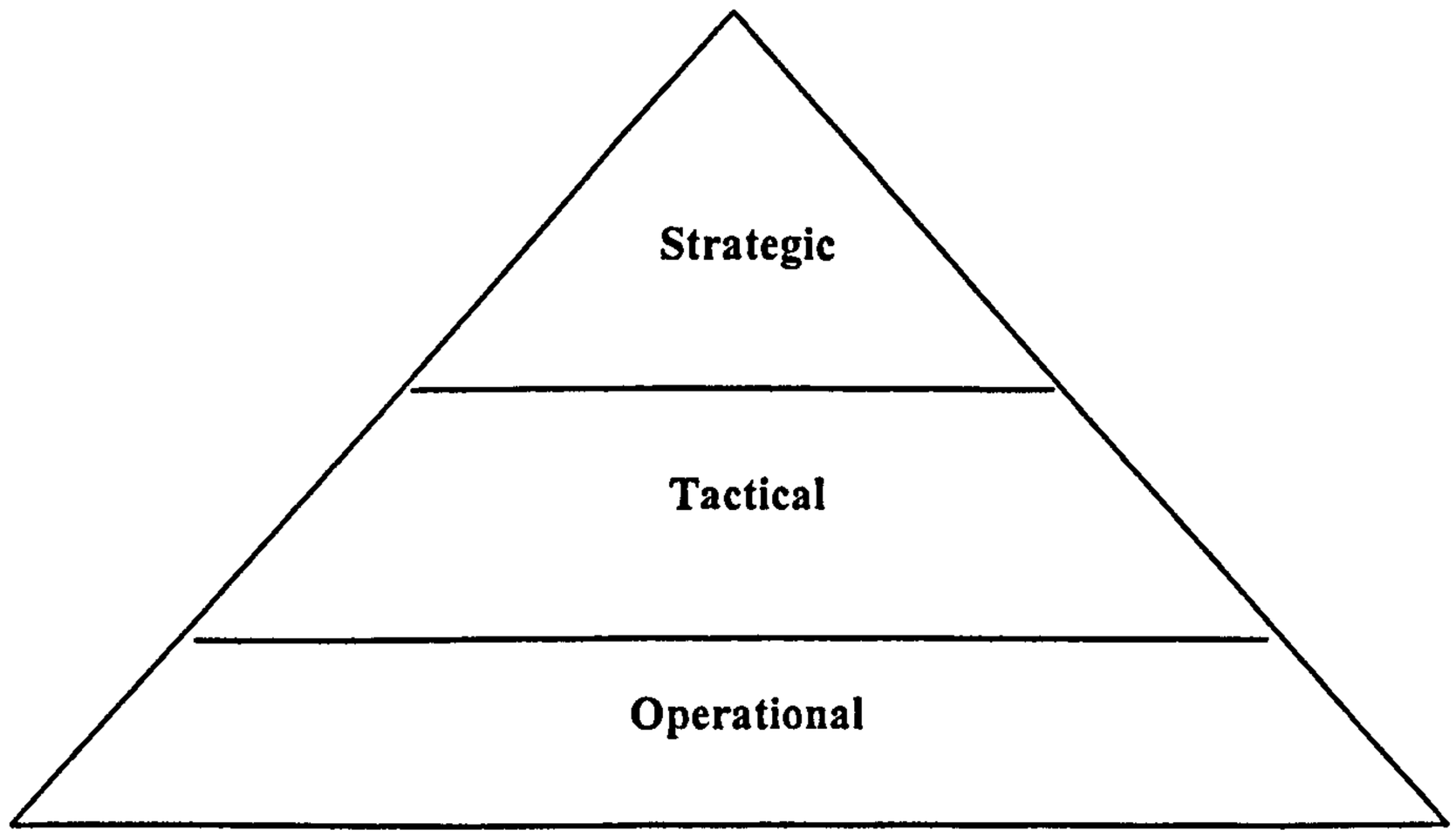

Figure 8 – Levels of managerial decision taking (Bocij, Chaffey, Greasley and Hickie, 2003)

At the strategic level decisions tend to be unstructured and managers are concerned with long-term organisational planning. "At the tactical level managers are largely concerned with medium-term planning" (Bocij, et al, 2003) whilst at the operational level the concerns are with day-to-day decision making and control.

The "collegial" culture, on the other hand, is more democratic with academic communities being afforded equal rights in decision-making, "anarchical" embraces the concept of academic freedom and autonomy that can make managerial interventions difficult and "political" is identified as having a culture of conflict within which individuals and groups wield professional power in the decision-making process (Sawbridge, 1996).

Land (2001) critically reviews each of these models and then aligns such organisational cultures to orientations towards academic development practice itself. In doing so he suggests that there are 12 categories of orientation that will have a different focus at the

operational level. For example, a managerial orientation, that Land (2001) identifies as being "concerned with developing staff towards achievement of institutional goals and mission", will have a focus at the Institution level. An Entrepreneurial orientation, on the other hand, Land (2001) describes as being one that "fosters innovative practice related to needs of world of work and employers".

Thus, within a typical university there might be a very complex structure of stakeholders and decision making as Becher's (1989) examination of university culture has demonstrated. Each of these stakeholders will then contribute to the planning and control process which will, in turn, relate to their 'stake' and power to ensure that their interests are reflected in the final implementation of any curriculum development.

For example, tutors, in particular, are usually keen to retain academic autonomy in the way they utilise the various pedagogical techniques to support their teaching. Within a networked environment tutors are now provided with a much greater variety of approaches that they may wish to adopt but the manner in which these are integrated into their teaching will inevitably reflect the different perceptions of learning that tutors may hold as well as the prevailing culture within the Institution. Indeed, Mason (1998) suggests that there are three basic models of existing on-line courses – the "Content + Support Model", the "Wrap-around Model" and the "Integrated Model". The first two of these models "either replicate the structure of a traditional taught course or can be inserted into a course as a component without requiring any major change in approach from staff, students or institutional infra-structural support. This represents a major difference with the integrated model which implies that "both staff and students are

prepared to adopt an educational approach that is inherently more pro-active from the student's perspective and that is in turn less pre-structured and more responsive to students' requirements from the teacher's perspective." (Brittain and Liber, 1999).

Warren (2002), in fact, argues strongly "for the integrated approach as the best means of meeting both the widening participation and "skills" agendas". However, Stiles 2002 notes, that evidence to date shows that technology has largely been used to support what might appear to be far more automated and objectivist approaches to learning and teaching i.e. technology has been used for facilitating the transmission/acquisition model of learning through production of "shrink-wrapped" knowledge for subsequent delivery in "bite-sized" chunks. For example, "On the international stage problems concerning the national cultural bias of content have been highlighted (Khakher, 1999) and there is recognised need for the "chunking" and repurposing of content" (Stiles, 2002).

Thus, as Stiles (2002) notes, "there is a clear focus on the conversion of traditional lecture programmes, emphasising the distribution of materials followed by assignments and test (Maher et al, 2001), with pedagogy remaining based largely on the traditional (Birchall et al, 2002, Littlejohn 2002)". As a consequence Stiles (2002) then argues that there needs to be an "increasing move to, or at least a wider understanding of, constructivist approaches encompassing theories on the social nature of learning (Vygotsky, 1978), situated learning (Brown et al, 1989), and cognitive apprenticeship (Lave, 1988) and models of learning such as the conversational model (Laurillard, 1993)".

Thus, Currier, Brown and Ekmekioglu, (2001) note, "professional uncertainty is clearly a major problem for institutions to address. For teaching staff, part of this concern is over the issue of pedagogy". For example, within the bounds of computer mediated learning, there are at least two main approaches that can be identified. The first is in developing 'intelligent' tutoring systems (e.g. Sleeman and Brown, 1982) which are often intended to replace the 'traditional' human teacher and the second is in developing open learning environments wherein the student may take control and determine his or her own learning pathways and goals. Each of these inevitably has an impact upon approaches to teaching as it is increasingly recognised that "there are some technological developments which have the possibility of radically shifting the established paradigms of learning" (Wintlev-Jensen, 2000).

How academics approach the new teaching possibilities that emerge is, therefore, important if the learning experience is to be enhanced. As Kellner (1999) summarises, "it is up to each individual to determine how they will live the new technologies and cyberspaces, how they will themselves deploy them, and whether they will ultimately be empowering or disempowering." However, the way technology is used is often influenced by a number of factors that might include the tutor's particular subject discipline or their academic orientations towards learning and teaching (Land, 2000; Annand, 1997). It is therefore important to them that tutors do not have their pedagogical approach dictated by the technology. Thus, Lee and Thompson (1999) emphasise a focus on education needs rather than on the technology and that "staff needed to identify how they want to teach before selecting the technologies".

However, Bull and Zakrzewski (1997) have additionally warned that any learning technology that is not properly integrated into course work is unlikely to be well rated and therefore used by the learners and Boddy and Tickner (1999) have proposed that "before designing the technological aspects of the learning environments, educators and designers should best begin by analysing the actual activities learners engage in during the course". Thus "whilst creating new learning environments or learning communities, it is not just a matter of implementing and putting into use new technology but in many cases, also applying simultaneously new practices of learning and instruction" (Lipponen, 2002). Boddy and Tickner (1999), however, caution that "the social context in which technology is being used will influence how students respond" which, in turn, could result in learners using technology in a different way than was originally the vision of the organisation. There are, therefore, a number of issues to be addressed, not only by individual tutors, but by any educational institution contemplating the adoption of technology to support learning and teaching. Lee and Thompson (1999), for example, identify four "prime issues for institutional concern:

- Equity: how to ensure that all learners are treated equally
- Participation: how to ensure that all learners are actively involved in online learning
- Teaching: will the distance factor/online factor compromise the teaching element of the course
- Workloads: what additional resources will be needed and will this mean more time will need to be allocated to online courses" (Lee and Thompson 1999)

These suggestions do, however, raise a number of fundamental questions. The first of

these concerns the use of the term "equally" which can be ambiguous because it is not defined. For example, it could imply that we need to treat all learners the same when much research (e.g. Knowles, 1970; Marton and Säljö, 1976; Miller, 1991) has shown that all learners are different, that they will have multi-variant needs and are likely to adopt a variety of approaches to learning (Gardner, 1993). As such, giving all learners the same treatment would not be appropriate – rather we need to ensure that all learners have equality of opportunity and access to a variety of resources that they may use as appropriate for their individual learning style. Such styles may, of course, change over time - as Twigg (1995), perhaps rather optimistically proposes: "Tomorrow's students will resemble today's research faculty and will possess qualities of increased independence and self-reliance. No longer will students be passively taught by teachers who organise the learning experience for them. Students will learn how to find and use learning materials that meet their own individual learning needs, abilities, preferences, and interests; they will be learning how to learn. Faculty will encourage and guide students to use the rich information resources available to students and to work collaboratively when appropriate". (Twigg, 1995)

Whilst Twigg's (1995) vision of tomorrow's students may or may not be either realistic or, indeed, realised, a further issue with Lee and Thompson's (1999) proposals concerns the lack of definition as to what is meant by participation and being actively involved, and the implicit assumption that this can actually lead to better learning. Research has, for example, been divided on a number of these issues as noted by Lipponen (2002).

Furthermore, in the latter two points Lee and Thompson (1999) are perceived to adopt a rather negative approach as evidenced in the language used. This may, in fact, be counter-productive in terms of encouraging institutions to adopt technology. Finally, any concerns regarding impact on the quality of the learning experience seem to be missing. Tutors, for example, may need to appreciate that, as Davison, Bryan and Griffiths (1999) suggest, learners approach learning and technology in a way that is influenced by their personal learning style and so teachers are likely to approach teaching according to their own individual learning style, possibly to the disadvantage of some learners. O'Connor (1997), for example, notes that whilst "the teacher may define the classroom according to their (not student) preferences, teachers have to acknowledge that their styles will not necessarily suit clusters of students in their classroom." Therefore, "as teachers attempt to modify their classrooms, they need to begin by exploring their own styles". (O'Connor, 1997)

Such a task may, however, be difficult to undertake, as Phipps and Merisotis (1999) note, "understanding of how the learner, the learning task and a particular technology interact is limited".

It is clear, therefore, that the Political, Economic, Social and Organisational constraints imposed by the HE Institution itself can encourage a focus on drivers which are not connected with the 'efficacy' of the learning process but are rather more concerned with its efficiency. In addition, the highly pressured teaching workforce (which tends to lack both educational and IT skills) may itself be resistant to change and may seek to respond to the opportunities which technology affords by reproducing the traditional in

the hope of reducing workload, rather than by seeing it as a means of enabling innovation (or at least improvement) in teaching and learning practice. (Stiles, 2002)

The problem domain being faced by those wishing to implement CSCL in HE institutions therefore has two dimensions - there is the logical dimension and the cultural dimension. The cultural dimension consists of the organizational issues, the political issues and issues arising from the wider social context. These equate to measures of the institutions attitude or Institutional Readiness Criteria (Twigg, 1999).

Thus, irrespective of the technology used these will be the criteria for successful implementation and sustainable development of CSCL. In contrast to this there are the logical issues relating to the educational process, subject specific issues and the technological issues. While there has been much research and debate into the pedagogy of using ICT in HE that addresses the issues relating to the logical dimension of the problem there has been less work on the impact of the issues in the cultural dimension.

As a consequence, analysis of the systems and models that could constitute an integrated approach to learning, together with identification of the stakeholders in the political, social and organizational dimensions, needs to be undertaken for effective implementation of CSCL. For example, the current project based approach, where systems are developed outside the cultural framework within which they will be used appears to demonstrate that when the project is expanded to the larger institution it fails as it does not address these fundamental cultural issues. This problem has, in fact, been recently noted in the BEATL project "that aimed to develop effective and efficient

methods of integrating the use of new learning technologies into the delivery of modules within the undergraduate modular programmes" at three different universities (Winter, 2001). The final summary project report, for example, notes that whilst the impact has been significant and positive with the 37 academics involved with the project that "the challenge now for the departments concerned is to reach beyond the 'early adopters', and engage with the 'early and late majority'" (Winter, 2001).

In order, therefore, to identify the variety of cultural and other issues involved a literature review was then required in order to evaluate how the various technologies can be used for supporting learning and how these related to the various models and contexts of learning.

3.3. Technologies for supporting learning

With regard to technology, Leidner, et al (1995), propose that this can serve to fulfil a number of purposes that could each be aligned to the different models of learning. As such they propose that technologies that serve "the automation function are closely aligned with objectivist theory, in which case the instructor remains the center of attention and in control of the learning process". This does, of course, link to the 'transmission' model of learning exemplified through the use of technology for production of such things as Powerpoint lecture slides and Web pages that are concerned with content.

Leidner, et al (1995) further suggest, however, that technologies may be used to "informate up" which they define as using technology to "assist the instructor as the nucleus of class activity" as well as "to improve the information an instructor receives concerning student comprehension of material". In this sense the use of both Powerpoint (to provide content) and the 'tracking' facility (within VLEs) could be perceived to be providing this sort of functionality in as much as the tutor might, for example, be able to gauge actual 'engagement' of the students through being able to quantify both their access and contribution to the environment.

On the other hand, the use of technology to "informate down" or "transform" (Leidner, et al, 1995) is probably most appropriate for achieving collaborative learning. Here they suggest that the technologies that support the "informate down" approach include such things as the creation of learning networks, use of simulations/virtual reality and synchronous conferencing.

However, in what can be a geographically dispersed but campus-based HE environment using the technology to "transform" the organization is likely to be even more appropriate for justifying the use of networking technologies for facilitating CSCL as Leidner, et al (1995) claim, that this then places "much of the control of the content and pace of learning in the hands of students". They suggest this will "involve using IT (1) to redraw the physical boundaries of the classroom, (2) to enable more teamwork, (3) to allow learning to be a continuous time-independent process, and (4) to enable multi-level, multi-speed knowledge creation". Thus, "the purpose of instruction then moves away from knowledge dissemination towards knowledge creation" (Leidner, et al,

1995). They further note that "the notion of virtual learning spaces begins to operationalize these assumptions" and that "virtual learning spaces are those that link geographically dispersed students with no time constraints" - "the simplest virtual learning spaces are founded on electronic mail and electronic bulletin boards". Nevertheless, there are a number of other issues that need to be considered in utilising technology-based group working tools as opposed to facilitating group-working per se. For example, "Reciprocal teaching" is another concept designed to provoke zones of proximal development within which readers of varying abilities can find support in a F2F context. (Brown and Palincsar, 1989).

However, it is recognised that in the F2F situation there are a number of constraints that impact the interaction that actually takes place and that, as Fleischman points out, "in classroom discussion it is not routinely possible to depend on a lively diversity of viewpoints when engaging a particular text, case study or issue". (Fleischman, 2001).

Thus, using the technology "to push back the threshold imposed by these constraints", by "opening up new media for discourse that are not subject to the same delivery bottlenecks as traditional methods {OECD,1996}" (Lee, et al, 1998) could offer new opportunities for supporting learning.

There are, however, a variety of factors that impact upon how individuals within groups interact and these would then have an influence on their activity within a virtual environment. Belbin (1981), for example, suggests that "different core personality traits, intellectual styles and behaviours" all impact group interaction.

Because of this, the activity of individuals in virtual environments has been investigated in several areas. Shih, (1998), for example, in his paper on consumers experience in hyperspace concluded that there were a number of factors that were important in the design of virtual environments. In particular the greater the interactivity with and user's ability to control the environment means that there will be a higher degree of telepresence which will make the user feel more immersed in the virtual environment. As such the user will spend more time in the virtual environment and the more positive will be the effective feeling users will experience. There is then a much higher probability that users will make repeat visits. (Shih, 1998)

More importantly for the design of educational virtual environments Shih (1998) considers the concept of 'bricolage' a term developed by Piaget, literally meaning tinkering or manipulating objects in your environment to develop ideas. This could, of course, equally apply to creating and developing discussion threads within an ACC environment.

Further research was therefore undertaken into the use of particular ACC technologies in supporting the development of campus-based learning communities in order to address the main research questions. Preliminary findings from this subsequently indicated that a number of technologies are available ranging from basic use of email through to more sophisticated tools that support 'threaded' discussions within Virtual Learning Environments. However, use of email has been found to have technological limitations for supporting discussion lists (e.g. Boddy and Tickner, 1999; Crook, 1997) therefore as the aim of using ACC was to get students to engage in discussions and to

have their dialogue easily available for others to read, it was felt that investigation of the more sophisticated tools was more appropriate.

As a consequence a brief comparison was initially developed as outlined in Appendix C and later reference was made to a recent JTAP report by Britain and Liber (1999) that was found to have undertaken a more detailed comparison of the different technologies in terms of their functionality. Amongst their findings the VLEs - WebCT and Blackboard - were found to provide the necessary functionality for supporting ACC and a number of other comparative evaluations had commented favourably upon the use of WebCT as a VLE (ULT Canada, 1999; McKenna and Bull, 1999; Wisdom Tools, 1997).

It was then felt that, at this stage, further detailed evaluation of each of the available technologies was not a prime issue as the real areas of concern were a) how use of the particular technology would be integrated into instructional strategy and b) what impact this might have upon the student learning experience.

Having determined that use of a VLE would be an appropriate tool to facilitate CSCL further investigation was then undertaken into particular implementations of CSCL outlined in relevant research in order to determine the major issues that had been identified.

3.4. Computer Supported Collaborative Learning (CSCL)

A literature review of CSCL research shows that there have been a variety of interpretations of the acronym itself as well as a wide diversity to the experiments undertaken. For example, as Lipponen (2002) points out the second "C" in the acronym has been used by Pea, (1996) and Jermann and Dillenbourg (1999) to mean "collective" and by other researchers to mean "coordinated", "co-operative" and "collaborative" (Koschmann, 1994). In addition there are a variety of definitions for the terms cooperative and "collaborative". For example, co-operative work can be taken to mean 'involving the division of labour amongst the participants' (e.g. Aronson's, 1978 Jigsaw classroom) whereas collaboration entails the co-ordinated effort of the group members to solve a problem together. (Lehtinen, Hakkarainen, Lipponen, Rahikainen, Muukkonen, 1999).

Similarly, Crook, 1998; Roschelle and Teasley, 1995; and Engeström, 1992 all share the idea that the co-construction of knowledge and mutual engagement of participants is "key" to the meaning of collaboration.

However, the importance of recognising the distinction between what is meant by co-operation and collaboration is further illustrated by Panitz (1996) who points out that "the cooperative learning tradition tends to use quantitative methods which look at achievement: i.e. the product of learning" whereas "the collaborative tradition takes a more qualitative approach, analyzing student talk in response to a piece of literature or a

primary source in history" (Panitz, 1996). Such differences in the definition of terms and approach are therefore likely to be significant when assessing research findings.

This may, of course, account for the fact that there are a number of diverse opinions regarding the positive effects on student achievement of collaborative learning. For example, the Jigsaw method "requires students to study topics in preparation for a discussion in which they feature as 'experts', first by themselves and then in conjunction with other 'experts'" (Jacques, 2000) to share and upgrade their expertise. Once this has been done the students then split into crossover groups, each of which contains an expert from each topic who then has to lead the discussion. In reviewing the Jigsaw method, however, Slavin (1995) did not generally find positive effects on student achievement whereas other implemented applications have proved successful. (Sharan and Shachar, 1988; Sharan and Sharan, 1992; Johnson and Johnson, 1994). Again this may point to issues over the context concerned as well as to the rigor applied to implementation and evaluation of the research undertaken.

However, whilst the literature review has illustrated that "collaboration is a basic form of human activity essential for cultural development" (Lipponen, 2002) there seems to be little consensus over a precise definition as to whether the term refers to "a special form of interaction" or to "a process of participation". Again as Lipponen (2002) notes, these same debates over "collaboration" are very similar to discussions regarding the definition of learning (e.g. two metaphors of learning - learning as product (acquisition) or learning as process; learning as a cognitive (individual) or situative (social) activity). Thus as Lipponen (2002) suggests "It appears that we can --that

perhaps we must-- analyze collaborative activities on both micro and macro levels, and, as proposed by Dillenbourg (1999), concern ourselves with aspects such as situation, interactions, processes and effects". However, research on CSCL has, as noted earlier, adopted a variety of approaches using different evaluative instruments, as well as technologies to investigate these aspects as illustrated in Appendix D, pp193-194.

Furthermore, such diversity of approach has, as Lipponen, (2002) points out, then led to significant difficulties for subsequent comparison of findings – "One does not know exactly the circumstances in which one set of results can be extended to another context" (Lipponen, 2002).

In addition, Lipponen (1999) who had previously noted that "little attention, thus far, has been focused on analyzing the challenges of CSCL in authentic school environments" commented in a more recent paper, (Lipponen, 2002) that there still "exists little research on how students participate in networked mediated collaboration and on the consequences of different types of participation patterns and how these are related to other aspects of CSCL such as quality of students' discourse". Whilst some research can, in fact, be found regarding each of these aspects (e.g. Wortham, 1999; Jeong and Chi, 1997; Roschelle, 1992; Guzdial and Carroll, 2002) it is evident that such work is largely related to distance, mature (often post-graduate) learners and more particularly, education in the USA. This does mean, therefore, that there is still a lack of CSCL literature with regard to undergraduate study in the UK and that, as research has suggested, further, more focussed fieldwork studies need to be undertaken to address this gap in the current field of knowledge.

However, a further consideration with CSCL is that this can be conducted in either an asynchronous or synchronous manner so these issues were then addressed:

3.4.1. Synchronous CSCL

According to Mason (1998) synchronous delivery systems have the following advantages:

- "motivation - synchronous systems focus the energy of the group, providing motivation to distance learners to keep up with their peers and continue with their studies

- telepresence - real time interaction with its opportunity to convey tone and nuance helps to develop group cohesion and the sense of being part of a learning community

- good feedback - synchronous systems provide quick feedback on ideas and support consensus and decision making in group activities, both of which enliven distance education

- pacing - synchronous events encourage students to keep up-to-date with the course and provide a discipline to learning which helps people to prioritise their studies". (Mason, 1998)

Within the campus-based environment, of course, synchronous delivery is generally conducted within a F2F context rather than mediated through use of technology therefore the advantages of asynchronous CSCL were investigated.

3.4.2. Asynchronous CSCL

Mason (1998) determines that "there are four crucial advantages to the asynchronous media" which are arranged in descending order of significance:

- "flexibility - access to the teaching material (e.g. on the Web, or computer conference discussions) can take place at any time (24 hours of the day, 7 days a week) and from many locations (e.g. oil rigs)

- time to reflect - rather than having to react 'on one's feet', asynchronous systems allow the learner time to mull over ideas, check references, refer back to previous messages and take any amount of time to prepare a comment

- situated learning - because the technology allows access from home and work, the learner can easily integrate the ideas being discussed on the course with the working environment, or access resources on the Internet as required on the job

- cost-effective technology - text based asynchronous systems require little bandwidth and low end computers to operate, thus access, particularly global access is more equable". (Mason, 1998)

As the primary purpose was to use technology to supplement F2F activity with the campus-based student in order to promote greater engagement with the module outside of normal contact time using CSCL asynchronously would, therefore, seem to be the most appropriate strategy to adopt. Such use could, it seems, then encourage greater reflection on the part of the students as well as opportunities for situated learning through enabling much more flexible access to ideas being discussed. In addition, such

flexibility is of particular importance for part-time students to enable them to interact more readily with other group members as well as to access module resources.

However, a further issue in setting up CSCL is with group dynamics as research has identified that there are a number of factors that impact both the development and activity evidenced. For example, groups in a F2F context have been found to operate on different levels (e.g. Bion, 1961) and will develop through a series of stages (e.g. Tuckman, 1965). In addition, individuals are likely to adopt different roles and will evidence different motivation and orientations towards group working (e.g. Banet and Hayden, 1977; Belbin, 1981). Such group activity may then be further impacted by different factors as a consequence of the "virtual" nature of CSCL. A review of research into group working was, therefore, undertaken in order to identify these issues as well as to determine the impact that they might have for implementing CSCL.

3.5. Group Behaviour

As noted earlier, both Piaget's and Vygotsky's models of learning very much support the idea that it is through continuous interaction with others that learning takes place. Thus, as Jacques (2000) notes "Group learning gives students practice in thinking and explaining; it exposes them to multiple viewpoints, which helps them to make connections among concepts and ideas; it provides opportunities for "scaffolding"; it often results in students teaching each other".

However, according to Bion (1961) a group operates simultaneously at two levels: the work group and the basic assumption group. The work group meets to perform a specific and overt task. This can, however, be obstructed or diverted by the powerful emotional drives of the basic assumption activity. According to Bion the basic group behaves as if it shared some tacit assumptions or motives that are defined as being – dependency, preservation (flight/fight) and pairing. All of these motives then underpin the group's primary task which is to survive. However, when the overt tasks of the work group and the covert tasks of the basic group meet, conflict is likely to occur. This might, in fact, account for some of the problems often encountered by students undertaking group assignments within an HE context.

However, other factors that impact group dynamics are, according to Banet and Hayden (1977) authority, responsibility, boundaries, projection, organisation and large group phenomena. For example, if the tutor assumes authority the group will either respond by becoming dependent upon them or counter-dependent (attacking authority). Equally an authority figure will be assumed to carry the ultimate responsibility for failure or success of the group. In a learning group situation this then means that if a tutor is involved as an authority figure then students will automatically assume less responsibility towards their learning. This is, of course, borne out by the findings of research discussed earlier (e.g. Jacques, 1995; Veerman, Andriessen and Kanselaar, 1999; Marris, 1965). Boundaries then become important in terms of who controls these. In the teaching session the boundaries can be perceived of as being the physical space and time that are usually controlled by the tutor but there are often less tangible task boundaries that can distinguish one group from another.

Projection is another factor identified by research (e.g. Jacques, 1995). This particular phenomenon can occur when some students perceive the tutor as being hostile when they are, in fact, feeling hostile themselves towards the tutor. Whilst not necessarily acknowledging this, such feelings can then lead to groups adopting a "fight" stance towards the tutor.

However, the organisational structure, in terms of power relationships, and size of groups are additional factors that are likely to be influential on how the group behaves. For example the organisational structure usually develops through a process of negotiation and differentiation with the various individuals taking on special roles and responsibilities. Thus, such structure will vary according the how large the group is. As Jacques (2000) notes small groups (2-6) will evidence more cohesion and the structure and organisation required will be minimal whereas with groups of 12-25 and >25 there is likely to be much more tension and less cohesion. With larger groups, therefore, the setting up of a more formal structure and role differentiation become vital for success.

However, in addition to identifying the various factors influencing behaviour the literature then suggests that all groups go through different stages of development. Four particular models of team development are compared in Table 4 below:

Phases of Group disposition/activity	***Three Stage Model (Honey, 1994)***	***Four/Five Stage Model (Tuckman, 1965)***	***Six Stage Model (Hunt, 1979)***	***Seven Stage model (Adapted from Johnson and Johnson, 1987)***
Initial stage - Little/No Clarity in group roles, objectives, strategy Socializing Negotiating roles Much squabbling with individuals vying for position	Chaotic Stage	Forming Storming	Orientation Deliberation Conflict	Defining and structuring procedures Conforming to procedures and getting acquainted Rebelling and differentiating
Roles, strategy and objectives have been agreed by consensus. Greater formality – commitment and unity is strong	Formal Stage	Norming	Emergence Trust	Recognizing mutuality and building trust
Group has a shared vision and roles, strategy and objectives are clear Relaxed Functionality – getting the work done High degree of group autonomy	Skilful Stage	Performing	Reinforcement	Committing to and taking ownership for the goals, procedures and other members. Functioning maturely and productively
Conclusion of the group activity		Adjourning		Terminating

Table 4 – Four models of how teams are formed

As can be seen each of these models (with a slight adaptation of Johnson and Johnson's (1987) model) are very similar in nature. However, from the literature

review Tuckman's (1965) 5-stage model (Forming, Storming, Norming, Performing, Adjourning) seems to be the model that is most widely cited and used for describing group development.

Tuckman's (1965) model proposes that when the group is 'forming' there will be high dependence on the leader for guidance and direction. Therefore, there will be little agreement on team aims other than those that have been received from the leader. Individual roles and responsibilities are, however, unclear at this stage and the leader must be prepared to answer lots of questions about the team's purpose, objectives and external relationships. At this stage, processes are often ignored and members will test the tolerance of the system and the leader. The leader's role at this point is therefore to direct or 'scaffold' the group activity.

During the next stage of development, 'storming', decisions don't come easily within the group because individuals will be vying for position as they attempt to establish themselves in relation to other team members and the leader. The leader may, during this stage, receive challenges from team members. Clarity of purpose increases but plenty of uncertainties persist. Cliques and factions can form and there may be power struggles. The team needs to be focused on its own specific goals to avoid becoming distracted by relationships and emotional issues. For example, these barriers to communication may be caused by a previous bad experience of group working or an individual's perception of other group members and this can then lead to the adoption of defensive strategies. These can sometimes be circumvented by promotion of ground

rules and explicit codes of behaviour within the group. The leader coaches at this stage in the development phase and compromises may be required to enable progress.

Following on from the 'storming' stage where there have been disagreements, teams will, according to Tuckman (1965), arrive at the 'norming' stage. This is the stage where agreement and consensus largely forms among the team and it will respond well to facilitation by the leader. Roles and responsibilities are clear and accepted with major decisions being made by group agreement. Smaller decisions may be delegated to individuals or small teams within the group as they discuss and develop their processes and working style. Commitment and unity is strong and the team may engage in fun and social activities. There is general respect for the leader and the team shares some of the leadership. The leader facilitates and enables during this stage – this could align with the concept of 'fading' identified by Wood, et al (1976).

At the 'performing' stage the team is more strategically aware and knows clearly why it is doing what it is doing. The team has a shared vision and is able to operate independently with no interference or participation from the leader. There is a focus on over-achieving goals, and the team makes most of the decisions against criteria agreed with the leader. The team, at this stage, has a high degree of autonomy so that whilst disagreements occur these are now resolved within the team positively and the team makes necessary changes to processes and structure. The team is able to work towards achieving the goal, as well as attending to relationship, style and process issues along the way. Team members look after each other but require delegated tasks and projects from the leader. The team does not, however, need to be instructed or assisted although

team members might ask for assistance from the leader with personal and interpersonal development. The role of the leader during this phase is to delegate tasks and to oversee the activity.

Finally the 'adjourning' stage involves the termination of task behaviours and disengagement from relationships.

There are, however, a number of additional barriers that can impact group activity particularly in regard to virtual teams. For example the impact of different time zones, lack of non-verbal cues, cultural differences and problems of trust and identity can all impact the effectiveness of the group. Kimble, Li and Barlow (2000), argue that the existence of trust and identity are particularly relevant for virtual teams who are spatially and temporally separate. In such case they argue that identity is ambiguous as "one can have as many electronic personas as one has time and energy to create". Similarly they say that "trust is an important enabler of co-operative human action" and that many authors have highlighted the importance of trust in the success of teams (Larson and LaFasto, 1989; Katzenbanch and Smith, 1993; Handy, 1995; McMahan, 1999). Jarvenpaa and Leidner (1998) have then identified actions and behaviours that can foster trust. Initially these are largely based on social communication (exchanging greetings, names, interests and other personal information). However, once the work has started other types of trust emerge and these are based on action undertaken by the group members. Thus group behaviour already identified by Tuckman (1965) and others may or may not readily translate into the virtual context.

However, another factor that might impact group behaviour and attitude towards CSCL can stem from individual learning styles as research into this area has shown that learners may adopt a variety of different approaches. Such assessment of individual learning styles may or may not, of course, correlate with findings from research into group behaviour. A review of research into learning styles was, therefore, undertaken in order to identify whether or not these could be useful in the formulation of groups or in evaluating any group activity evidenced.

3.6. Learning Styles

The Learning styles literature shows, (as briefly summarized on the Center for Teaching and Learning Web site, http://www-isu.indstate.edu/ctl/styles/model2.html) that a variety of approaches have been taken towards determining learning styles (Birkey and Rodman, 1995). However, other research has found that there are, many inconsistencies with the learning styles research which can then lead to unreliability and validity issues regarding them. (Carswell, 2001; Miller, 1991; Schmeck, 1983). Such issues may then call into question the development of any learning environment based on the results of such instruments.

Nevertheless, Blackmore (1996) suggests, "knowledge of these learning styles can guide you in the development of appropriate instructional strategies". Blackmore, then outlines Knowles (1970) theory of Andragogy (adult learning) that is an attempt to "differentiate the way adults learn from the way children learn" (Blackmore, 1996).

For example, Knowles (1970) suggests that adult learners have differing needs, because whilst they might have gained extensive practical experience, they might have limited theoretical knowledge or be under-skilled technologically. Some of their needs will then fall into the following categories;

- focused on learning opportunities
- convenient delivery
- upgrading/maintaining skills
- career development
- just in time education

Thus Knowles' Andragogy, as opposed to Pedagogy, was initially defined as "the art and science of helping adults learn." (Connor, 1996) The term currently defines an alternative to pedagogy and refers to learner-focused education for people of all ages. Knowles' (1978) assumptions are:

- the need to know — adult learners need to know why they need to learn something before undertaking to learn it.
- learner self-concept —adults need to be responsible for their own decisions and to be treated as capable of self-direction
- role of learners' experience —adult learners have a variety of experiences of life which represent the richest resource for learning. These experiences are however imbued with bias and presupposition.

- readiness to learn —adults are ready to learn those things they need to know in order to cope effectively with life situations.
- orientation to learning —adults are motivated to learn to the extent that they perceive that it will help them perform tasks they confront in their life situations. (Knowles, 1978)

Similarly, Burge (1996) notes, that in the case of the adult learner, learning styles may be influenced by social perceptions. For example, as adults, they may need to become "self-responsible" in the new learning environments, essentially moving away from the traditional roles of teacher and learner and concepts of power relations therefore opportunities for them to achieve this should exist. Equally other research has noted (e.g. Cantor, 1992; Kearsley, 1996; Knowles, 1970) that adults have a variety of different motivations for learning to those generally found in children and that they face different barriers. Thus Kearsley (1996) summarises that Androgogy means that "instruction for adults needs to focus more on the process and less on the content being taught".

Vincent and Ross then provide further insight into the adult learner, studying for professional qualifications in the work place. "In the workplace adult learners have unique needs. These students have years of experience and can be resources to others. A variety of teaching strategies such as problem solving and discussion adds to their motivation to learn. Self-esteem and egos are at risk in the classroom environment, so all questions should be treated with respect." (Vincent and Ross, 2001).

Thus learning styles are deemed to be the way a student responds to, and uses, different stimuli in the context of learning. Gardner's (1993) theory of multiple intelligence, for example, further underlines the need to provide variety in the learning experience in order to accommodate not only the diversity of preferences in any one group of students but the range of intelligence available within each student. 'We should spend less time ranking (students) and more time helping them to identify their natural competencies and gifts and cultivate these' (Gardner, 1993)

Nevertheless, various instruments have been developed to determine a student's learning style and Leopold-Lusman (2000) provides a comprehensive review of various works exploring learning styles. Such research then goes on to show how an understanding of learning styles and traditional teaching styles can be transferred from the traditional classroom to a virtual learning environment which may be of help in integrating the use of CSCL within a campus-based environment (Leopold-Lusman, 2000).

According to research (Conner and Hodgins, 2000) therefore, "learning styles come from three schools of thought: Perceptual Modality, Information processing and Personality Patterns". In Perceptual Modality the concerns are with the primary way students take in information using auditory, visual, smell, kinaesthetic and tactile approaches. On the other hand, the information processing approach looks at the way information is processed. For example it takes into account the way students think, solve problems and remember information. Finally, the Personality Models look at the way students perceive, organize and retain information as exemplified in the Myers-

Brigg Type Indicator (MBTI). Scores on the MBTI indicate a person's preference on each of four dimensions – Extroversion, versus Introversion, Sensing versus Intuition, Thinking versus Feeling and Judging versus Perceptive.

Despite these different approaches, however, research has shown that no single measurement of style can ensure that a learner's needs could be met. Rather it seems that the building of a varied and adaptable learning environment is much more likely to cater for and keep the interest of the various types of learners likely to be involved. Gardner (1993) has, for example, theorised that learners will all use one or two different approaches for the most effective learning depending on the context or needs of the learner. Similarly Marton and Säljö (1976) suggest that a learner's approach might involve either surface or deep learning. Surface-level processing is where a student takes a passive approach to learning when they are more concerned with covering the content and finding the right answers. Students taking an active approach to learning signify deep-level processing – e.g. when they engage in reflection and questioning. Atherton (2002) provides an overview of the concepts of "deep" and "surface" learning, identifying its roots in research carried out by Marton and Säljö (1976) and its further development by Ramsden (1992), Biggs (1987, 1993) and Entwistle (1981). He goes on to summarise the characteristics of deep and surface learning as identified by Ramsden (1992). Such summary is as depicted in Table 5:

Deep	Surface
Focus is on "what is signified"	Focus is on the "signs" (or on the learning as a signifier of something else)
Relates previous knowledge to new knowledge	Focus on unrelated parts of the task
Relates knowledge from different courses	Information for assessment is simply memorised
Relates theoretical ideas to everyday experience	Facts and concepts are associated unreflectively
Relates and distinguishes evidence and argument	Principles are not distinguished from examples
Organises and structures content into coherent whole	Task is treated as an external imposition
Emphasis is internal, from within the student	Emphasis is external, from demands of assessment

Table 5 – Characteristics of Deep and Surface learning (Ramsden, 1992)

More importantly Atherton draws attention to two significant factors

- Although learners may be classified as "deep" or "surface", they are not attributes of individuals: one person may use both approaches at different times, although she or he may have a preference for one or the other.

- The classifications correlate fairly closely with motivation: "deep" with intrinsic motivation and "surface" with extrinsic. However, they are not necessarily the same thing and either approach can be adopted by a person with either motivation. (Atherton, 2002)

This suggests that deep and surface learning are strategies that are adopted in response to the learning environment. The assessment process, for example, has been identified as being the most important factor in creating a surface learning approach in students.

(Atherton 2002, Norton et al 2001, Rust 2002). However Boud (2002) emphasises the importance of assessment in the learning process quoting Socrates "The unexamined life is not worth living" or "...not liveable". He proposes a more positive model of assessment using peer assessment and self- assessment to aid learning. This is consistent with the concept of reflective practice and the development of the reflective practitioner (Kolb, 1984). Entwistle, however, suggests a third approach, the "strategic" approach (Entwistle, 1981), where students respond to the learning situation in what is described as an "organised surface" approach.

Nevertheless, if the objective is to encourage deep learning then approaches that encourage this and discourage a "surface" or "strategic" approach need to be considered.

3.7. Conclusions from this Chapter

The literature review has, so far, shown that approaches to learning have clearly spanned two extremes – on the one hand there are the objective, deterministic models of learning that have largely underpinned the more didactic practice of teaching and learning, (Skinner, 1954; Bernstein, 1977). On the other end of the spectrum are the more liberal, divergent, philosophies (Illich, 1974; Vygotsky, 1978) that have latterly had an influence upon learning environments.

Review of the literature has, however, determined that whilst there are these different definitions and models of learning that the development and encouragement of

discourse is fundamental to the creation of learning environments. Such discourse can then be supported by judicial implementation of networking technologies although currently there is a dearth of theoretical models for implementing the use of using ACC to support module delivery within a campus-based HE context within the UK. (Lipponen, 1999; 2002).

The literature review further suggested that there are several factors that influence the type of learning adopted by students and these include:

- The role of the tutor. (Mitchell, 2001; Jacques, 1995)
- Institutional factors (Becher, 1989) and orientations towards academic development. (Land, 2001)
- Group dynamics. (Banet and Hayden, 1977)
- The teaching strategies used to prompt or support learning. (Stiles, 2002; Grout, 2002; Booth et al., 2000)
- The design and characteristics of VLEs. (Shih, 1998)
- The learning context and individual learning styles. (Knowles, 1978; Connor, 1996)
- Staff/student attitudes towards Assessment (Boud, 2002; Rust, 2002; Norton et al, 2001)

It was clear, therefore, that the questions that needed to be addressed within any fieldwork studies included such things as:

- "What is the role of the teacher in using ACC to support CSCL in a campus-based environment - Is scaffolding/moderation a necessary or sufficient condition for success?";

- "How can ACC be integrated into F2F contact sessions?";

- "How could use of ACC be assessed to support achievement of learning outcomes"?

- "What kinds of communication patterns emerge in using ACC and are students able to communicate productively?"

In order to address such questions a series of fieldwork studies were, therefore, heuristically developed in order to determine the major factors that influence the use of ACC to support module delivery within a campus-based HE context. Further aims of such research were to provide a pedagogically sound foundation to underpin and justify the design of a "mixed mode" context for supporting learning as well as to develop guidelines to support the successful integration of ACC within traditional F2F module delivery.

Chapter 4 – Fieldwork Studies

4.0. Background

The research undertaken had, at this point, suggested the potential for both extending and supporting the wider discursive context through judicial implementation of appropriate technologies. This Chapter, therefore, describes each of the fieldwork studies undertaken together with the evaluative instruments used to determine the influencing factors involved.

Firstly, the particular technology offering the most potential for widening the discursive context as well as shifting the locus of control away from the tutor, was determined to be that of asynchronous computer conferencing (ACC). In order to facilitate such potential the particular implementation of this technology was, therefore, originally perceived to be embodied in Brittain and Liber's (1999) adaptation of Stafford Beer's (1981) Viable Systems Model illustrated in Figure 9:

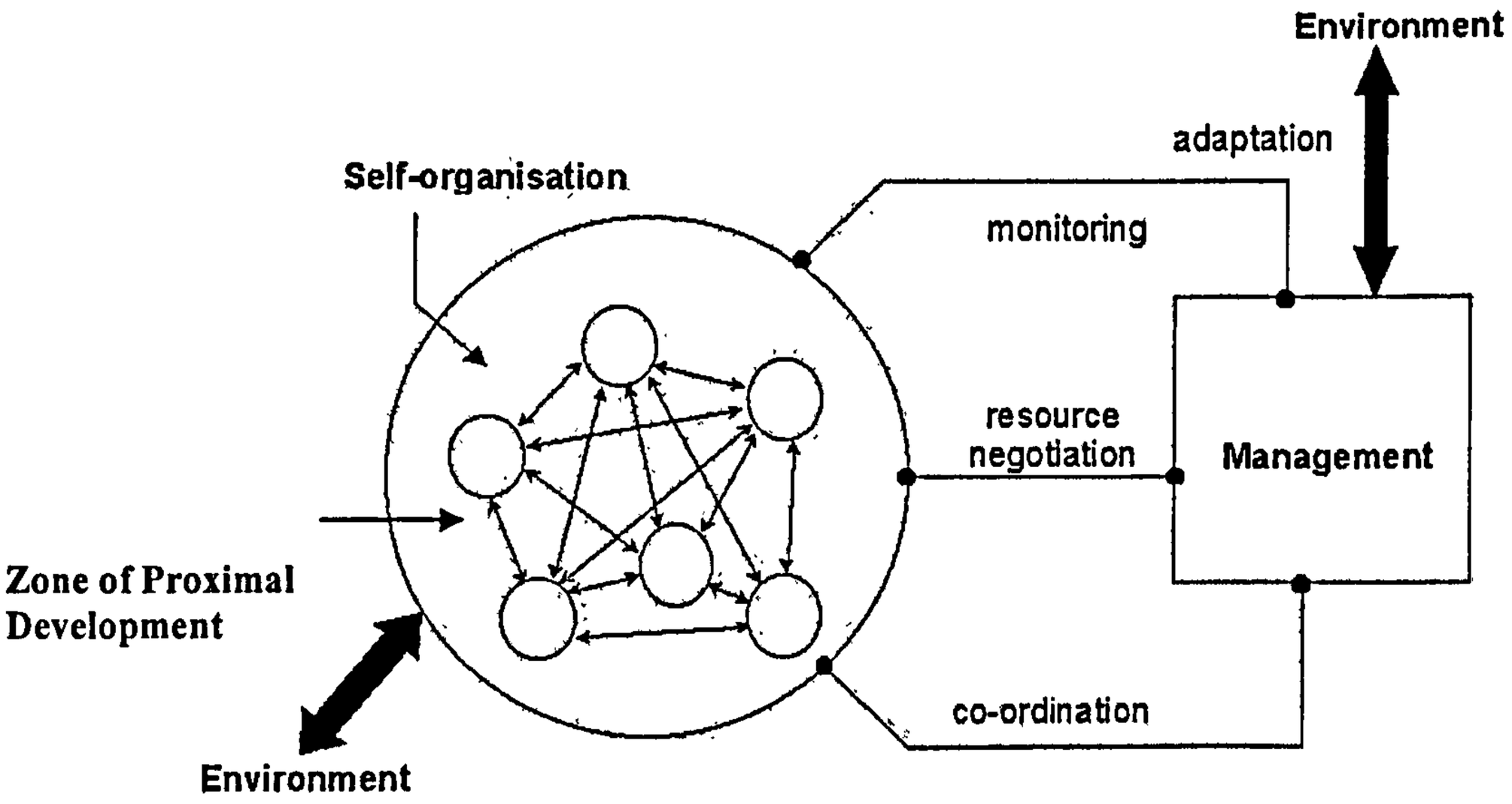

Figure 9 – Adaptation of the Viable Systems Model (Brittain and Liber, 1999)

Within this model the students would be perceived of as a self-organising community of learners composed of multiple zones of proximal development. Within such self-organized learning there would be no "omniscient teacher, but instead there are participants with different degrees and areas of expertise" (Pfister, Wessner, Holmer and Steinmetz, 1999).

Such an approach does, of course, not only accord with Knowles' concept of how adults learn but was perceived to be more likely to facilitate the different learning styles. For example, through operating simultaneously each of the participants would be able to navigate via different routes at different rates (Brown and Reeve, 1987) and the acquisition and transfer of knowledge then proceeds "informally, mainly by discussion and argumentation among the participants" (Pfister, Wessner, Holmer and Steinmetz, 1999) as autonomous, self-directed adult learners. The role of the tutor within this approach is then simply to monitor and co-ordinate the activity without actually moderating it.

Thus the tutor, in addition to adopting the traditional role of "sage on the stage" (Guzdiel and Weingarten, 1995) within the traditional lecture setting, would be organising and negotiating the resource allocation within the virtual (ACC) environment thus becoming a facilitator (reflective of the more liberal, divergent approaches to learning). As Lipponen, (1999) notes "the traditional role of the teacher as information deliverer is changed to a role of facilitator and co-learner. This means facilitating collaboration between students, encouraging them to monitor their understanding

(without directly giving them information), communicating with them and carefully examining knowledge produced by the students". However, the intention within the first of the fieldwork studies was that any communication undertaken by the tutor would be confined to the F2F lecture/seminar sessions thus testing out the hypothesis that moderation of the ACC environment was neither a necessary nor sufficient condition for success. Furthermore, as the research was to be conducted with students, an ethical framework was devised in order to address the various ethical issues necessarily raised by such activity (See Appendix O, pp308-310). In implementation this meant that students were briefed during the initial F2F contact sessions as to what data was going to be collected and how it was going to be used. This was then supplemented by Privacy statements placed on the VLE itself as well as on the various questionnaires used – participation was, therefore, by informed consent. Other ethical issues such as privacy, accuracy and accessibility were further addressed through implementation of the proposed (PET) strategy (See Appendix H, p245) in fieldwork studies 6 and 7.

4.1. Evaluative Instruments Implemented

The evaluative instruments that have variously been used to guide incremental development of each of the fieldwork studies are:

- Transaction Analysis (Wortham, 1999) to determine the different transaction patterns (All fieldwork studies)

- Module Assessment Outcomes (All fieldwork studies)

- Questionnaires to gain qualitative staff and student feedback (All fieldwork studies)

- Community of Inquiry Model (Garrison, Anderson and Archer, 2001) used to categorize each of the messages contributed. (See fieldwork studies 5, 6, 7)
- Moral Judgement Development (Lind, 2001) to assess group and individual moral development and "deep" learning. (See fieldwork studies 5 and 7)

- Learning Styles (Honey and Mumford, 1992) to enable students to focus on their own particular learning styles as well as being used to stimulate general debate regarding the use of "profiling" instruments. (See fieldwork study 6)

- Group Behaviour (Belbin, 1981) to encourage students to reflect on group roles as well as information group formation by the tutors. (See fieldwork study 7)

4.2. Fieldwork Studies

4.2.1. Fieldwork study 1 – "First Steps"

4.2.1.1. Description/Activities

In fieldwork study 1 the Basic Support for Collaborative Working (BSCW) application was used to support a module entitled "Innovative Trends in Information Systems" with one group of undergraduate computing students based on one campus.

At the start of the module, the content consisted of some 300 documents, collected during previous years, in the general topic areas of CSCW/GroupWare, Teleworking, E-Commerce and Technology. These were, for the most part, either text documents prepared by the tutor, or localised URLs - i.e. web pages downloaded and set up on the BSCW server. By adopting this approach the bandwidth problem, of many students accessing the same remote sites for large documents at approximately the same time, was avoided.

Encouragement for using the BSCW system was then given in F2F contact sessions but there was to be no overt active tutor presence within the ACC environment itself. Discussions were, however, monitored by the tutor in order to evaluate usage. The overall ethos of the course was, therefore, one of the synergy to be produced by the massed individual learning experiences - all the students, and the tutor, were to benefit mutually from what was learned by each individual. In certain cases, the feedback given during the assessment of previous students' work was posted in the form of an annotated (but anonymous) version of the assignment.

One preliminary activity consisted of an invitation for the students to study two documents and judge which was the better of the two. In order to assist such assessment students were provided with the assessment criteria to be used for evaluating the module coursework itself.

4.2.1.2. Findings

- Students reported that their usage of the system was, in the main, evenly divided between using it as a resource for their own personal research and for 'lurking' rather than for actually contributing. This does not, however, accord with the actual statistics recorded as illustrated in Figure 10:

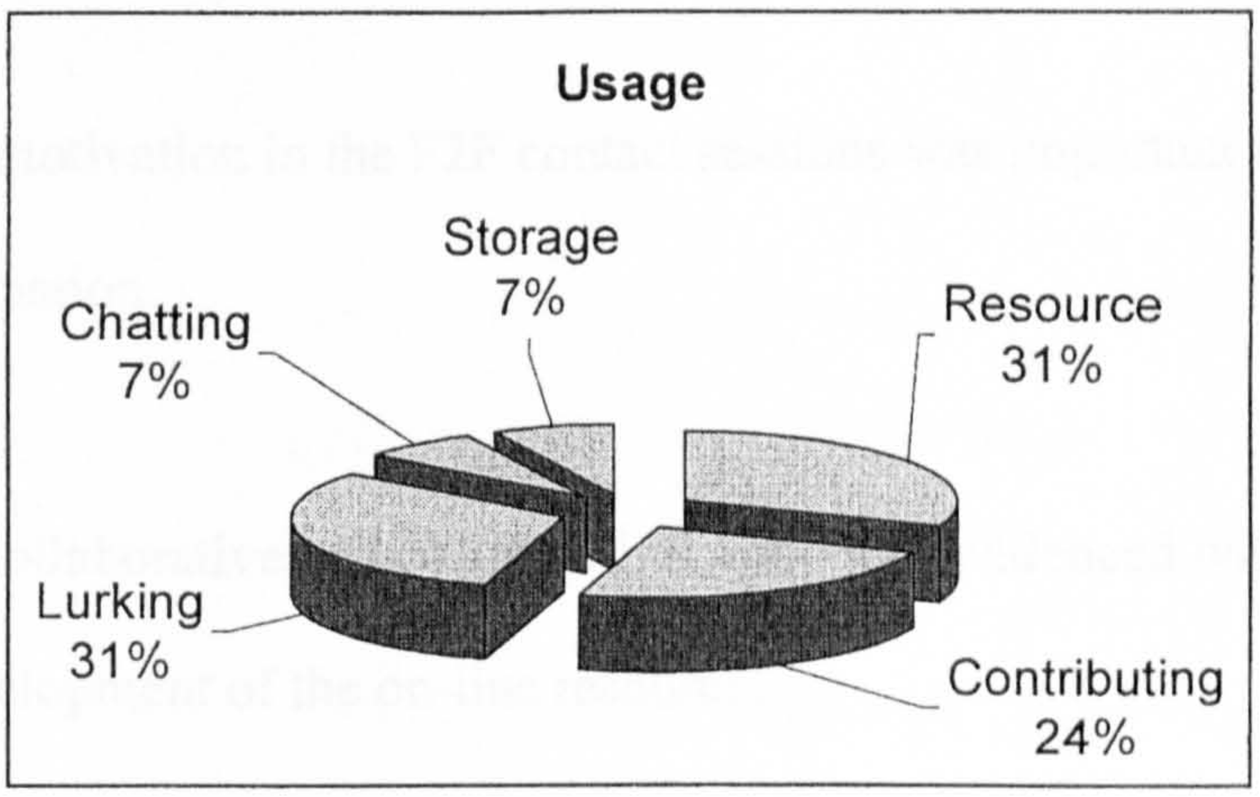

Figure 10 – Recorded Usage of BSCW

- The article judged to be the best by the students was, in fact, the poorest in terms of academic quality. This did, therefore, evidence that the critical evaluation skills of final year undergraduates needed further development.

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
1	BSCW environment Unmoderated Single tutor/single campus	Staff/Student feedback questionnaire and interview. BSCW Usage statistics	Anarchic nature of contribution and resource development – possibly due to lack of precise focus for the module itself and/or lack of tutor intervention. Student's critical faculties and organisational skills were not as well developed as expected. Student's perception of usage did not correlate with actual usage.

	Diversity of subject area (56 students)		There was little significant correlation between the number of read activities and the eventual grade awarded for the module (0.22%); perhaps surprisingly, there was no significant correlation between the number of create events and the final grade (0.08%)

Table 6 – Fieldwork study 1 - Variables, Evaluation Techniques and Outcomes

4.2.1.3. Conclusions from fieldwork study 1

- Tutor motivation in the F2F contact sessions was important for encouraging student participation

- Both collaborative and co-operative work was evidenced with students contributing to development of the on-line resource.

- Students had participated well in the discussion forum but some felt that they lacked confidence in making their views known to their peers.

- Students' perception of usage did not correlate with actual usage.

- Assessment outcomes showed no significant correlation with degree of activity (Read or Create) within the conferencing environment

- The majority of students felt that use of ACC was beneficial to their learning.

- Students appreciated the availability of the resource online so that they could access it at a time/place to suit their own learning style.

- That a more focused, relevant module was needed for future fieldwork studies.

- That a VLE such as WebCT should be used in preference to BSCW as, according to research, this offered more functionality.

- That moderation of the conference environment was perhaps needed to provide more control and structure to the learning experience.

- That good instructional design is important to properly integrate the use of the technology.

- Students' critical faculties did not appear to be as well developed as had been anticipated in their final year of study.

  Veerman, Andriessen and Kanselaar, (1999), however, note that "key problems that may inhibit students to engage in critical argumentation are that students tend to believe in one overall correct solution, that students show difficulties with generating and comparing counter-arguments and with using strong, relevant and impersonalised justifications. (Treasure-Jones, submitted thesis, p.13; Kuhn, 1991). In addition students' exposure of a critical attitude can be inhibited because of socially biased behaviour. For example, students may fear to lose face (e.g. in front

of their classmates), to go against dominant persons in status or behaviour (e.g. a tutor) or for what other people think (e.g. that you are not a nice person)".

4.2.1.4. Implications for fieldwork study 2

Implications for the next fieldwork study were that:

- the module chosen should be more focussed and discursive;
- tutor motivation in the F2F contact sessions needed to be continued
- moderation needed to be undertaken in order to provide more control and structure to the learning experience;
- WebCT should be used as the conferencing environment as it provided more functionality;
- Students' critical faculties needed to be developed alongside conferencing activity.

4.2.2. Fieldwork study 2 – Taking Control

4.2.2.1. Description/Activities

This fieldwork study involved the Computing and Ethics module that was to be delivered to 32 undergraduate computing students based on one campus within the UK. This module was chosen because it was not only highly discursive in nature but was perceived to require development of critical analysis therefore use of the discussion board was an entirely appropriate strategy to adopt to facilitate this. In addition the module itself offered a great deal more focus in terms of topic area for the students. Such requirement for a more focused module had been identified during the initial study as was the perceived need for Tutor moderation. Thus Tutor presence in the ACC for this study was that of Moderator – Moderating Student Activity - and trying to prompt and "scaffold" the student learning experience.

A further change of variables was made in choosing to use WebCT as the virtual learning environment. Such change was prompted because WebCT offered greater functionality than BSCW had done and it was felt that this would encourage greater participation on the part of the students.

Thus, resources within WebCT initially took the form of provision of a course outline that identified both learning outcomes as well as an indication of the content of each lecture and tutorial session. Additional resources included providing reading lists, lecture notes, links to relevant journal papers, links to video resources as well as the

discussion forum itself. Students were then registered onto the system and were variously encouraged by the tutor within the F2F sessions to use the WebCT resource as they felt appropriate. Postings to the conference by the students were, however, to be on a purely voluntary, non-assessed basis as opposed to making it a module requirement. Such decision was taken because it was felt that requiring assessable contribution would necessarily change the environment and impose a variety of constraints.

However, in order to "pump prime" the discussion, the tutor initially posted scenarios into the system. One of the original intentions for doing this was to replace some of the F2F tutorials but this proved to be very unpopular amongst the students. Therefore, all scheduled F2F lectures and seminars were undertaken but notably the topics raised within these sessions were then subject to continued discussion within the virtual environment.

4.2.2.2. Findings

During the delivery period of the module all accesses to the WebCT environment were tracked and the following results were gained for the discussion forum:

Total of Students	Male	Female	Total Student Contributions	Contributions by Gender
32	26	6	49	Male = 42 Female = 7

Table 7 - Student Contribution – 1999

19 male students and 4 female students contributed towards the discussion in total.

Application of the Mann-Whitney test however evidenced no significant difference between contributions by gender (P two tailed test = 0.555652).

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
2	Change of software - WebCT environment Tutor Moderated Single tutor/single campus Change to a more focussed type of module that would include development of critical analysis – Computing and Ethics. (32 students)	Staff/Student feedback questionnaire and interview. WebCT Usage statistics Transaction analysis Mapping message postings and Accesses to Assessment outcomes.	Transaction analysis indicated a propensity towards a "star" network of communication around the tutor postings. (See Appendix E, pp196-199) Very little correlation (0.207) between contribution to the discussion and coursework grades but exam passes were, on average, better – Message Postings mapped to overall module grades evidenced a correlation coefficient of 0.075 - (See Appendix F, p236) Contributing – 71% pass rate, Non-Contributing – 67% pass rate

Table 8 – Fieldwork study 2 - Variables, Evaluation Techniques and Outcomes

4.2.2.3. Conclusions from fieldwork study 2

- Development of a Code of Conduct should be included as a task for the students to undertake to strengthen the link between the module objectives and use of the technology.

- Patterns of interaction appeared to be affected by tutor intervention – either a "star" pattern of interaction was evidenced or threads were limited or stopped by tutor

intervention (See Appendix E, p196). This accords with similar findings from research undertaken by Nurmela, Lehtinen and Palonen, 1999

- Assessment of contribution was suggested but this would introduce another variable likely to impact the pattern of interactions.

4.2.2.4. Implications for fieldwork study 3

Implications for the next fieldwork study were that:

- WebCT should remain to be the environment used for the conferencing activity as it had provided the necessary functionality.

- Moderation of the conferencing environment by the tutor should be stopped as this was having an undesirable affect on the communication patterns.

- The conferencing environment should be used to supplement F2F contact sessions.

- A strategy needed to be developed to both prompt and integrate usage of the conferencing system within module design.

- A stronger link should be made between the module objectives and use of the technology through requiring students to develop a Code of Conduct for use of the conferencing system.

- In order to provide a more authentic use of the conferencing system that it be extended to include students on other campuses who were studying the same module.

4.2.3. Fieldwork study 3 – Extending the context

4.2.3.1. Description/Activities

This fieldwork study involved 103 undergraduate computing students based on 2 campuses (UK and Denmark).

Based on the findings from fieldwork study 2 it had been decided that a different strategy needed to be adopted in order to both prompt and integrate usage of the conferencing system into the teaching of the module. Thus tutor presence comprised monitoring activity and the posting of a non-assessed introductory exercise that required the students to devise a Code of Conduct to be used as guidance for their own usage of ACC. By setting such a task a certain amount of structuring for the group was, therefore, being imposed outside of the discussion area itself and the intention was, as Jacques (2000) notes, that by getting the group to choose and set up procedures that would govern their ways of working that this might have a positive impact on the "atmosphere, participation pattern and cohesion" of the group. Further tutor postings were, therefore, deliberately restricted but usage by the students during this delivery period was significantly improved as illustrated in Table 9 below:

4.2.3.2. Findings

Total of Students	Male	Female	Total Contributions	Contributions by Gender
103	91	12	694	Male = 642 Female = 52

Table 9 - Student Contribution – 2000

Application of the Mann-Whitney test however evidenced no significant difference between contributions by gender (P two tailed test = 0.896528). Transaction analysis of such usage, however, showed that the pattern of contribution notably differed with more of an "all-point" network emerging amongst the students – whilst some students inevitably were notable in often starting threads of discussion, generally these did not lead to the "star" network seen in the previous fieldwork study. Contributions by greater numbers of students were clearly evidenced which, in turn, meant that the threads created tended to be much longer. (See Appendix E, pp200-202)

However, a further pattern emerged that seemed to suggest that whilst initial discussions were relatively focussed and pushed forward ideas on ethical issues, that mid-term there was a degeneration into general inappropriate use including "flaming". This may have been clear evidence of the "storming" phase identified by Tuckman (1965) and was due to the fact that there was no overt tutor presence within the environment. This then meant that the students might have felt less constrained in their use of the technology. Students may even have seen it as an outlet whereby they could challenge traditional roles and provoke reaction. One student commented in an email:

> *"After a short while the odd post that perhaps could be called 'unsuitable' appeared and the lecturers didn't seem to respond in any-way. When this happened, I know a lot of people started to ignore the fact that tutor's were watching and just got on with writing whatever they felt like".*

However, at the time such inappropriate postings were being made, some other students became anxious and reported this to tutors who then took action in the F2F sessions to address the problem. At this stage it was felt that perhaps moderation of the conferencing environment might actually be necessary – that this was being thought about by both tutors and students was later evidenced in another student email:

> *"The idea of self-moderation is a good one and I think I was one of the people who was saying that 'everyone is sensible' so I didn't see a need for a 'discussion moderator' or any sort of hard rules. Well, it looks like I was too trusting (as usual, lol), for I soon noticed that one or two 'out of hand' people, managed to ruin (perhaps 'ruin' is a little harsh, but still...) it for the rest of us. I still think that tough moderation isn't necessary, although we really ought to have had some rules given to us. Rules that are set by the lecturers tend to get adhered to, whereas 'rules' given by the students are more likely to get broken and/or heavily argued about."*

Another student, on one of the feedback forms, subsequently put forward a suggestion that one of the rules imposed should be:

> *"People deliberately swearing should be removed from the discussion group."*

However, following intervention by the tutor in the F2F session, the on-line discussion became much more focussed and appropriate without the need for further moderation and students were clearly evidencing increasing engagement with the module.

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
3	Unmoderated Multiple tutors/sites (UK and Denmark) Introduction of a preliminary task – development of a Code of Conduct for the environment to encourage more integration with F2F delivery of module content. (103 students)	Staff/Student feedback – questionnaire and interview. WebCT Usage statistics Transaction analysis Discourse analysis Mapping message postings to Assessment outcomes.	Transaction analysis indicated a pattern of lengthy, "threaded", discussions with contributions coming from a larger number of students. Not quite an "all channel" network. (See Appendix E, pp 200-202). There were no contributions from students on the Denmark campus. Pattern of degeneration in use of the conferencing system – rectified in the F2F situation by the tutor. Very little correlation (0.103) between contribution and coursework grades but exam passes were, again, on average, better – Contributing – 78% pass rate, Non-Contributing – 65% pass rate Message postings mapped to overall module grades evidenced little correlation (0.16) (See Appendix F, p236)

Table 10 – Fieldwork study 3 - Variables, Evaluation Techniques and Outcomes

4.2.3.3. Conclusions from fieldwork study 3

- The Code of Conduct was started, but not completed, as the students could not reach a consensus.

- The transaction patterns indicated that longer discussion threads were occurring involving greater numbers of students when tutor intervention was absent.

- Monitoring would need to be stricter and students should, at the outset, be "briefed" as to expectations of their use of the facility. (As the module is specifically

concerned with professional issues in computing a useful, relevant link could be made – i.e. students could become their own case study).

4.2.3.4. Implications for fieldwork study 4

Implications for the next fieldwork study were that:

- The Code of Conduct exercise was still a useful task to try to get the students to undertake

- Parallels could be drawn between developing rules for the Internet and rules for the conferencing environment – this could be further encouraged through the F2F contact sessions.

- Students needed to be "briefed" as to expectations of usage and reminded that they would be expected to use it in an ethical and professional manner.

- Tutors would need to be briefed regarding monitoring of the environment and expectations.

4.2.4. Fieldwork study 4 – "Pump-priming"

4.2.4.1. Description/Activities

This fieldwork study was conducted across 2 campuses within the UK - Leicester and Milton Keynes) with 61 undergraduate computing students in total. Tutor presence in the ACC again initially comprised monitoring activity following the posting of the "Code of Conduct" exercise for students to undertake.

In order to further link or embed use of ACC within the F2F activity, students were, as had been suggested by findings from fieldwork study 3, initially briefed on expectations regarding appropriate usage. Students were then encouraged to perceive the virtual environment of the conference as a microcosm of the Internet itself. For example, certain parallels were drawn between the two contexts in that the conferencing environment (as with the Internet) was virtual, everyone had access to it and everyone had the freedom to express their own views. This, therefore, gave ample opportunity for tutors to reinforce this parallel of contexts through relating ethical issues discussed in the F2F sessions to activities/discussions that were undertaken within the virtual environment. In order to facilitate a common approach amongst all of the tutors a "briefing" sheet was developed and distributed. This briefing sheet included the request for tutors to simply monitor the conference activity and completely refrain from posting messages into it.

4.2.4.2. Findings

Total Student Numbers	Male	Female	Total Contributions	Contributions by Gender
61	45	16	169	Male = 155 Female = 14

Table 11 - Student Contribution – 2001

The pattern of contribution during this period evidenced that discussion was predominantly undertaken by 2 male students located on one of the campuses (63 postings by one student and 62 by one other) (See Appendix E, pp203-204). A further finding was that only 2 female students from any of the campuses made any contribution at all. Applying the Mann-Whitney U test the results from these patterns of contribution were not found to be significant (P two tailed test = 0.417086)

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
4	Unmoderated Multiple tutors/sites (Leicester and MK) More focussed strategy for integration with F2F delivery: • Tutor briefing sheet developed • Students briefed on expectations regarding appropriate usage • Students encouraged to become their own case study (61 students)	Staff/Student feedback – questionnaire and interview. WebCT Usage statistics Transaction analysis Mapping message postings and accesses to Assessment outcomes. Mapping to Group Behaviour (Belbin)	Pattern of contribution different – undertaken predominantly by 2 male students on one campus. (See Appendix E, pp203-204) No correlation (0.046) between contribution and coursework grades but exam passes were, again, on average, better – Contributing – 59% pass rate, Non-Contributing – 42% pass rate Message posting mapped to overall module grades evidenced no correlation (0.02) (See Appendix F, p237) Mapped to Group Behaviour Analysis – some correlation evidenced (0.68) (See Appendix F, p229)

Table 12 – Fieldwork study 4 - Variables, Evaluation Techniques and Outcomes

4.2.4.3. Conclusions from fieldwork study 4

- The pattern of contribution was different - predominantly undertaken by 2 male students on one campus. (See Appendix E, pp203-204)

- Discussion appeared relevant and indicated improved analysis and reflection on the part of the students.

- Assessment outcomes did not correlate with activity in the ACC. (See Appendix F, p237)

- Access to the discussion outside of normal time/place constraints was welcomed as students felt that they had time to reflect on other's views both within and without their own local culture and environment. (See Appendix N, pp301-303)

- That perhaps there needed to be more incentive for students to use the conferencing system in a more focussed way to encourage knowledge building.

4.2.4.4. Implications for fieldwork study 5

Implications for the next fieldwork study were that:

- More incentive needed to be provided for students to use the conferencing system

4.2.5. Fieldwork study 5 - "Focussing on the task"

4.2.5.1. Description/Activities

In order to provide even more incentive for students to use ACC as an integral part of their studies an international collaborative project was set up involving students in three universities: University of Limerick in Ireland, De Montfort University in England and Sacred Heart University in the USA. Thus, as McConnell (2000) suggests, "the emphasis is on researching real uses of CSCL, in natural and meaningful contexts where tutors and learners are obliged to use the medium in order to complete their work".

As such, students from each of the three universities, following similar courses, were required to work together in virtual groups to solve moral dilemmas involving the use of ICT.

Tutor presence within the environment was one of monitoring and giving encouragement as scaffolding of the learning experience was encompassed in the fact that the students were tasked with undertaking a group assignment using the Blackboard system to facilitate this. By placing the emphasis on task the tutor's role then became one of organizing the structuring of the sub-groups, setting time limits, monitoring what was happening and making any necessary interventions using either group email, front-end notice boards or picking up issues in the F2F context.

Thus, seven multi-institutional groups were established. Each of these groups then selected a scenario from a list supplied by the course tutors and worked over a six week period using text-based ACC tools provided within the learning management system, Blackboard, to produce a report.

Upon completion of the task all of the group reports were independently graded by each of the three course tutors according to a mutually agreed grading scheme. These "independent" grades were then moderated and finally awarded to each group. Individual grades were then adjusted where there was evidence of different levels of contribution from particular group members.

As the discussion was now task driven a modification to the Viable Systems Model (Beer, 1981) previously adopted was then made as depicted in Figure 11

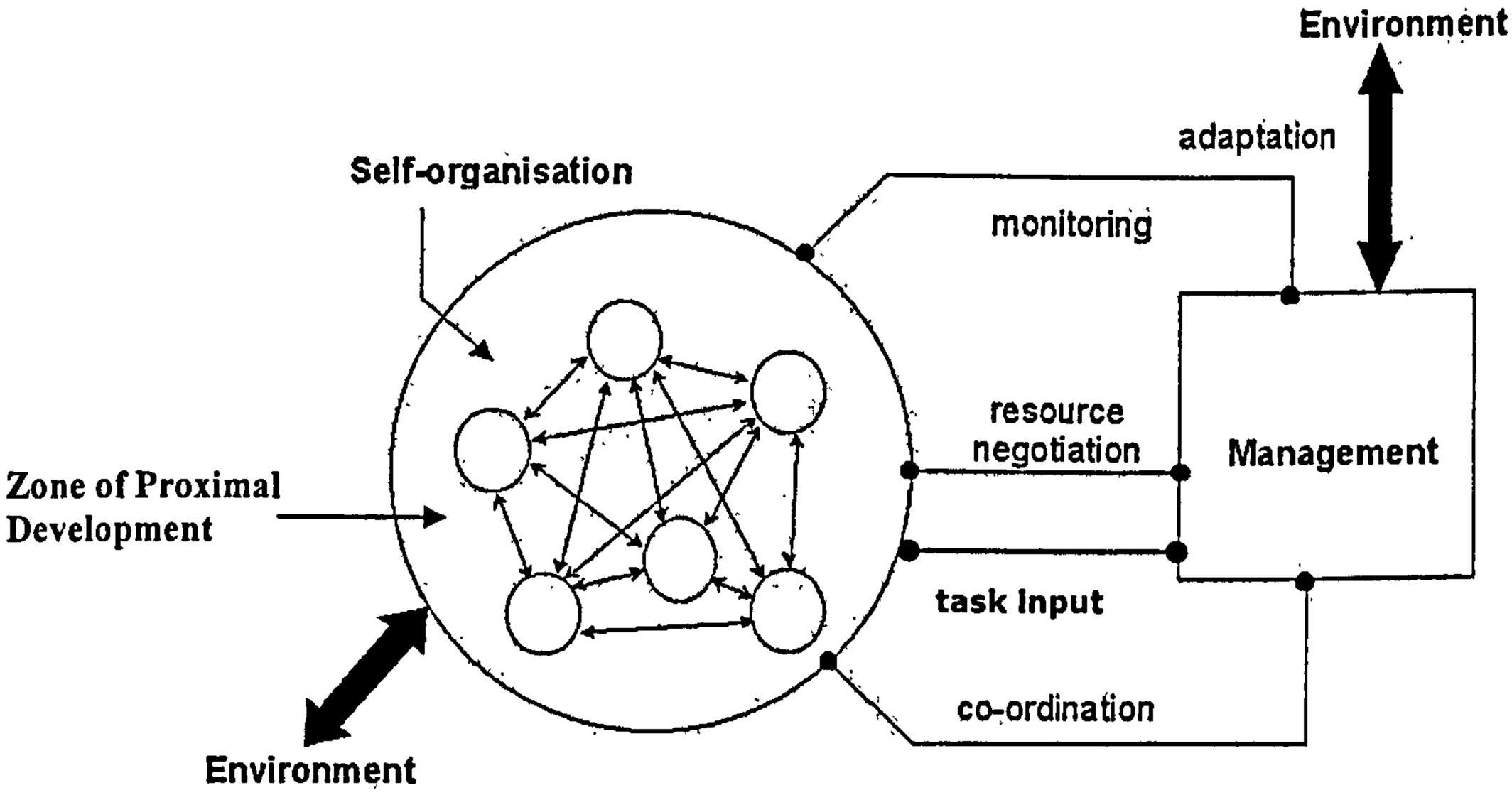

Figure 11– Task input added to the Viable Systems Model (Stafford Beer, 1981)

However, in order to assess what, if any, changes may have occurred in students' moral reasoning while working in multi-institutional groups, the Moral Judgment Test was used as an evaluative instrument within this fieldwork study. Analysis of this test thus examined the changes in the MJT C-index (Lind, 2000) from the pre course stage to post course stage of the multi-institutional virtual groups. Such results were then

compared with other "control" groups based in the University of Limerick and these showed that single institution groups scored higher on average (3.9) than multi-institution groups (-0.12). In addition, a higher percentage of single institution groups achieved positive C-score differences between the pre and post-test conditions than was achieved by multi-institution groups.

In addition to use of the MJT test the Community of Inquiry Model (Garrison, et al 2001) was subsequently applied to individual message postings in order to measure teaching presence, cognitive presence and social presence.

4.2.5.2. Findings

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
5	Change of software - Blackboard environment Multiple tutors/sites (MK, USA and Limerick) Single institution and multi-institution groups established for production of a group assignment Change of module - PCICT - similar in focus and subject area to Computing and Ethics Some tutor	Application of the Community of Inquiry Model – measuring Teaching, Social, and Cognitive Presence Application of the MJT Student feedback questionnaires. Blackboard Usage statistics Transaction analysis Mapping message postings and	Single institution groups scored higher on the MJT than multi-institution groups. Students used the virtual environment more when they had the additional opportunity to communicate F2F. Using the Community of Inquiry Model (Garrison) to identify the different categories of Cognitive Presence in the messages posted, 8 out of 41 students were identified as being group leaders and motivators. Each of these students then evidenced that they had the most number of hits 1400 (average) with a range from 1078 - 1987 as compared to the average number of the rest of the cohort 380 hits (average) with a range from 9 - 959. The informal group roles identified using the Garrison model were then perceived to have an influence on the success of some groups – e.g. Group 3 gained the highest scores of any group across the range of categories for Cognitive Presence and gained the best grade for their coursework. Activity mapped to Group Behaviour Analysis – no significant correlation (0.07). Activity mapped to assessment outcome – students in the "virtual" groups produced high quality coursework and most achieved high grades in their exam. One UK student who contributed little (only 2 messages) achieved an average grade in the exam (C) although they failed the coursework (23%) but

	postings to give advice on process Setting of a collaborative group activity for assessment to give extrinsic reward for use of ACC (41 students)	Accesses to Assessment outcomes. Mapping to Group Behaviour (Belbin)	one US student who was seen to have contributed little failed the whole module. Contributing – 100% pass rate, Non-contributing – 50% pass rate Transaction analysis (See Appendix E, pp205-209) – occasional tutor intervention to give procedural advice stopped the threads to which these were posted. All other transactions conducted by students evidenced a "threaded" nature with most students in each of the groups making a lot of contributions (549 in total). Overall there were 23,364 "hits" over a 9-week period. Of these 16,634 (70.09%) were made to the Group Discussion Boards.

Table 13 – Fieldwork study 5 - Variables, Evaluation Techniques and Outcomes

4.2.5.3. Conclusions from fieldwork study 5

General difficulties experienced by the students were:

- The asynchronous nature of the tool (often students were waiting before they could move on to the next task) (See Appendix N, pp301-303).

- Lack of organisational skills on the part of students using this kind of media for division of work (they just expected things to happen rather than specifically articulating them)

- Lack of roles within the group (the groups that achieved the highest grades, took the suggestion to have group roles, those that did not had no leader or organiser and students just expected others to do the work)

- The virtual nature of the groups (no tutors constantly monitoring progress as opposed to other courses where there might be constant pressure from regular F2F tutorials)

- Self-organisation of virtual groups (setting own deadlines and milestones)

- More time was needed for students to get to know each other, to articulate their strengths and weaknesses.

- There may well be a need to formally teach students how to operate in virtual groups, how to manage projects, assign roles and review progress

- Differences in the MJT test may be attributable to the fact, supported by anecdotal evidence, that students did not take the completion of the MJT as seriously as they might. Future fieldwork studies will need to introduce methods to impress upon students the seriousness of taking the MJT.

- Lack of expertise by both faculty and students on how to behave socially in virtual groups may have inhibited the potential for success of this particular fieldwork study.

4.2.5.4. Implications for fieldwork study 6

Implications for the next fieldwork study were that:

- Strategies needed to be developed to promote recognition of the need for group roles and organisational skills on the part of the students.

- More time should be set aside at the start for students to socialise and get to know each other – building trust.

- The strategy framework developed as a consequence of the first 5 fieldwork studies be implemented and tested.

- Inclusion of a collaborative piece of assessed work should be contineud to promote engagement.

4.2.6. Fieldwork study 6 – "Extending the tutorials to support assessment"

4.2.6.1. Description/Activities

In setting up this fieldwork study the developed strategy for the construction and management of an online environment was implemented. Such strategy (See Appendix H) was based on earlier fieldwork studies as well as on an adaptation of the "Action

Learning Forum" (Hale, 2000) and Activity Centred Design (Gifford and Enyedy, 1999) approach towards developing a Community of Learners.

Tutors on each of the campuses therefore had to meet and agree to implement this strategy as this particular fieldwork study involved 117 undergraduate computing students in 2 universities: De Montfort University (Leicester and MK campuses) and the Southern Connecticut University, USA. 20 groups using WebCT were set up. Of these 11 comprised of international students and 9 groups comprised students based on a single campus (Leicester).

As the previous study had shown that inclusion of a collaborative piece of assessed coursework improved the level of engagement of the students it was mutually agreed that this would be incorporated for the teaching of the Computing and Ethics module.

4.2.6.2. Findings

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
6	Multiple tutors/sites (MK, Leicester and USA) Single institution and multi-institution groups established. A total of only 3 tutor postings were made into the group	Application of the Community of Inquiry Model – measuring Teaching, Social, and Cognitive Presence Application of the Belbin Self-Perception Inventory Application of the Honey and Mumford	Students tended to try to set up F2F meetings when based on the same campus. One group of students attempted to use the discussion board for synchronous chat purposes. Students undertook the Learning Styles Analysis and this was then used in a F2F tutorial session to stimulate debate about the various findings and "profiling" systems in general. Such discussion then met one of the learning outcomes of the module. Using the Community of Inquiry Model (Garrison) to identify the different categories of Cognitive Presence in the messages posted, indicated that all groups exhibited a range of contributions being made by each of the students and that different patterns of interaction were being evidenced. (See Appendix F, pp231-235)

	discussion areas. Each of these was to inform of an individual (USA) student's withdrawal from each of the three groups. Setting of a collaborative group activity for assessment to give extrinsic reward for use of ACC (117 students)	Learning Styles Analysis Student feedback questionnaires. WebCT Usage statistics Transaction analysis Mapping message postings and Accesses to Assessment outcomes. Mapping to Group Behaviour (Belbin)	Message Postings mapped to Group Behaviour Analysis evidenced little correlation (0.04) – All students posted messages but those students designated as being "Shapers" were shown to contribute the greatest range of postings whereas "Monitor Evaluators" contributed <20. (See Appendix F, p230) Message Postings for all students mapped to Module grades evidenced slight correlation (0.15) but show that students contributing >20 messages scored higher in their module grades although there were some failures evidenced amongst those students who contributed between 10 and 45 messages. Transaction analysis (See Appendix E, pp210-216) – Transactions conducted by students evidenced a "threaded" nature with most students in each of the groups making a lot of contributions (2624 in total). Students recording >300 accesses to the WebCT area achieved higher module grades (>60%) with the main clustering of accesses being between 200 and 500. Overall pass rates for students on the Computing and Ethics module was 84%. Overall Module grades mapped to Belbin Types show that 4 out of the 8 types recorded failures on the module. This was primarily due to poor exam performance. One of the students designated as being "Plant" gained the highest grade in the examination as well as in the module overall. Contributing – 84% pass rate, Non-contributing – Not applicable

Table 14 – Fieldwork study 6 - Variables, Evaluation Techniques and Outcomes

Other findings from this fieldwork study included the fact that 3 different discussion groups were operating as depicted in Figure 12

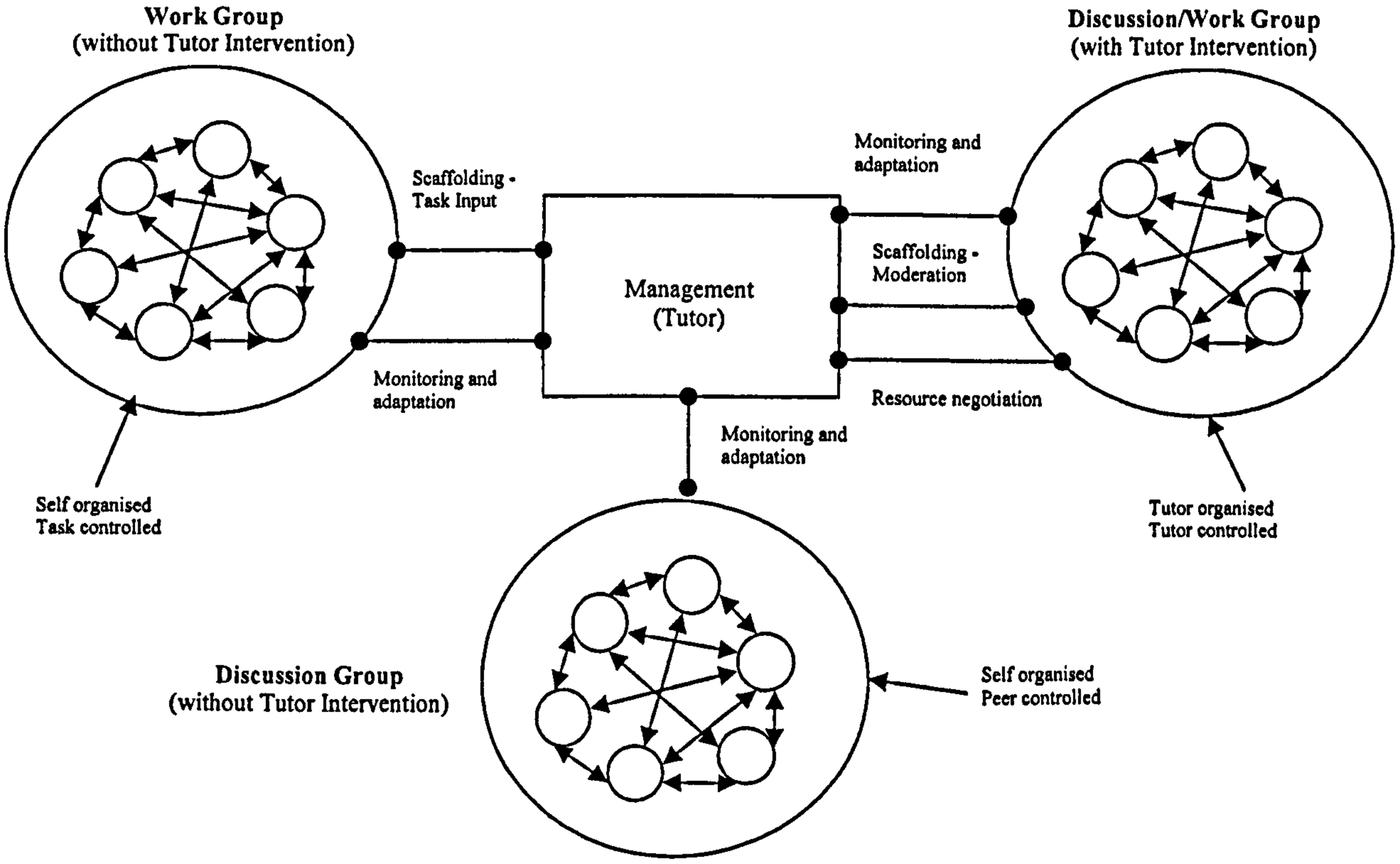

Figure 12- Discussion Group Types

Looking in detail at each of these 3 groupings the following factors were then identified:

Group Type	*Organisation*	*Scaffolding*	*Dialogue*	*Focus*
Work Group (without Tutor Intervention)	Self	Task moderation	Peer to Peer	Task completion
Discussion/Work Group (with Tutor Intervention)	Tutor	Tutor moderation	Tutor to Learner/ Peer to Peer	Knowledge building/ dissemination Skill enhancement
Discussion Group (without Tutor Intervention)	Self	Peer moderation	Peer to Peer	Knowledge building/sharing

Table 15 – Aspects of Discussion Group Types

An additional finding was the fact that student groups that were self-moderated were clearly evidencing autonomy in their decision making. For example:

- Some groups excluded some of their peers due to non-submission to deadline.

- One group tried to explain to a student that the work they had done was inappropriate. As a consequence this particular student got quite upset. The tutor actually agreed with the groups' evaluation of the work submitted and the situation was eventually resolved by the tutor removing this individual from the group concerned.

Feedback from the students was again positive about the whole experience and one typical student comment was:

> *"Although it's been strange not meeting up with you it's definitely been excellent working with you all"*

4.2.6.3. Conclusions from fieldwork study 6

- Tutorial discussions around ethical issues were extended within the general discussion area thus facilitating greater opportunity for students to engage with the module outside of F2F contact time.

- Scaffolding/control within each of the different discussion environments changed as a consequence of who undertook the organisation of the groups and the focus that directed the discussion. (See Table 15)

- Use of both discussion areas ("Work group" and "Discussion") afforded further opportunities for students to contribute as well as to learn vicariously from the contributions of others as evidenced by the high VLE usage statistics – all students were accessing the VLE and all posted some messages. (See Appendix F, p230)

- Student groups displayed a good deal of autonomy when self-moderating and where the scaffolding/control was perceived to be the task.

- Student feedback on the experience was positive.

- Overall pass rate for the module was an average of 83% which was a big improvement on the previous year's performance that had been an average of 69%. (See Appendix F, p245)

- Mapping statistics to Belbin Types showed some mixed results although statistics showed that generally there was very little correlation between overall module grades, coursework grades, exam grades and message postings when mapped to Belbin types. (See Appendix F, pp223-235)

4.2.6.4. Implications for fieldwork study 7

Implications for the next fieldwork study were that:

- Modification needed to be made to the PET strategy to incorporate more of a focus on group roles and the setting up/management of virtual groups.

- Group development needed to be monitored

- Initial socialisation should be encouraged.

- Monitoring rather than moderation should be undertaken by the tutors to encourage more communication and responsibility for learning on the part of the students.

4.2.7. Fieldwork study 7 - "Thinking about groups".

4.2.7.1. Description/Activities

This fieldwork study again involved computing undergraduate students in three universities: University of Limerick in Ireland, De Montfort University in England and Sacred Heart University in the USA. Tutor presence in the ACC was one of Monitoring and Encouragement Activity

As before, students from each of the three universities worked together in virtual groups to solve moral dilemmas. However, in this study, although students were still allowed to choose a partner on their own campus, each of the groups was established by the tutors on the basis of the Belbin (1981) Self-Perception Inventory that requires individuals to determine their perception of their own group behaviour.

Students were, therefore, asked to complete the Self-Perception Inventory and were then classified according to one of 8 roles identified by Belbin (1981) – Chairperson, Shaper, Monitor/Evaluator, Team Worker/Builder, Company Worker/Implementer, Resource Investigator, Completer/Finisher or Plant. These classifications were then used to group the students together for the purposes of the assignment. The underpinning rationale for using this particular instrument was to try to establish effective teams by bringing together people with individual differences who have the variety of requisite skills needed for group working to see if this improved overall performance.

Thus, eight multi-institutional groups, comprising 6 students each, were established and encouragement was given, via the front-end notice-board facility, for them to begin by socializing with each other. Such initial socialization was encouraged because research (e.g. Jarvenpaa and Leidner, 1998) has identified that the building of trust is important to the development of virtual teams and that this can be achieved through social communication such as exchanging names, interests and other personal information.

However, scaffolding of the learning experience was further achieved through initially requiring the students to focus on group work activity and to collaborate in production of a strategy for approaching the assignment itself as an interim deliverable. All of the groups therefore started socializing by posting messages about themselves. Once such initial introductions had taken place they each debated their strategy until agreement was reached. Having posted their strategy by the deadline imposed the groups then, as before, chose a scenario from the selection supplied by the course tutors and worked

over the ensuing period of time using text-based ACC tools provided within the learning management system, Blackboard, to produce a report.

Again, in this fieldwork study, the intention was that tutor presence within the environment was to be that of monitoring and giving encouragement as this had proved to be effective, in fieldwork study 6, for heightening participation by the students. However, the tutors in both the USA and Ireland were very reluctant to refrain from intervening in the group discussion areas as they perceived moderation of the conferencing environment to be their required role. As a consequence these tutors did make some postings to give advice on process. The effect of these tutor interventions then evidenced 3 different responses – a) student interaction proceeded to revolve around the tutor's comments, b) threads were terminated, c) no response within the discussion area was given. In one case one of the students actually challenged the direction they perceived the tutor was giving them commenting:

> *"So, whilst I accept your comment, is it ethical to direct students away from considering the possible legal implications involved?"*

The tutor responded by saying:

> *"I didn't mean to direct just suggest".*

This therefore evidenced the fact that at least one student's perception of tutor intervention was that they were being given direction. In this case the student had the confidence to challenge it. It is quite likely that other students might have shared this view although they may not have had the courage to voice their opinion let alone challenge a tutor. The response of the student did, however, illustrate to the tutor the

particular influence they were having upon the discussion and no further tutor postings were made directly into this particular group's area. However, upon assessment this group achieved one of the highest grades for their coursework, which was, as before, independently graded by each of the three tutors according to a mutually agreed grading scheme. These "independent" grades were then moderated and finally awarded to each group report. Following this, an individual student's grades, where necessary, were adjusted where different levels of contribution were evidenced. Such adjustment was made, in particular, for two of the US students who failed to contribute fully to the discussion. For example, one student contributed only 4 messages in total and the other one just 9 – the majority of these messages simply agreed with what others had said rather than making any real contribution towards knowledge building.

As regards group development within this fieldwork study, it was evident that all of the groups progressed through the various phases of development modeled in Chapter 3 although there were some slight modifications. Such modifications to behaviour are likely to have been caused by the strategy adopted for implementation as well as by the virtual nature of the conferencing environment. For example, in the "forming" stage (Tuckman, 1987) all of the groups began by having a high dependency on tutors in the F2F context for giving them guidance and direction as to how they were going to use the conferencing environment. Students were, therefore, dependent at this stage upon the tutors for setting them up into their groups within the virtual environment and had to have the various tasks outlined to them. This was achieved both verbally in the F2F contact sessions as well as through provision of both "hard" and "soft" copy written text. At this stage, some of the students exhibited concern over using the conferencing

environment as this was a new experience for them whilst others were extremely enthusiastic about having the opportunity to communicate with students in other universities. For example there were some concerns expressed by a few students regarding undertaking what they perceived to be "an experiment" and group work that would count towards their final classification. In order to overcome such concerns the tutors had to be extremely supportive and encouraging to those students who were worried about the ensuing experience. Tutors thus had to make it very clear to students what their expectations of them were. For example, how such usage of the conferencing environment related to the learning outcomes for the module, how the students would be expected to use the discussion board, together with the safeguards that were in place to minimize any potential problems. Discussion of these and any other concerns raised were undertaken with the whole class in the F2F contact sessions. This could, of course, be aligned with one of the defining aspects of this phase identified by Tuckman (1987) - where students will test the tolerance of the leader/tutor. During the next stage, "storming", the necessity for vying for position was largely eliminated by virtue of the fact that the students had undertaken the Belbin (1981) Self-Perception Inventory. Students used the results of these to assign themselves roles and generally found this to be useful. For example, it made them much more aware of group dynamics in development of their strategy. Typical comments were:

"I think the group allocation of roles worked well"

"I thought this strategy was grand. The delegation of work in the group worked well".

However, there were, as Tuckman (1987) predicted, barriers to communication at this stage. For example one student commented:

> *"It was hard to get my ideas across through text instead of verbally and is something I must work on. This project made me think a lot and it was difficult to come up with a final conclusion, is it fair isn't it fair, there were so many advantages and disadvantages to such a system."*

Nevertheless, requiring them to provide short biographies of themselves at least helped most of them overcome any initial reticence in making their first posting and one student commented:

> *"The threaded discussions proved an easy and valuable resource to utilise in combining everyone's ideas, arguments and suggestions".*

The next stage, "norming", evidenced that, in the main, individuals had accepted the various roles:

> *"As Company worker, I felt the role suited my practical, common sense and less creative aptitude towards solving problems."*

4.2.7.2. Findings

Apart from one or two students, general commitment to the group was perceived to be strong although some of this commitment was impacted by the workload that students were variously engaged in. Thus, some students withdrew from making any contributions to the discussion board during this phase. Some students, who felt the need to explain the reasons for such reduced contribution, later posted apologies for their lack of activity. At the "performing" stage the groups did evidence a clear focus in knowing why they were doing the exercise and what was expected of them. Each of the groups therefore exhibited a higher degree of autonomy during this stage and made, as expected, more rapid progress towards completion of the task as the deadline approached. Once again some groups exercised their own discretion in determining

how late submissions should be dealt with. For example, where mitigating circumstances were offered the group determined that the individual concerned should not be prevented from participating in the rest of the work. At the end of this stage all of the groups were then successful in producing their report to deadline and the grades achieved were high.

Finally the majority of the groups (7 out of 8) engaged in the "adjourning" phase by posting messages indicating their pleasure at having worked with each other, wishing team members luck with their future and their exams, and generally thanking others for their efforts. Overall perception of the whole experience was positive with one student commenting:

> *"Being part of a group in a project of this kind opened my eyes in a way to the importance of communication between members in order for further development of the work".*

Thus, despite the fact that the groups never met F2F, there was clear evidence that group identity and cohesiveness had been developed plus clear indication that individuals were engaging in a great deal of reflection upon their activity. (See Appendix N, pp301-303)

FwS	*Variables*	*Measurement/ Evaluation Techniques*	*Outcomes*
7	Multiple tutors/sites (MK, Limerick and USA) Single institution and multi-institution groups established for production of a group assignment Some tutor postings to give advice on process Setting of a collaborative group activity for assessment to give extrinsic reward for use of ACC (48 students)	Application of the Community of Inquiry Model – measuring Teaching, Social, and Cognitive Presence Application of the Belbin Self-Perception Inventory Application of the MJT Test (Lind, 2000) Student feedback questionnaires. Blackboard Usage statistics Transaction analysis Mapping message postings and Accesses to Assessment outcomes. Mapping to Group Behaviour (Belbin)	Students tended to try to set up F2F meetings when based on the same campus. Two groups of students attempted to use Instant Messaging or similar systems for synchronous chat purposes and 1 set of students were proposing to travel to Ireland for a F2F meeting. Tutor postings giving direction on process affected the type of interactions evidenced. Group development generally followed the Tuckman (1965) model with all phases being evidenced in the messages posted. Using the Community of Inquiry Model (Garrison) to identify the different categories of Cognitive Presence in the messages posted, it was interesting to note that in the "unbalanced" groups the Company workers not only posted more "Triggering" types of message but overall posted the most messages. However, in the "balanced" groups it was the Shaper and Resource Investigator that posted the greater number and range of messages. (See Appendix F, pp231-235) Message posting activity mapped to Group Behaviour Analysis – Shapers and Company Workers posted the most messages with Monitor Evaluators posting the least (See Appendix F, p230) Activity mapped to assessment outcome – Between 10 and 250 accesses reflected an overall module grade >60% with the main cluster of postings being between 10 and 50. Equally message posting was perceived to correlate with a better overall module grade (0.65) and students contributing greater than 20 messages gained 60% or more. The main cluster of number of messages posted lay between 20 and 40 postings. (See Appendix F, p238) All students contributed to the discussions and all achieved a pass in the module. (See Appendix F, p238) Transaction analysis (See Appendix E, pp217-219) – Occasional tutor intervention to give procedural advice. Transactions conducted by students evidenced a "threaded" nature with most students in each of the groups making a lot of contributions (1172 in total).

Table 16 – Fieldwork study 7 - Variables, Evaluation Techniques and Outcomes

4.2.7.3. Conclusions from fieldwork study 7

- Clear guidance and rationale for student use of the conferencing environment had to be given by tutors in the initial stages in order to boost confidence - both students and tutors needed to be aware of both the extrinsic and intrinsic gains they would accrue by use of the technology.

- Only two types of interaction were evidenced, as the students did not make much use of the "general" discussion area. A possible cause for this was that the F2F tutorial content differed from the focus of the conferencing environment.

- Students used the Blackboard system to access resources and to specifically address group strategy and the assignment (discussion of an ethical dilemma) within the Work group discussion area.

- Tutor intervention within the group discussion area affected the type of interaction evidenced.

- The initial requirement for students to socialise helped them to overcome their reticence towards posting messages.

- The use of results gained by the Belbin (1981) Self-Perception Inventory to group students together and to focus student attention on group dynamics proved

to be useful for both students and staff according to solicited and unsolicited feedback obtained. (See Appendix N, pp301-303)

- Feedback from 23 out of 47 students was obtained through an on-line questionnaire (See Appendix N, pp301-303). This indicated that :

  - collaboration with students from abroad together with the setting of a project to address a real-life scenario were both worthwhile undertakings.

  - a good deal of reflection on the particular difficulties encountered in using the conferencing environment as well as the benefits gained was evidenced in the detailed student comments provided. (See Appendix N, pp301-303)

4.2.7.4. Implications from fieldwork study 7

The implications from fieldwork study 7 are that:

- Extrinsic and intrinsic gains need to be identified for both staff and students in using ACC.

- Tutor intervention affects the type of transactions undertaken by the students.

- Socialisation by the students is important in overcoming their fear of using ACC.

- Use of the Belbin (1981) Self-perception Inventory proved useful in getting students to focus on group roles and developing strategy.

- The development of virtual work groups will generally exhibit similar patterns of behaviour as those found in the F2F context.

4.3. Synthesis of findings

Synthesis of the findings from each of the fieldwork studies has identified that:

- A clear outline of expectations needs to be given to students to boost confidence in using the ACC medium.

- Both tutors and students need to have both extrinsic and intrinsic reward for using the system in order to stimulate motivation.

- Tutor intervention reduces the number of messages posted within the conferencing environment but inclusion of a task focus increases contribution as evidenced by message postings:

	FwS1	FwS2	FwS3	FwS4	FwS5	FwS6	FwS7
Total of students	56	32	103	61	41	117	48
Total of messages posted	1007	49	694	169	549	2624	1172
Tutor intervention	No	Yes	No	No	Some	No	Some
Assessed Task	No	No	No	No	Yes	Yes	Yes

Table 17 – Statistics from fieldwork studies 1 - 7

- Tutor intervention promotes either a "star" pattern of transaction to be evidenced or threads are terminated. (See Appendix E, pp196-198)

- Exam performance on the Computing and Ethics module has shown an improved pass rate in 2 out of the 4 studies undertaken for students based on the Leicester and Milton Keynes campuses. (See Appendix F, p243)

- Coursework grades on the Computing and Ethics module show that the majority of students (Leicester and MK) in fieldwork studies 3, 4, and 6 have gained a pass grade in contrast to fieldwork study 2 where there was a 25% failure rate. (See Appendix F, p244)

- Overall module grades for Computing and Ethics (Leicester and MK) in each of the fieldwork studies show a good pass rate in 2 out of the 4 studies (fieldwork studies 3 and 6). The best of these rates were achieved in the fieldwork studies where tutor intervention within the conferencing environment was not undertaken and where there was a higher degree of access and message posting

by the students evidenced (e.g. fieldwork study 3 – 92% pass rate, fieldwork study 6 – an average of 84% pass rate) (See Appendix F, p245)

- Overall module grades (Leicester and MK) mapped to Belbin types (Figure 13 show that 100% of those students whose Self-Perception Inventories designated them as being "Completers" and "Resource Investigators" obtained module passes over fieldwork studies 4 – 7. Across the other 6 Belbin types only a 70% pass rate was evidenced. (NB Owing to the small number of students allocated to each of the Belbin types, testing for significance was not warranted for the following Belbin related comparisons).

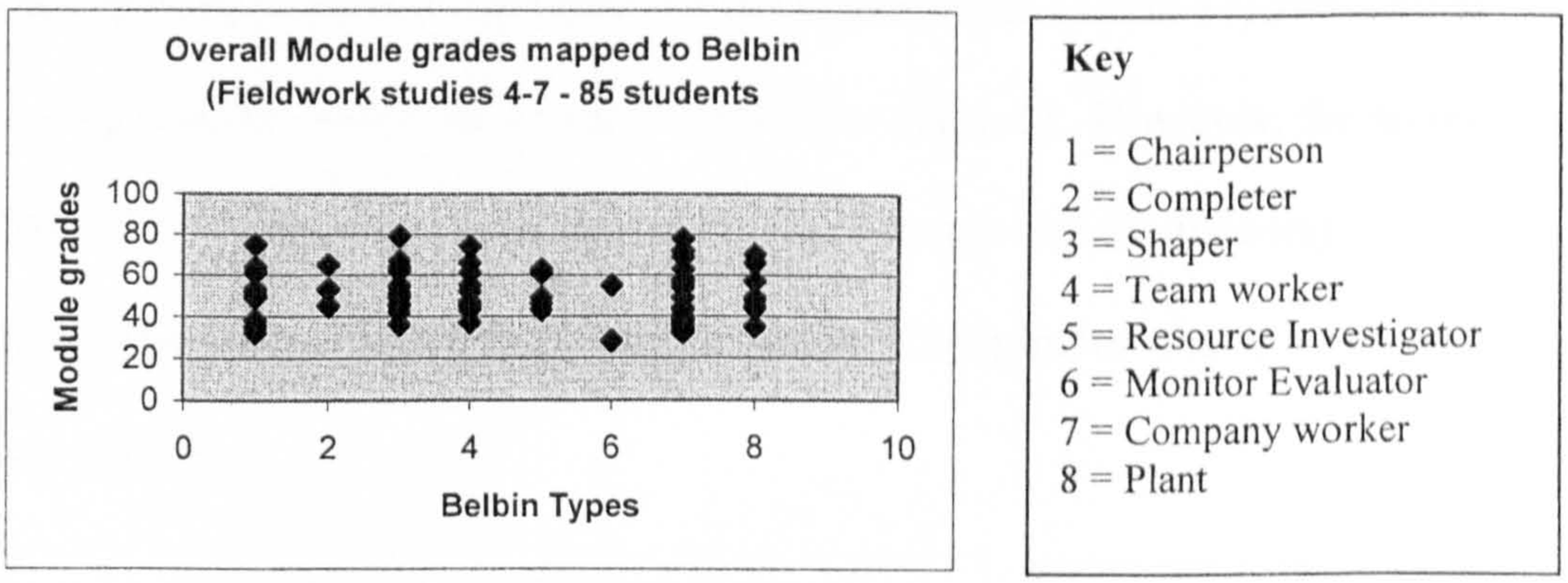

Figure 13– Overall Module grades mapped to Belbin Types

- Coursework grades mapped to Belbin Types (Figure 14 indicate that those students designated as being "Chairman" and "Shaper" evidence a greater spread of marks when standard deviation is applied. However, these categories also include the highest and one of the lowest marks gained which skews the deviation. Overall the average pass rate for all student types was 57% and all students designated as being "Resource Investigators" scored >= 50% over fieldwork studies 4 - 7

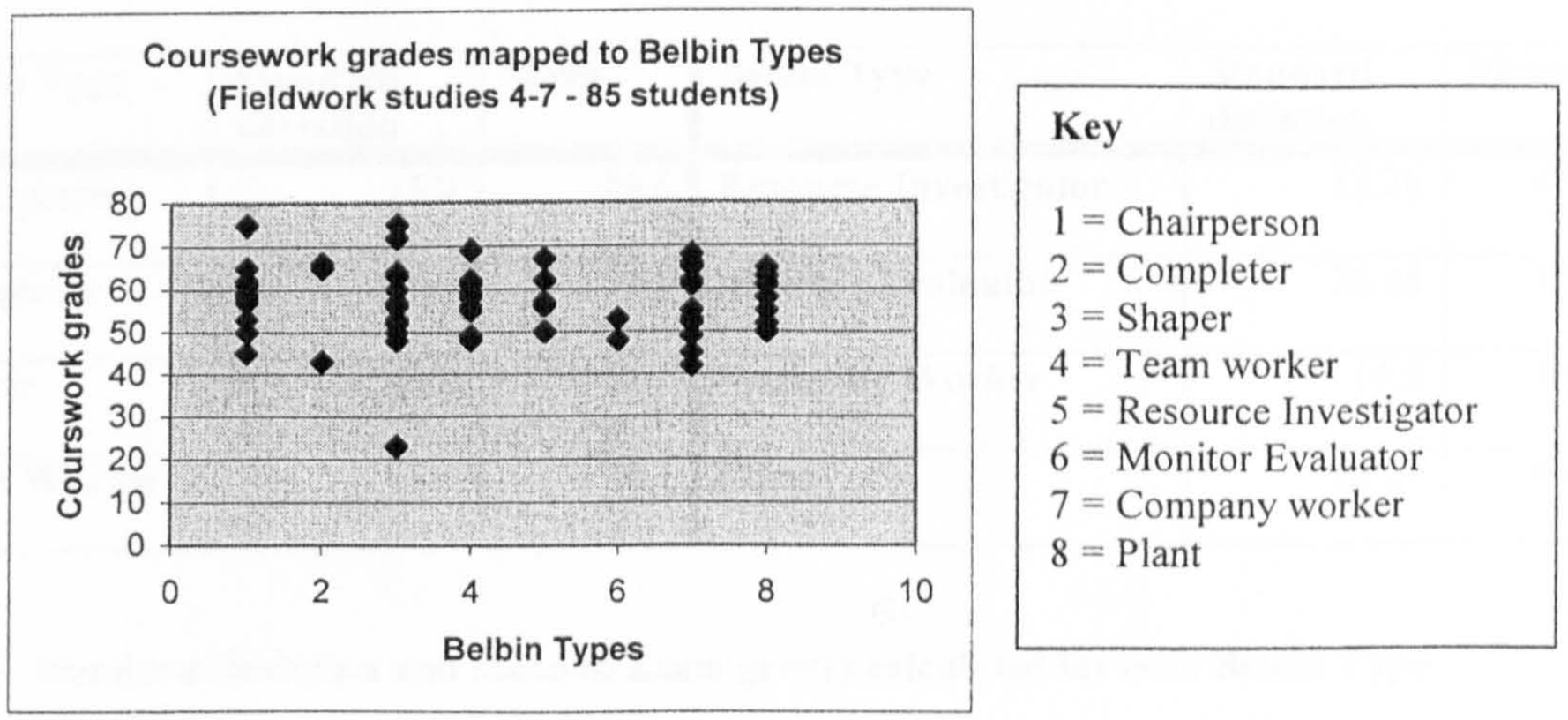

Figure 14– Coursework grades mapped to Belbin Types

- Exam grades mapped to Belbin Types (Figure 15 indicate that all types of student have a range of performance in examinations (Table 17) and similar average marks except for Monitor Evaluators (type 6). However, the anomalous figures evidenced here were due to the small group size (3 students).

  Interestingly it was only those designated as "Completers" that did not evidence any failures.

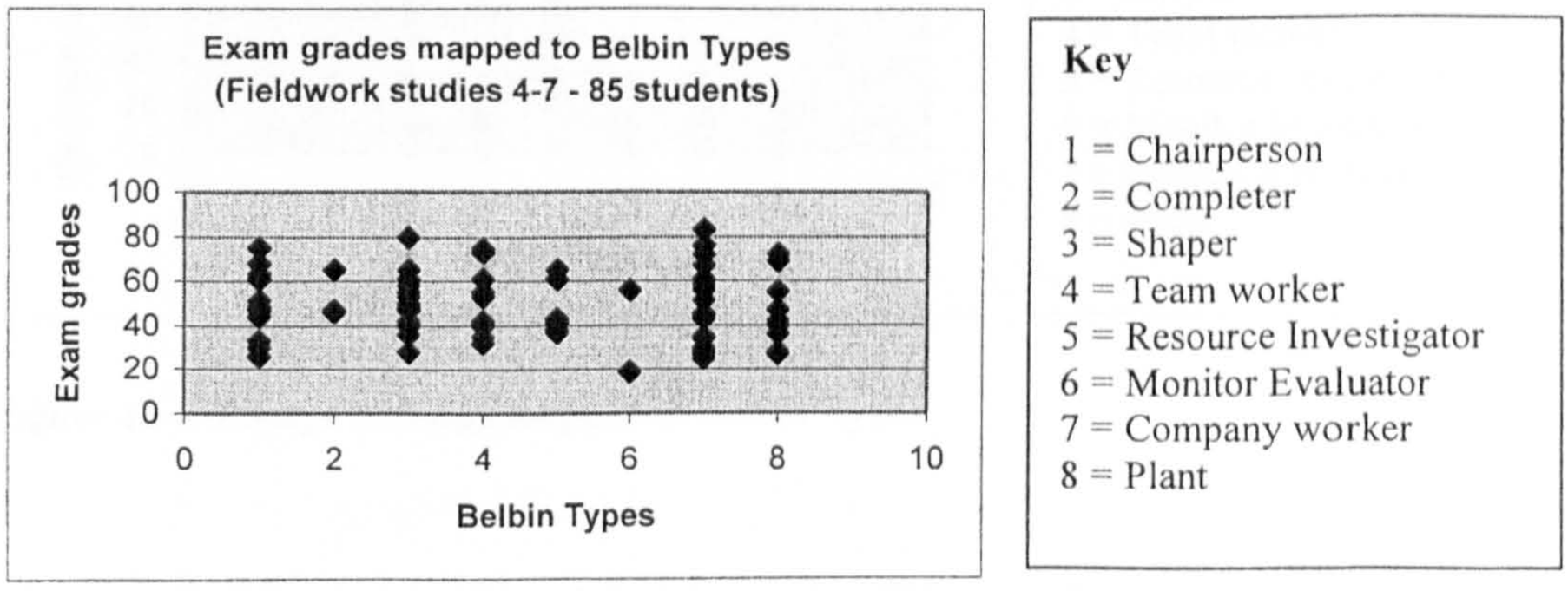

Figure 15– Exam grades mapped to Belbin Types

Belbin Type	Standard deviation	Mean	Belbin Type	Standard deviation	Mean
Chairperson	15.9	49.6	**Resource Investigator**	12.26	47.5
Completer	10.69	52.6	**Monitor Evaluator**	26.16	37.5
Shaper	13.03	52.2	**Company Worker**	18.5	47.1
Team Worker	15.2	50.7	**Plant**	16.29	46.2

Table 18 – Standard Deviation and Mean of Exam grades calculated for each Belbin Type

- Message Postings mapped to Belbin Types (Figure 16 illustrated a range of activity with "Shapers" and "Company Workers" although evidencing fewer average contributions (23) that overall there was a slightly larger spread of message postings (standard deviation 19.36) than the other types (average 26 postings with a standard deviation of 18.91) over fieldwork studies 4 – 7.

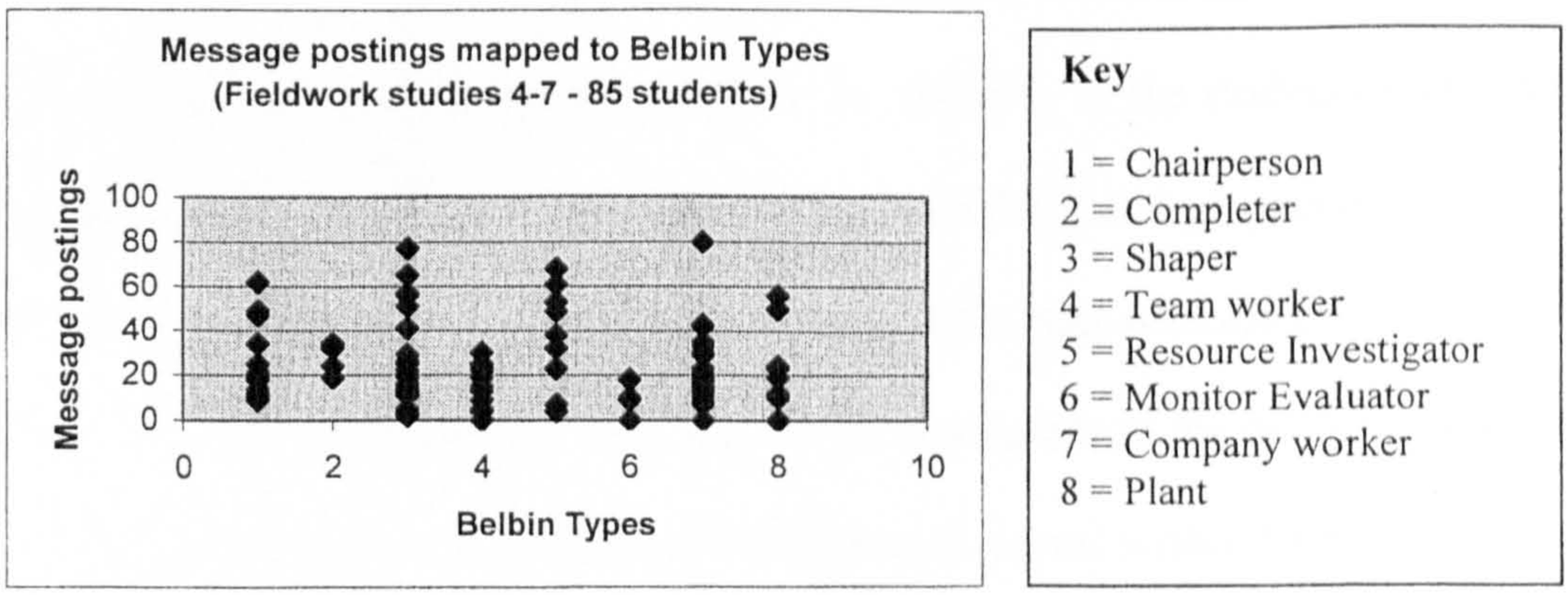

Figure 16– Message Postings mapped to Belbin Types

- Message Postings mapped to Module grades (Figure 17 again showed a variety of results although a larger percentage of pass grades tended to be achieved by those students who had posted at least one or more messages- 87% pass rate for

those students who took the exam and contributed at least one message as opposed to a 28% pass rate for those that did not post any messages:

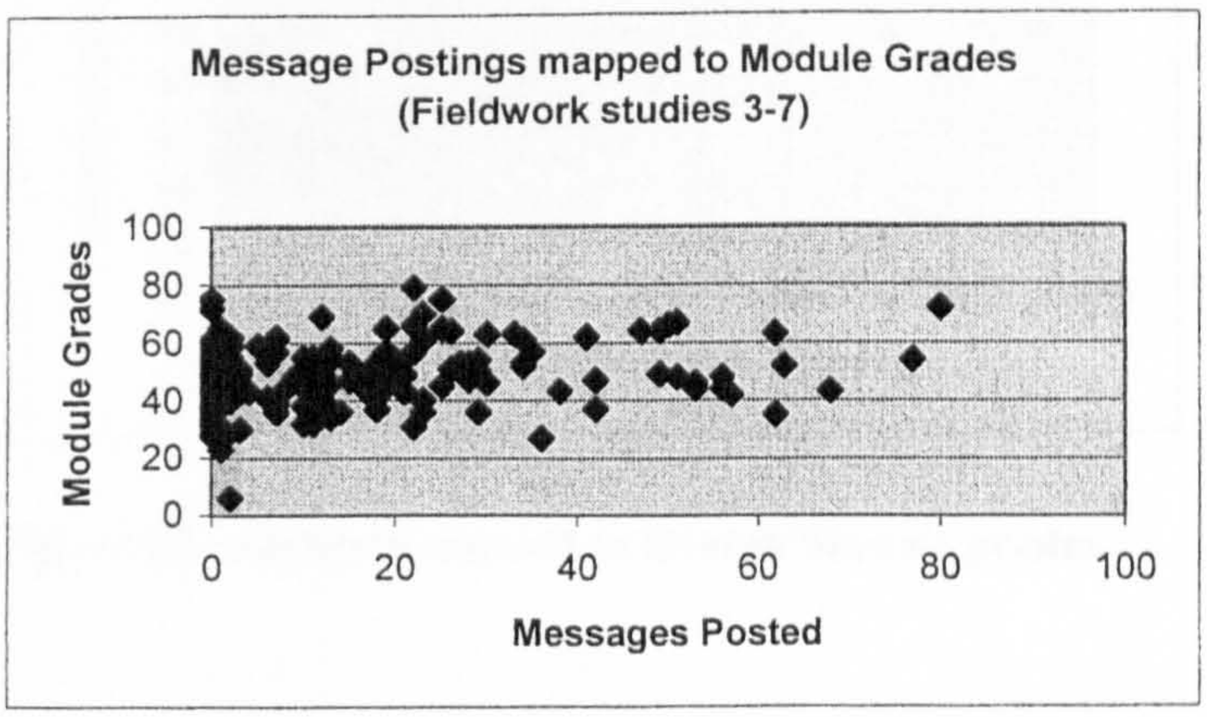

Figure 17– Message Postings mapped to Overall Module grades

- Accesses mapped to Module Grades (Figure 18 indicated that all students whose recorded accesses to the site were in excess of 600 passed the module. However, the statistics then show a larger clustering of accesses in the range 0 to 500 amongst all of the students. Of these the majority of the students accessing the site can be perceived to have achieved at least threshold progression – 87% of those accessing the VLE at least once achieved a pass whereas only 53% of those who did not access the VLE achieved a pass grade in the module. Such access indicators may be significant but statistics gained within VLEs would need to provide more detailed information than is currently available in order to ensure validity and accuracy of these particular statistics.

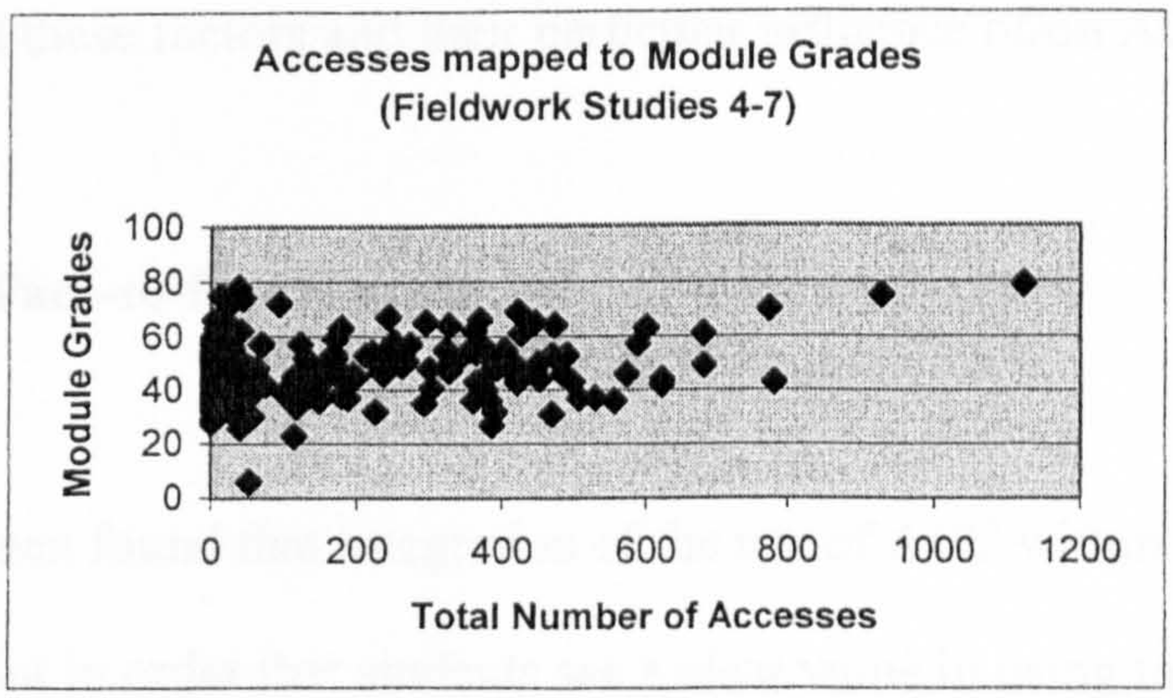

Figure 18– Accesses mapped to Overall Module grades

In addition to quantitative evidence gained from the fieldwork studies the following factors were found to be influenced by or have an influence upon Asynchronous Computer Conferencing within the campus-based HE context:

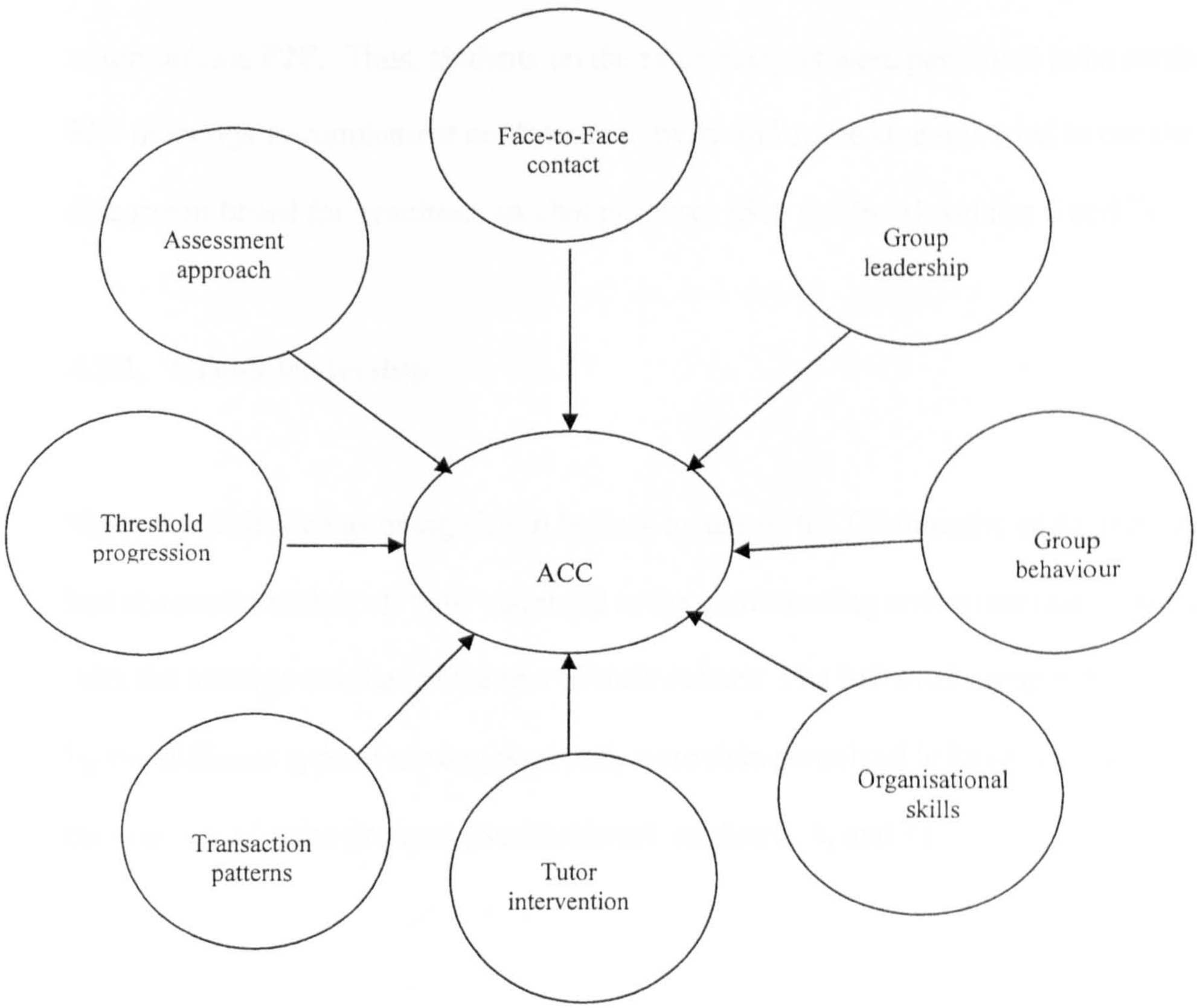

Figure 19 - Influences of/on ACC

Each of these factors and their particular influence of/on ACC were then summarised:

4.3.1. Face-to-face contact

It has been found that integration of the use of ACC within the F2F contact sessions is important in order that students see a clear value in using the technology. F2F sessions have to be used to "brief" students as to tutor expectations regarding usage so as to pre-empt any misuse of the conferencing environment as well as to encourage greater student participation within it. F2F can subsequently be used to follow up on any non-engagement with the module as evidenced by the tracking facility within the VLE. Students used the virtual environment more when they had additional opportunity to communicate F2F. Thus, students on the same campus were perceived to be setting up F2F meetings to supplement conference activity and some students tried to use the discussion board for synchronous chat purposes (See fieldwork studies 6 and 7).

4.3.2. Group leadership

Students evidenced as being Group leaders by use of the Community of Inquiry model had the most number of "hits" recorded to the conferencing environment as compared with the average number of the rest of their cohort. The informal group roles, identified by the different type of messages posted, were then perceived to have an influence on the success of some groups. (See fieldwork studies 5, 6, and 7)

4.3.3. Group behaviour

Use of the Belbin Self Perception Inventory was found to have been of help to both tutors and students. For example, tutors found it to be useful in assigning individuals to groups although allowing students to choose their own partner on campus inevitably constrained the ability to set up "balanced" groups where all of the requisite types were represented. Thus it was, on occasion, found that some of the students who chose to work together as a pair were designated as being of the same Belbin type. Nevertheless, students stated that they found use of the Inventory useful as it both raised awareness and focussed their attention on different group roles (See Appendix N, pp301-303). Some of these perceived roles were then used in developing group strategy (See Appendix N, pp301-303) although preliminary findings were that conferencing activity actually undertaken did not necessarily reflect the Belbin types identified. It was, however, subsequently noted that development of the groups followed a similar pattern to that outlined by Tuckman (1965) with the "storming" phase being particularly evident in fieldwork studies 3 and 6.

4.3.4. Organisational skills

The lack of organisational skills on the part of the students had a significant impact on the use of ACC (See fieldwork studies 5, 6). However, in the final fieldwork study (7) students were particularly directed to consider and develop a strategy for achieving the assignment as this was perceived to provide an appropriate method for them to organise themselves more successfully. All of the groups then found that development of the

strategy proved to be extremely difficult and upon evaluation determined that their strategy had not been particularly successful in implementation. (See Appendix N, pp301-303)

4.3.5. Tutor intervention

Tutor intervention will largely be determined by the tutor's perception of what the term "learning" means, why they are using the technology and what their role should be. For example, tutor intervention can reinforce the cognitive apprenticeship model within the conferencing environment as evidenced by the change in transaction patterns (See Appendix E, pp196-198). Tutors in both the US and in Limerick were very reluctant to refrain from posting messages into the group discussion areas as they felt that this was their role and that without such intervention the students would be likely to under-perform (See fieldwork studies 5 and 7). Thus the academic orientation of the tutor and the learning outcomes that students are expected to achieve will determine whether or not tutor intervention is undertaken and is appropriate. (See Chapter 3)

4.3.6. Transaction patterns

Transaction analysis indicated a propensity towards a "star" network pattern of communication when tutor intervention was undertaken in order to prompt and guide student discussion on a particular topic. (See Appendix E, pp196-198) When tutor intervention was for the purpose of giving administrative/procedural guidance transaction threads usually terminated. (See fieldwork study 5) (Nurmela, Lehtinen

and Palonen in a similar but more restricted study (18 students, 1 tutor and 2 supervisors) found a similar pattern of communication). Without tutor intervention the patterns of contribution evidenced longer threads and greater participation by group members (See Appendix E, pp199-200).

4.3.7. Threshold progression

The Garrison, et al Model (2001) was used to evaluate the process of learning and the MJT test was applied to test moral development in particular.

The Garrison, et al (2001) model was applied to messages posted in fieldwork studies 5, 6 and 7 for the purpose of identifying the different types of interaction that had taken place. In order to check for consistency in applying the Garrison, et al (2001) classifications for Cognitive Presence - "Triggering", "Exploration", "Integration" and "Resolution" - a colleague was asked to independently grade a set of messages. These were then compared with the classifications originally given and adjustments were made where appropriate. However, in actually trying to apply the grading system, both "message coders" found this to be extremely difficult as some of the messages did not fit neatly into the various classifications as outlined by Garrison, et al (2001). Thus whilst some attempt has been made to ensure the objectivity and reliability of classification through cross-checking with a colleague and making careful reference to the examples given by Garrison, et al (2001) the results remain, to a certain extent, subjective interpretation. It was, however, useful to note that in each of the groups, students were clearly adopting different roles as evidenced by the types of messages they were posting. Such activity was then mapped to the Belbin (1981) Types and the

evidence gained from this indicated that, whilst all of the students contributed messages that could be categorized as "Exploration", some students identified by their Belbin (1981) Type were evidencing different patterns of message posting. For example, those students who perceived themselves as being "Resource Investigators" posted most of the "Triggering" and "Resolution" types of messages, whereas the "Company Workers" seemed to contribute more in the way of "Integration" and "Resolution" type messages. (See Appendix F, pp231-235)

Application of the MJT test was, however, found to produce questionable results although some of this might be attributable to test-taking fatigue or frustration that the test was administered twice within a rather short period of time.

Nevertheless, engagement with the module outside of normal contact times was clearly evidenced by the student contributions made and the messages themselves indicated development of analysis and reflection. Furthermore, the tracking of student contribution subsequently helped the tutor to know which of the students was not engaging with the discussion and to then follow this up in the F2F sessions. It was noticeable that overall pass rate for the coursework assessment was either 99% or 100% for fieldwork studies 3 - 7. Exam performance later showed an improvement where the high number of messages posted to the discussion board were undertaken by the majority of the student cohort (See fieldwork studies 3, 5, 6, 7).

4.3.8. Assessment approach

Overall contribution to the discussion area has proved to have a limited effect upon overall module grades as illustrated in Table 19 below. However, tutor intervention in fieldwork study 2 shows a significant drop in student contribution and in fieldwork study 4 the degree of contribution largely reflects the dominance of just 2 students based on one campus. In each of these two fieldwork studies the overall pass rate is lower than those other fieldwork studies where student contribution was higher but the one significant drop has been recorded in fieldwork study 4. This may, in fact, be due to the fact that the average number of messages posted per student is down to 3 whereas in fieldwork studies 3 and 6 the average is approximately 7 and 22 respectively.

	Fieldwork Study 2	Fieldwork Study 3	Fieldwork Study 4	Fieldwork Study 6
Total number of students	32	103	61	117
Total number of contributions	49	694	169	2624
Coursework pass rate (excluding U grades)	74%	99%	100%	99%
Exam pass rate (excluding U grades)	65%	72%	47.5%	76%
Overall Pass rate for the module (excluding U grades)	77%	92%	69%	84%

Table 19 - Comparison of conference activity and assessment outcomes for the Computing and Ethics module:

Assessment outcome for coursework was, however, more closely linked to conference activity when the focus of the discussion was towards production of the assignment itself. For example, in fieldwork study 2 there was a 74% pass rate with 23% gaining grades >= 60% on coursework whereas in fieldwork study 6 there was a 99% pass rate

with 30% gaining grades >= 60%. (See Appendix F, pp236-242 for a comparison of results from each of the fieldwork studies).

Assessment outcome for the examination was subsequently related to conference activity with students involved in fieldwork studies 5 - 7 proving to be more successful. For example, a comparison of examination pass rates between fieldwork study 2 (65% pass rate amongst 32 students based on one campus) and fieldwork study 6 (76% pass rate amongst 90 De Montfort University (DMU) students based on two campuses) illustrates this fact. (See Appendix F, p243 for a comparison of results from each of the fieldwork studies).

The perceived improvement in module performance proved, however, to be even more significant when compared with an analysis of the final degree classifications awarded to DMU students who had studied the Computing and Ethics module in each of the fieldwork studies. For example, the statistics show that, over the 3-year period concerned, that the spread of marks is going up and, except for the group in fieldwork study 2, the average is showing a downward trend in overall degree classifications:

	2001	2001	2002	2003
	Fieldwork Study 2	*Fieldwork Study 3*	*Fieldwork Study 4*	*Fieldwork Study 6*
First	2	7	4	2
Upper Second	6	32	13	9
Lower Second	8	12	24	43
Third	3	3	4	11
Pass	12	11	10	10
N/A	1	5	6	18
Total Number of students	32	70	61	93
Standard deviation	14.56	18.61	19.20	22.48
Average	49.84	54.85	49.91	42.9

Table 20 - Final awards gained by computing students studying the Computing and Ethics module 2001-2003

Analysis of Learning Styles and Group Behaviour mapped to assessment performance and usage produced varying results as evidenced in Appendix F, pp215-217 but employing this type of analysis then begs the question as to whether these are appropriate measures. For example, measurement of assessment outcomes is very much geared towards a more positivistic, scientific approach to research.

Thus, whilst such quantitative measures can be useful in Action Research it must be borne in mind that the meaning or significance of any information gained is necessarily context specific and therefore may not suggest actions to be taken.

4.4. Conclusions from this Chapter

Through incrementally developing a series of fieldwork studies it has been possible to systematically improve practice as well as to contribute to the body of knowledge regarding implementation of ACC within a campus-based HE context.

The research has, for example, uncovered a number of factors that have been found to have had an influence upon the integration of ACC within module design. Each of these factors has then not only been described within the context within which they have appeared but have subsequently been evaluated using both quantitative and qualitative instruments in order to develop practice.

Synthesizing findings gained from the whole series of fieldwork studies then facilitated formulation of a list detailing the major influencing factors found within this research.

Such factors have then been categorized according to the management information system model discussed in Chapter 3 (Bocij, et al, 2003) in order to identify their particular influence within each of the three decision making levels.

Finally these factors have been used to develop a generalised learning model for implementation of ACC within a predominantly campus based context of learning in order to inform and guide future implementation practice (See Chapter 5).

Chapter 5 – Conclusions and Recommendations

5.0 Introduction

This Chapter draws together the conclusions and recommendations that have been determined by this research. It therefore identifies the major factors found, during production of this thesis, to have had an influence upon the use of ACC within a campus-based HE context. Such factors have then been used to develop: detailed guidance on the impact of using ACC within a predominantly campus based context of learning; provision of a pedagogically sound foundation for designing a "mixed mode" context for supporting learning; a generalised learning model for implementation of Asynchronous Computer Conferencing (ACC) with campus based undergraduates. Finally a critique of the approach undertaken has been given together with ideas for further research.

5.1. Overall Conclusions

5.1.1. What are the major factors that influence the use of Asynchronous Computer Conferencing (ACC) within a campus-based HE context?

It has been concluded that the range of factors that encourage use of ACC is wide, and that good instructional design is essential whether it is online or face-to-face. Nevertheless specific factors have been identified from both the literature review and the fieldwork studies as having particular influence on the use of ACC. These have

then been categorised within the three management levels (Chapter 3) impacting implementation as detailed in Table 21:

Management level	Influencing Factors
Strategic	The HE Institution and its particular attitude towards academic development
	Academic orientations towards learning as well as attitudes towards use of the technology.
Tactical	Type of module chosen (focused/discursive)
	Integration of ACC with face-to-face contact time in module design.
	Proposed assessment techniques
Operational	Students' confidence in using the medium
	Introductory strategies and motivation – intrinsic and extrinsic rewards
	Group leadership
	Group behaviour
	Skills of group members – organizational, technical, critical analysis, communication
	Tutor intervention

Table 21 - Major factors that influence the use of Asynchronous Computer Conferencing (ACC) within a campus-based HE context.

5.1.2. Can a pedagogically sound foundation be formulated to underpin and justify the design of a "mixed mode" context for supporting learning?

A pedagogically sound foundation has been formulated to underpin and justify the design of a "mixed mode" context for supporting learning. Such foundation is based on the social constructivist model of learning (Vygotsky, 1978) and is illustrated within the PET framework for developing modules of study (See Appendix H). This framework has been implemented in designing the approach used in fieldwork studies 6 and 7 and is now providing a model for future module design where integration of ACC within F2F delivery is perceived as desirable to support learning and teaching.

5.1.3. What guidelines can support the successful integration of ACC within a campus-based HE environment?

Based on the literature review and fieldwork studies the following incremental set of guidelines have been developed to support successful integration of ACC within a campus-based HE context:

- Choose an appropriate, focussed module that has a discursive nature requiring development of critical analysis. (See fieldwork study 1)
- Design module delivery according to the PET framework outlined in Appendix H. This will include determining strategies for integrating use of the ACC

environment into the F2F sessions as well as defining how such use is going to be assessed. (See fieldwork study 3)

- Brief students as to the monitoring that will be undertaken and how they are expected to use the environment (See fieldwork study 4).

- Propose introductory exercises for students to undertake using the technology. (See fieldwork studies 5 and 7).

- Encourage students within the F2F contact sessions to organise themselves and use the conferencing environment effectively. (See fieldwork study 1)

- Facilitate consideration of group roles in strategy development and implementation. (See fieldwork study 7)

- Encourage development of critical evaluation and responsibility for learning through adopting a non-moderating role within the conferencing environment. (See fieldwork studies 3. 4, 5, 6, and 7)

- Monitor the environment on a regular basis to pick up any issues that can then be addressed in the F2F contact sessions. (See fieldwork study 3)

- Facilitate both intrinsic and extrinsic reward for using the conferencing environment. (See fieldwork studies 5, 6 and 7)

These guidelines have now been placed within an activity framework in order to provide a generalised learning model for implementation of ACC within a predominantly campus based context of learning. (See Table 22):

CONFERENCING ACTIVITY	*TUTOR ACTIVITY*	*STUDENT ACTIVITY*
Preparation for conferencing activity	Choose module Design delivery (PET framework) Set up exercises: • To provide extrinsic reward • Introductory exercises Brief students	Develop skills: • Critical evaluation • Groupwork • IT
Ongoing conferencing activity	Encourage Monitor Integrate with F2F Assessment	Socialise Form group strategy On task Task completion Adjourning

Table 22 – A generalised learning model for implementation of ACC within a predominantly campus based context of learning

5.2. Guidance on the impact of using ACC within a predominantly campus based context of learning.

Based on findings related to the impact of using ACC within a predominantly campus-based context of learning the recommendations formulated are that:

- The approach to module design needs to be holistic and incorporate usage of the ACC environment (i.e. there needs to be a strong link between module objectives/learning outcomes and the use of the technology). If such usage is not designed into module delivery then campus-based students are unlikely to use it.
- The module chosen needs to be focussed and have key elements that require discussion.
- Use of the technology should enhance the learning experience rather than necessarily replacing face-to-face contact.
- In order to address the ethical issues involved, students be "briefed" as to expectations of them in using the system.
- Students be given an explanation of how the tutor will be monitoring their activity.
- Staff and students be made aware of both the intrinsic and extrinsic benefits than can be gained from using the technology.
- Tutors be aware that patterns of communication will be affected by their intervention should they adopt this role.
- Strategies be developed to raise students' awareness of group roles and team working to overcome their lack of organisational skills.
- Time be given for students to socialise to build their confidence in using the medium.
- Time be given to setting up and monitoring the environment

- Issues raised within the conferencing environment be followed up in the F2F contact sessions.
- Negotiation be undertaken when operating over multiple campuses with multiple tutors in order to reach consensus over approach and assessment.
- Tutors be aware that students on the same campus are likely to set up F2F meetings or synchronous chat to supplement conference discussions. Tutors will then need to decide whether or not this is desirable in relation to the particular learning outcomes they are seeking to achieve through use of the ACC environment.

5.3. Critique of approach and further research

The CRASP framework for Action Research (Critical (and self-critical) collaborative enquiry by **R**eflective practitioners being **A**ccountable and making the results of their enquiry public, **S**elf–evaluating their practice and engaged in **P**articipative problem-solving and continuing professional development) was undertaken for developing this thesis. As such the research proceeded through a series of cycles that involved planning, acting, observing and reflecting in line with the Lewinian experiential learning model (Kolb, 1984). Furthermore the method of research necessarily involved participation, collaboration and group decision making between both staff and students and this has clearly been undertaken.

Use of the CRASP approach to research was, therefore, valid in that it

- Supported the necessary and iterative development of the fieldwork studies to improve learning and teaching practice.
- It required reflection upon and dissemination of findings, which then meant that module design became a participative process that enhanced understanding. For example, the points of view of both students and staff were elicited in an authentic context and this then lead to redesign and modification of how ACC was integrated within module delivery.
- Results from the research have been disseminated to colleagues for peer review. This has subsequently led to development of guidelines for best practice that have been implemented for integrating ACC within module delivery in a campus-based HE context. Such dissemination has, as a consequence, made a significant contribution to the field of knowledge.

Using the CRASP approach could, however, have limitations in situations where collaborative enquiry is inappropriate or where adopting a quantitative approach might be more efficient. For example, conducting the series of fieldwork studies required a great deal of time in terms of setting up, development and evaluation. However, the results whilst largely qualitative in nature, have been related to the specific context in which they were conducted which is the nature of undertaking Action Research – "collaborative exploration helps practitioners, agency workers, client groups, and other stakeholding parties to develop increasingly sophisticated understandings of the problems and issues that confront them" (Stringer, 1999). This meant, of course, that only a generalised model for implementation could be produced rather than prescriptive

guidelines as might be produced by a more positivistic, scientific approach to research. However, in a complex environment where there are a variety of possible solutions and where the aim of the research is to develop practice then the CRASP approach has proved to have been entirely appropriate – this research has, for example, made a significant difference to the way practitioners approach the integration of technology and, in particular, asynchronous computer conferencing within their module delivery and design.

As regards the evaluative instruments used within the fieldwork studies there were a variety of conclusions drawn. For example, use of the Learning Styles Inventory (LSI) was only used within one fieldwork study because, whilst useful in getting students to reflect upon their own and their peer's particular approaches to learning, this was not found to be particularly relevant when looking at the group context. The Belbin Self-Perception Inventory was, therefore, used in preference to the LSI. Use of the Moral Judgement Test (MJT) also proved to be problematic as it was conducted over too short a time period and produced some very mixed results. However, transaction analysis (Wortham, 1999), the Belbin (1981) Self-Perception Inventory, questionnaires, semi-structured interviews and the Community of Inquiry Model (Garrison, 2001) all proved to be extremely useful as general instruments for analysing findings from the conferencing activity. As such, these evaluative instruments then enabled development of a generalised learning model that can now be applied outside of the subject specific context. Further research is, however, required in order to discover whether there is any significant correlation between group role preferences and the types of messages posted. This could be achieved by undertaking further mapping of the identified Belbin (1981)

type preferences to the identification of message types using either the Garrison (2001) model or through identification of a finer-grained set of classifications. Interaction Theory (Bales, 1970) could, for example, be used to give a more rigorous evaluation of each individual's contribution to the discussion as this instrument is concerned with the overt interpersonal behaviour between members of the group and takes into account both qualitative and quantitative considerations. As the basis of such interaction analysis is that everything that a group says or does, including non-verbal acts, body posture, facial expressions and tone of voice, may be coded this would, of course, have to be adapted to suit a text-based virtual environment. For example, use of emoticons, abbreviations and capitalisation might be coded.

Other virtual group dynamics related to cohesiveness, culture, group norms, gender, motivation and stages of development are additional areas that might be further researched in order to provide a fuller understanding of CSCL environments within a campus-based HE context. For example, such factors might then be related to individual or group use of discussion threads within a conferencing environment as these can tend to appear threatening by virtue of the fact that some students are not quite sure how to use them. A further issue in this regard relates to the length that the threads sometimes achieve. These can, at times, become intimidating in terms of there being too much information therefore the setting up of message folders that contain messages related to a particular topic may help in reducing the "information overload" that some students feel in using the conferencing environment.

Nevertheless the research undertaken in production of this thesis has made a sound and original contribution to the field of knowledge in as much as it has identified a number of influencing factors using both quantitative and qualitative instruments. Such findings have then been published in a substantial number of peer-reviewed, journal, conference and seminar papers (see Appendix G, pp246-249).

In addition, this research has now led to significant development in current and ongoing academic practice with regard to the integration of networked learning technologies within module design. Evidence for this can, for example, be seen in the pedagogically based implementation guidelines that have been developed and then used in the setting up of three international collaborative fieldwork studies. Furthermore, such guidelines are now being used to facilitate other colleagues to successfully integrate computer conferencing with face-to-face (F2F) strategies when adopting a blended or "mixed modes" approach to module design and delivery within a campus-based HE context.

Overall this research has fulfilled the primary aims initially outlined in Chapter 1. These were to add to the body of knowledge, and to systematically improve practice through gaining a greater understanding of how the learner, the learning task and a particular technology (asynchronous computer conferencing) interact within a campus-based HE environment.

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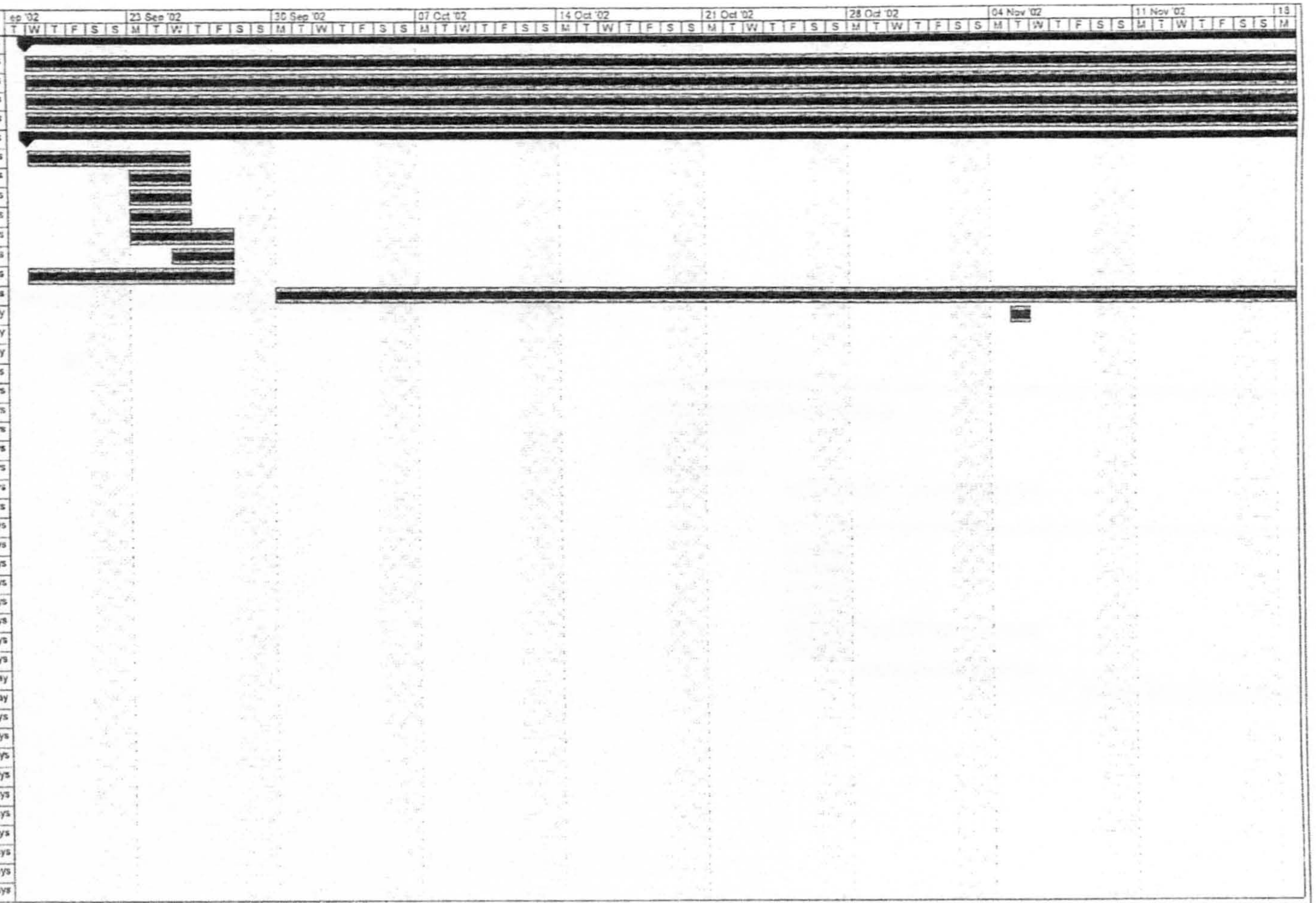
APPENDIX A

PROJECT PLAN

ID		Task Name	Duration
1	✓	Literature Review	300 days
2	✓	CSCL	300 days
3	✓	Technology	300 days
4	✓	Learning Styles	300 days
5	✓	Group Behaviour	300 days
6	✓	Fieldwork study 6	77 days
7	✓	Apply PET framework to module	5 days
8	✓	Specify techiques for integration	3 days
9	✓	Determine f2f techniques	3 days
10	✓	Determine degree of moderation	3 days
11	✓	Pre-implementation	5 days
12	✓	Determine evaluation techniques	3 days
13	✓	Design	8 days
14	✓	Implementation	69 days
15	✓	Belbin Group behaviour	1 day
16	✓	Learning styles questionnaire	1 day
17	✓	Questionnaire distribution	1 day
18	✓	Analysis of findings	55 days
19	✓	Garrison Model	10 days
20	✓	Learning Styles	5 days
21	✓	Group Behaviour	2 days
22	✓	Transaction analysis	5 days
23	✓	Student questionnaires	10 days
24	✓	Mapping to outcomes	10 days
25	✓	Fieldwork study 7	80 days
26	✓	Apply Revised PET framework	3 days
27	✓	Specify techiques for integration	3 days
28	✓	Determine f2f techniques	3 days
29	✓	Determine degree of moderation	3 days
30	✓	Pre-implementation	10 days
31	✓	Determine evaluation techniques	3 days
32	✓	Design	7 days
33	✓	Implementation	70 days
34	✓	Belbin Group behaviour	1 day
35	✓	Questionnaire distribution	1 day
36	✓	Analysis of findings	85 days
37	✓	Garrison Model	20 days
38	✓	Group Behaviour	20 days
39	✓	Transaction analysis	20 days
40	✓	Student questionnaires	20 days
41	✓	Mapping to outcomes	20 days
42	✓	Production of:	10 days
43	✓	Generalised learning model	10 days
44	✓	Guidance on using ACC	10 days
45	✓	Writing up of Final Report	150 days



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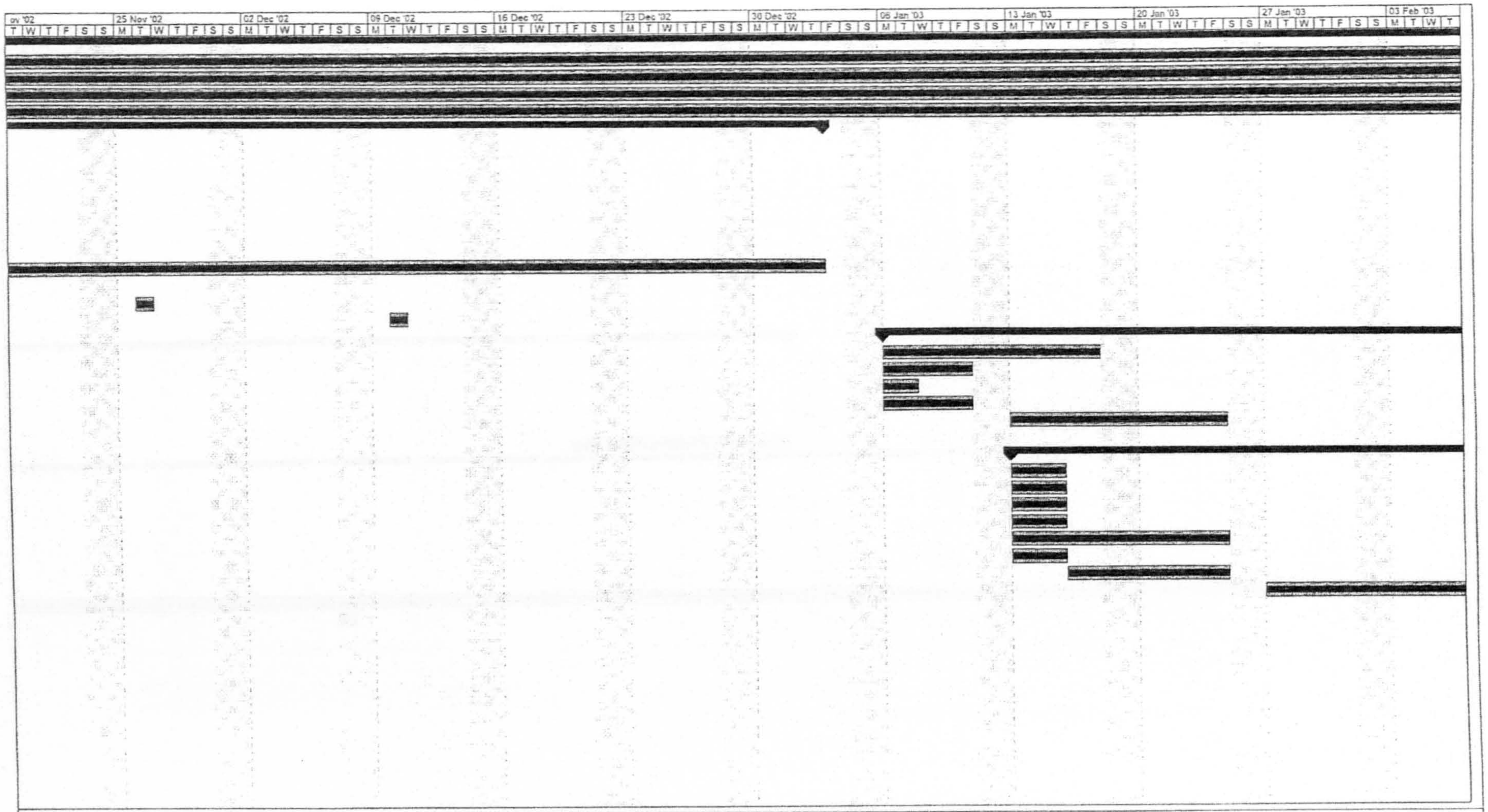
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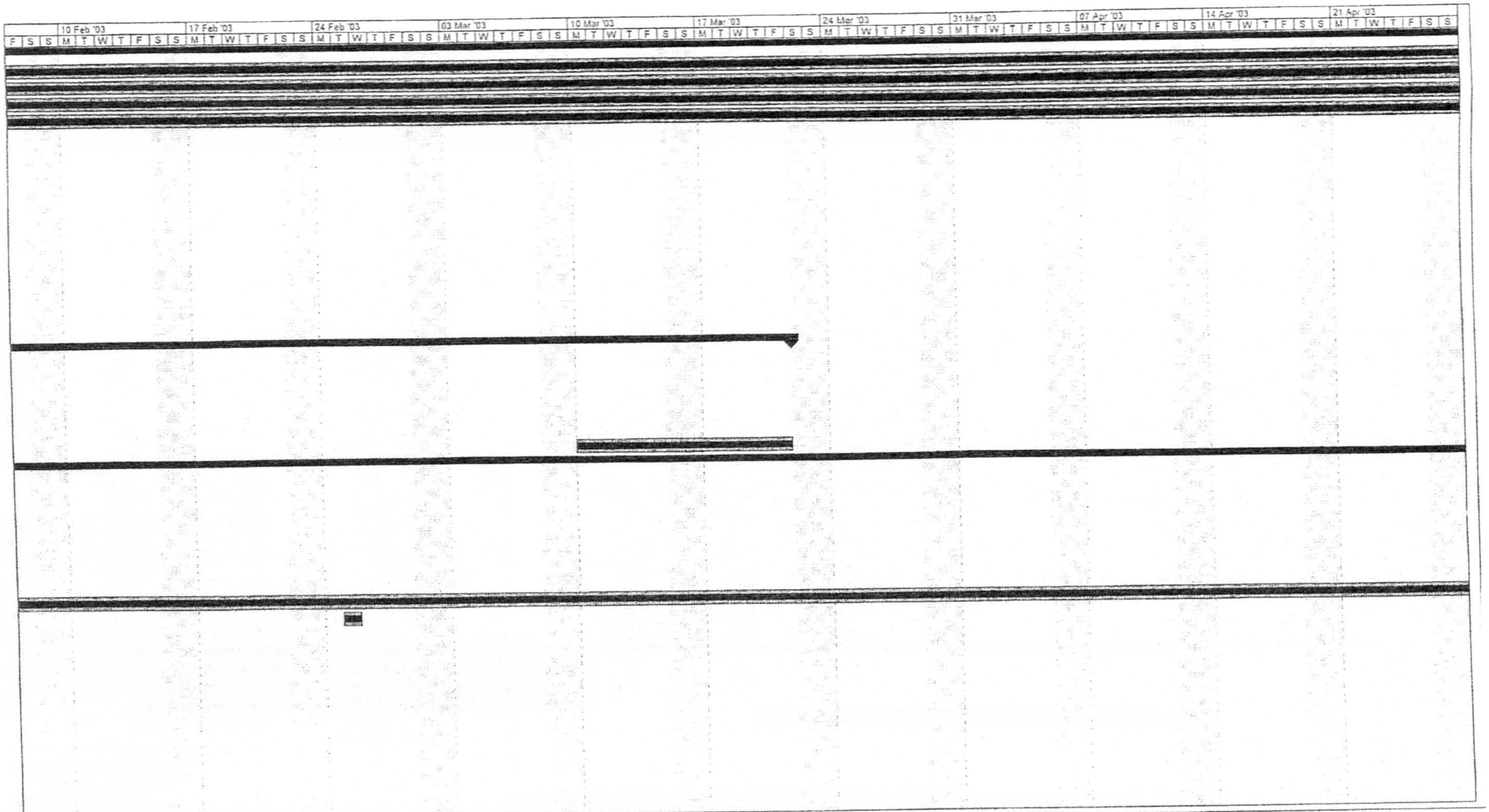
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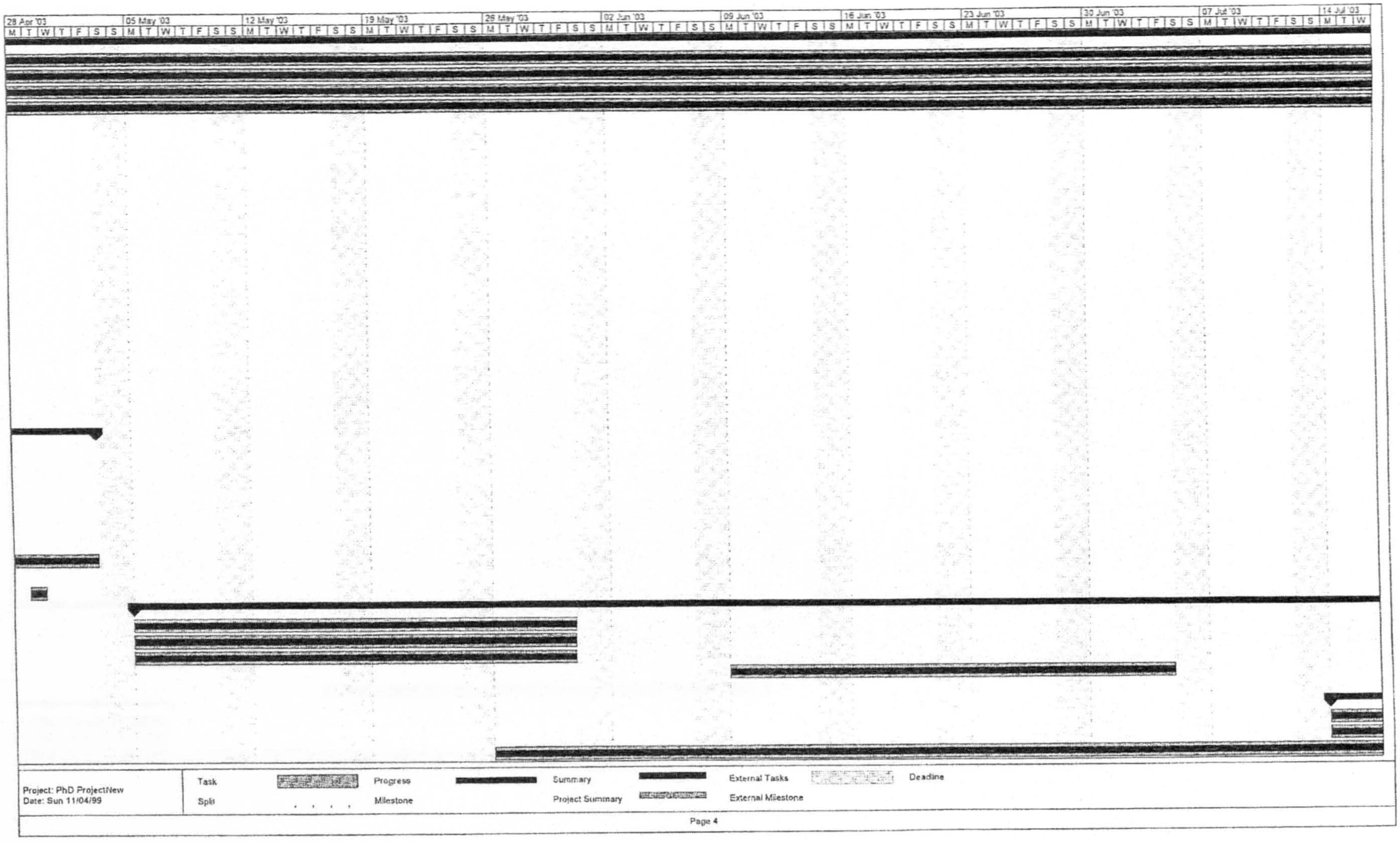
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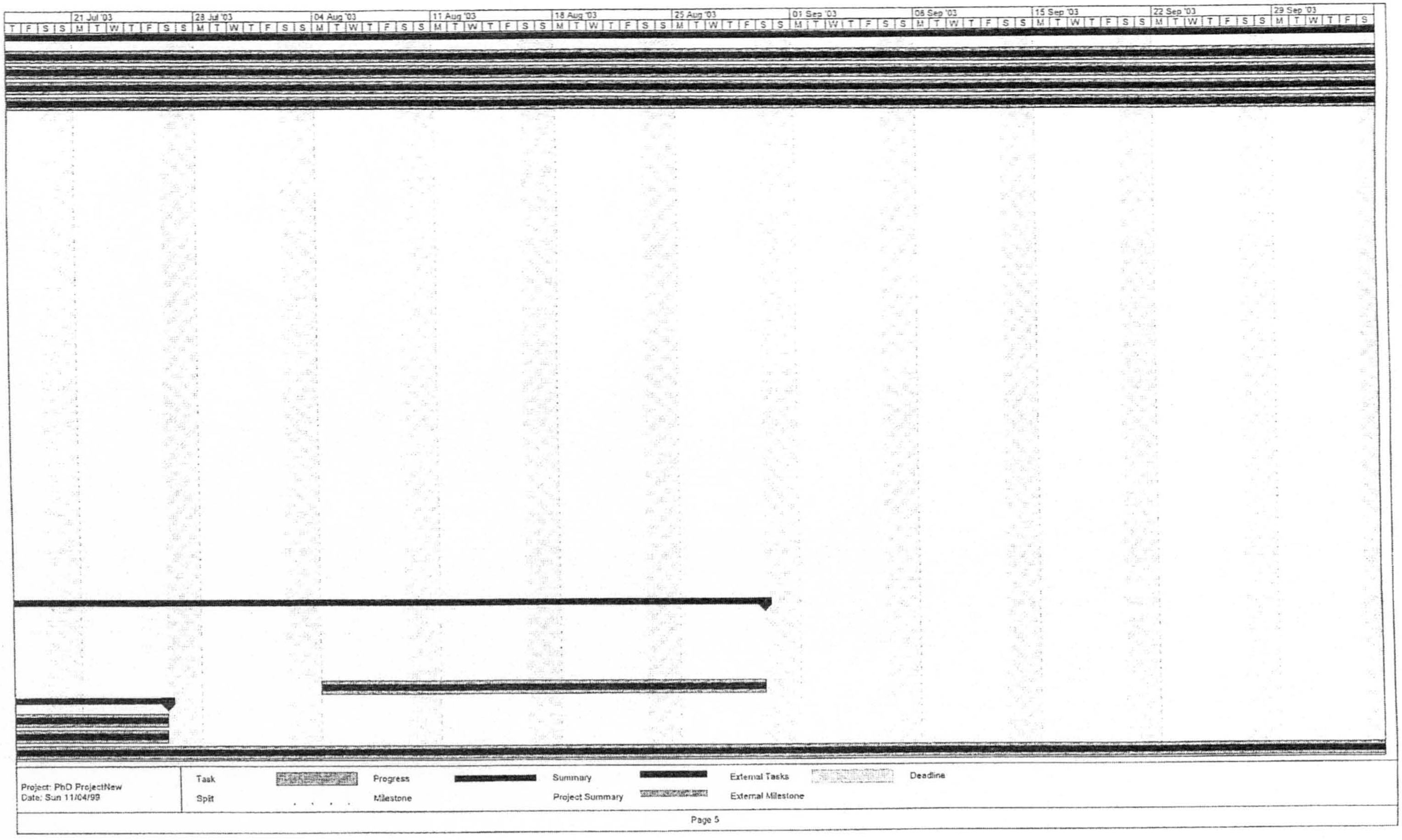
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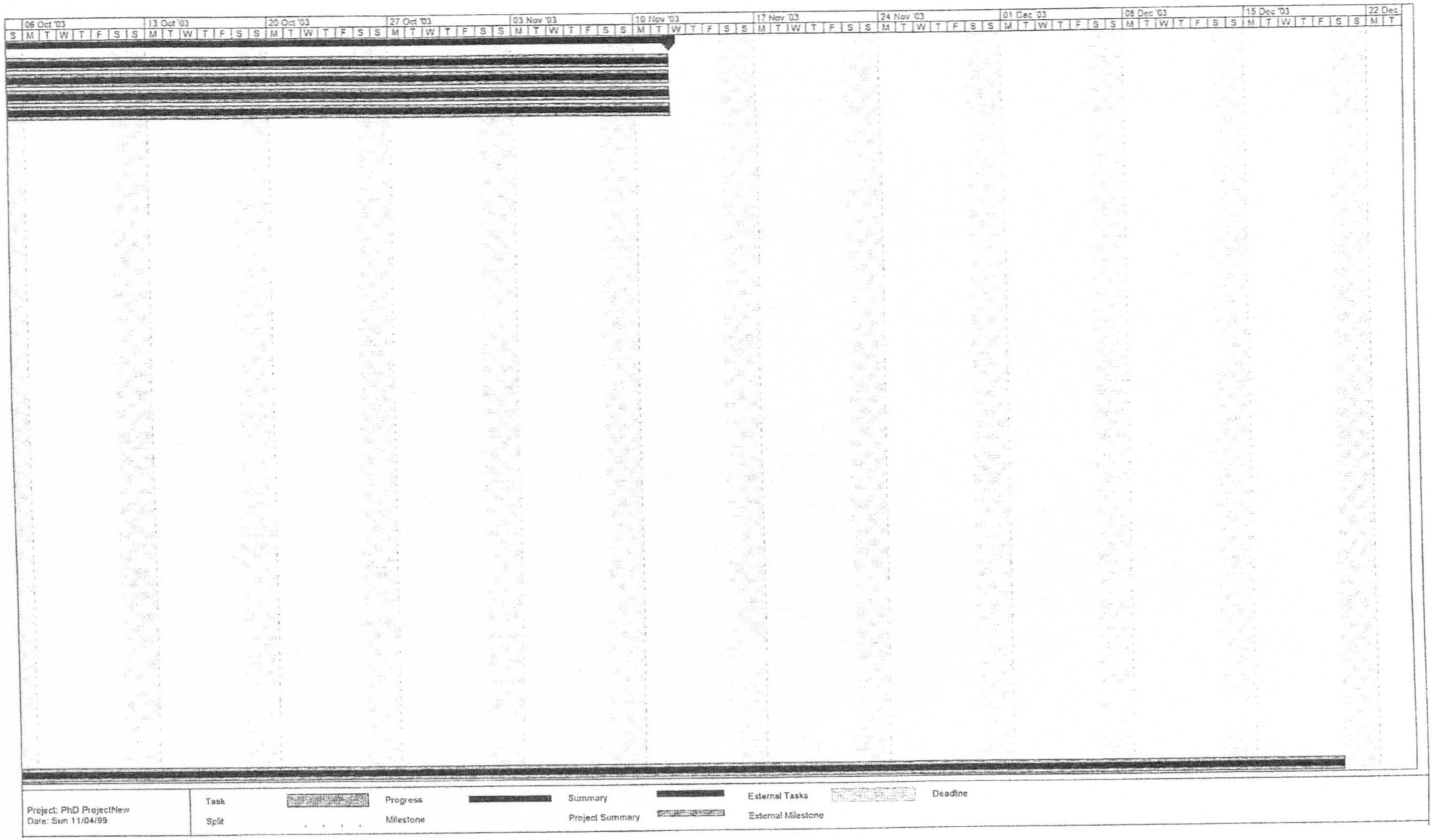
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APPENDIX B

DIMENSIONS OF LEARNING

APPENDIX B

Dimensions of Learning

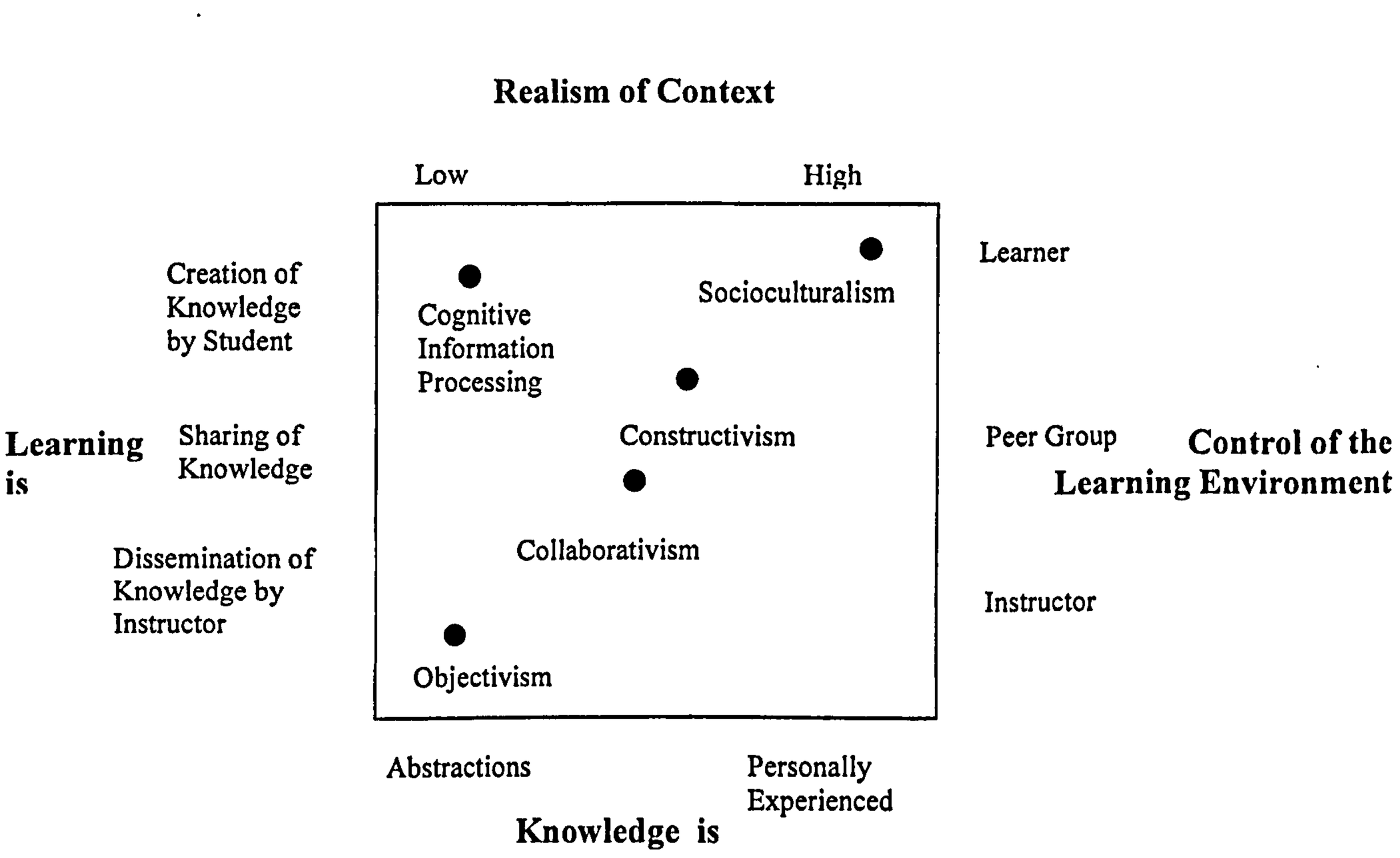


Figure 1 - The Dimensions of the Learning Theories (Leidner & Javernpaa, 1995)

APPENDIX C

TECHNOLOGY REVIEW

APPENDIX C

Technology Review

Initial evaluation of some of the more widely used technology for supporting asynchronous computer conferencing was undertaken in order to determine the different functionality of each environment. The following table illustrates these findings:

Facility	Learning Space	WebCT	Blackboard	*Virtual University*	*BSCW*	*First Class*
Schedule Manager	√					
Web based pages and links		√	√	√	√	√
Asynchronous communication – "threaded discussions", email	√	√	√	√	√	√
Synchronous communication- "chat", whiteboard, video and teleconferencing	√	√	√	√	√	√
On-line quizzes	√	√				
Image repository	√	√				
Glossary database		√				
Learner collaboration and presentation areas	√	√	√		√	
Tracking student access	√	√	√	√	√	√
Basic information on participants	√	√		√	√	
Preferences					√	
Interactive Simulations						√

1. BSCW

The Basic Support for Cooperative Work (BSCW) developments have been partially funded by the European Union through the CoopWWW project and the CESAR project of the EU's Telematics Applications Programme. Partners of these projects contributed to the development of the system.

The BSCW system supports collaboration by providing **shared workspaces** over the Internet. A shared workspace allows storage and retrieval of documents and sharing information within a group. This functionality is integrated with an event mechanism to provide each user with an awareness of the activities of others within the workspace. BSCW comprises numerous features, e.g., support for threaded discussions, version management and upload of documents, group management, search features and many more. The system is designed primarily to support self-organising groups.

2. WebCT

WebCT is the world's leading provider of integrated e-learning systems for higher education and provides tools for: course development and management tools; statistical tools; content management tools; communication and collaboration tools; assessment tools; personal information management tools; academic web resources; and system management tools. Using these tools the following facilities are available: publication of learning materials (including links to module-related websites); publication of announcements; provision of a range of collaborative tools including discussion boards and chat rooms; communication tools including email. All files are stored on the WebCT. By using this 'shell' approach an instructor can build up a course site for any module with different types of learning materials and can use a range of communication tools to assist with the management and assessment of the module. Students can share files and use communication tools to contact other students and the lecturer either synchronously or asynchronously.

3. Blackboard

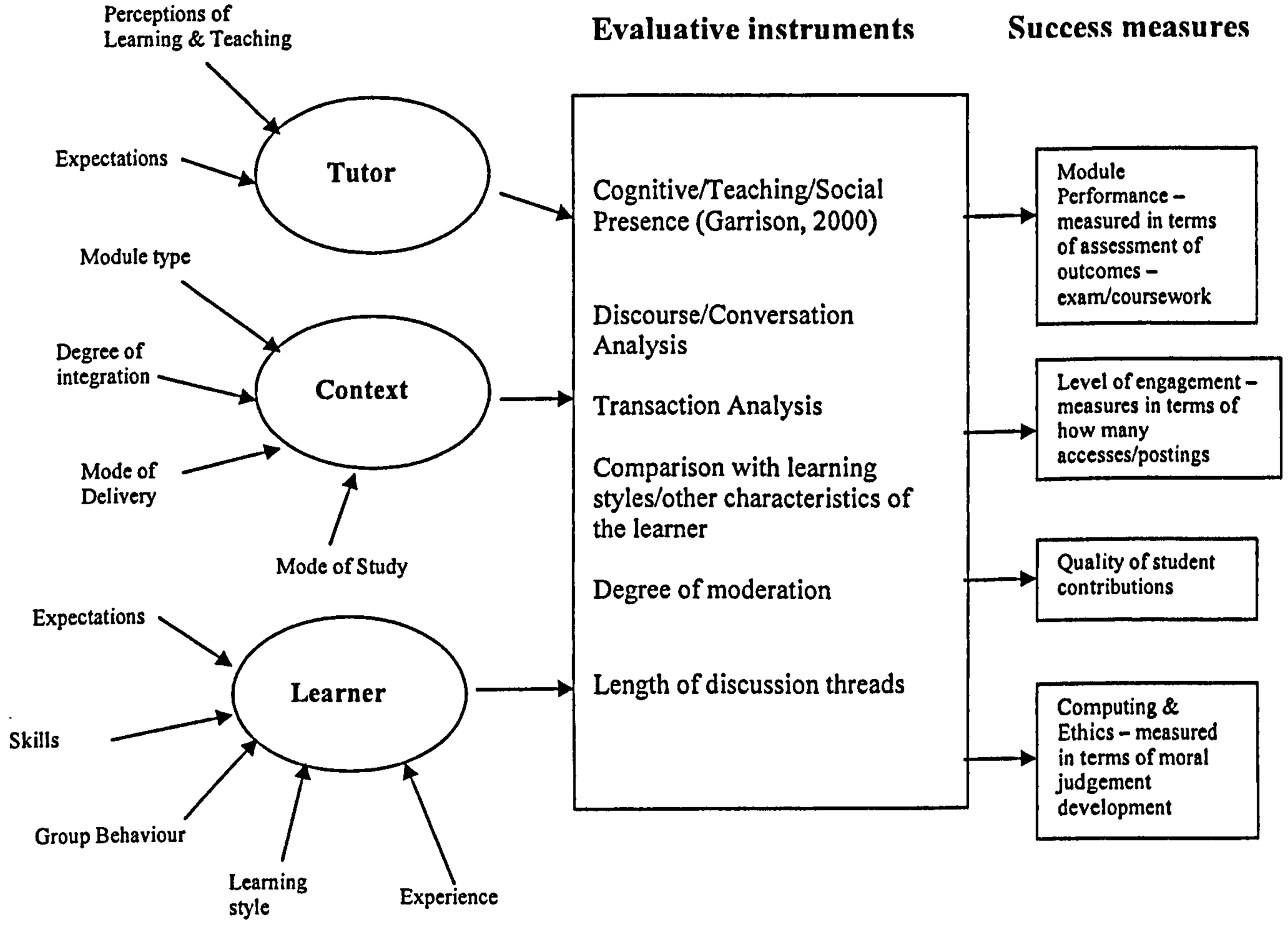
The Blackboard system is another integrated set of web-based tools designed for the creation and management of a learning environment and offers very similar functionality to that provided by WebCT. The interface design of Blackboard relies on buttons and menu bars as opposed to Icons as used in WebCT.

APPENDIX D

ASPECTS OF CSCL RESEARCH

APPENDIX D

Aspects of CSCL Research



APPENDIX E

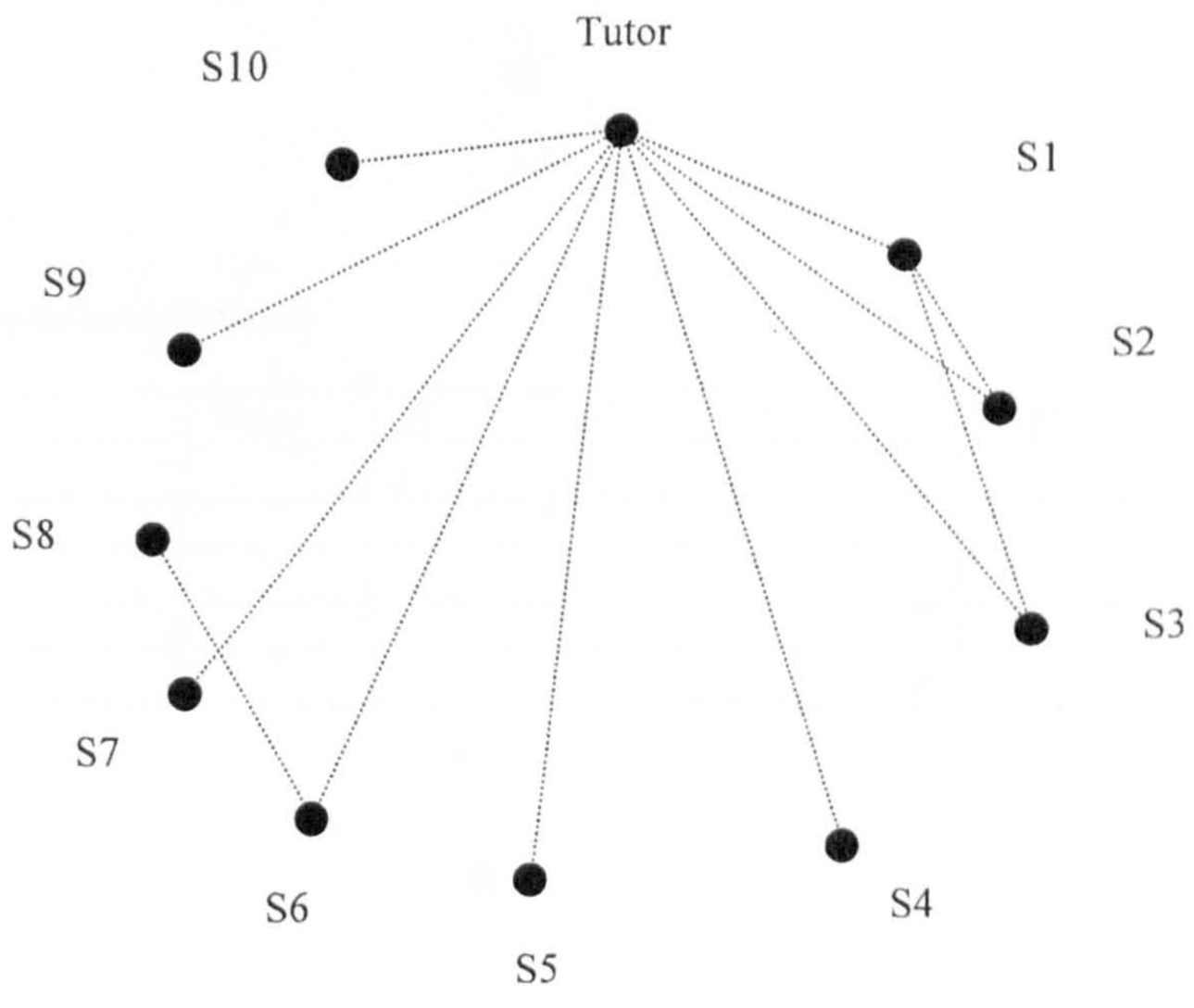
TRANSACTION ANALYSES
(Fieldwork Studies 2 – 7)

Fieldwork Study 2 – Milton Keynes only – Semester 1, 2000

Tutor entering into the discussion thread

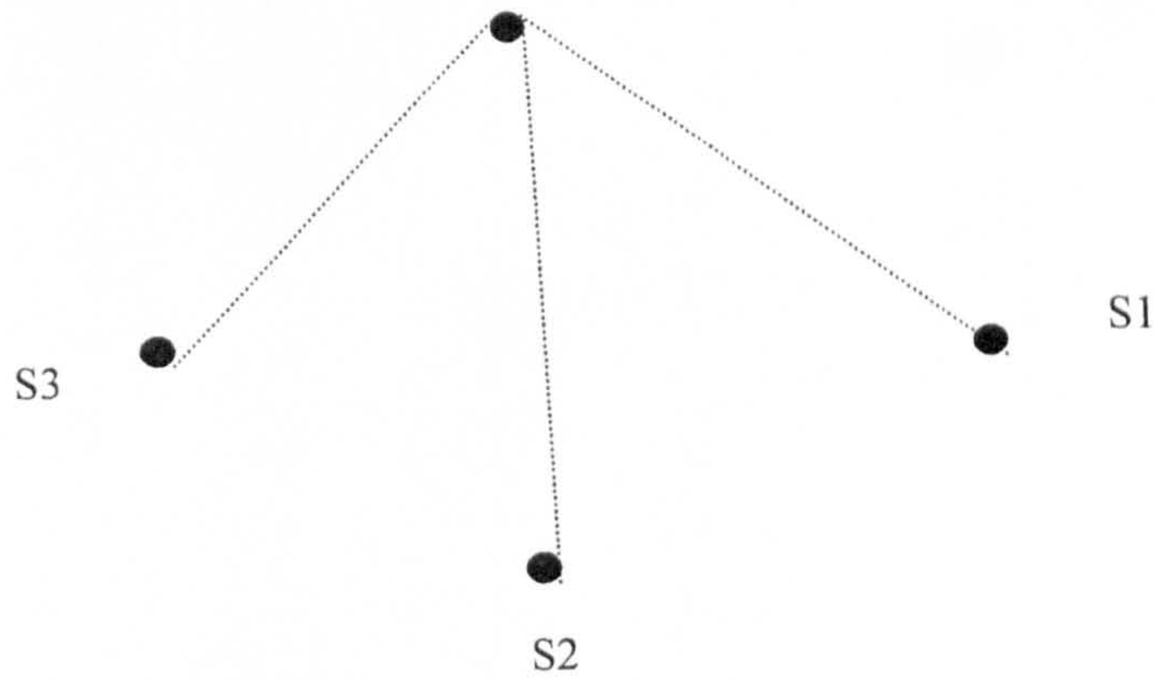
Thread - Mis-use of Data

	Tutor	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	CD(Pk)
Tutor		1	1	1	1	1	1	1		1	1	9
S1			1	1								2
S2												0
S3												0
S4												0
S5												0
S6												0
S7									1			1
S8												0
S9												0
S10												0



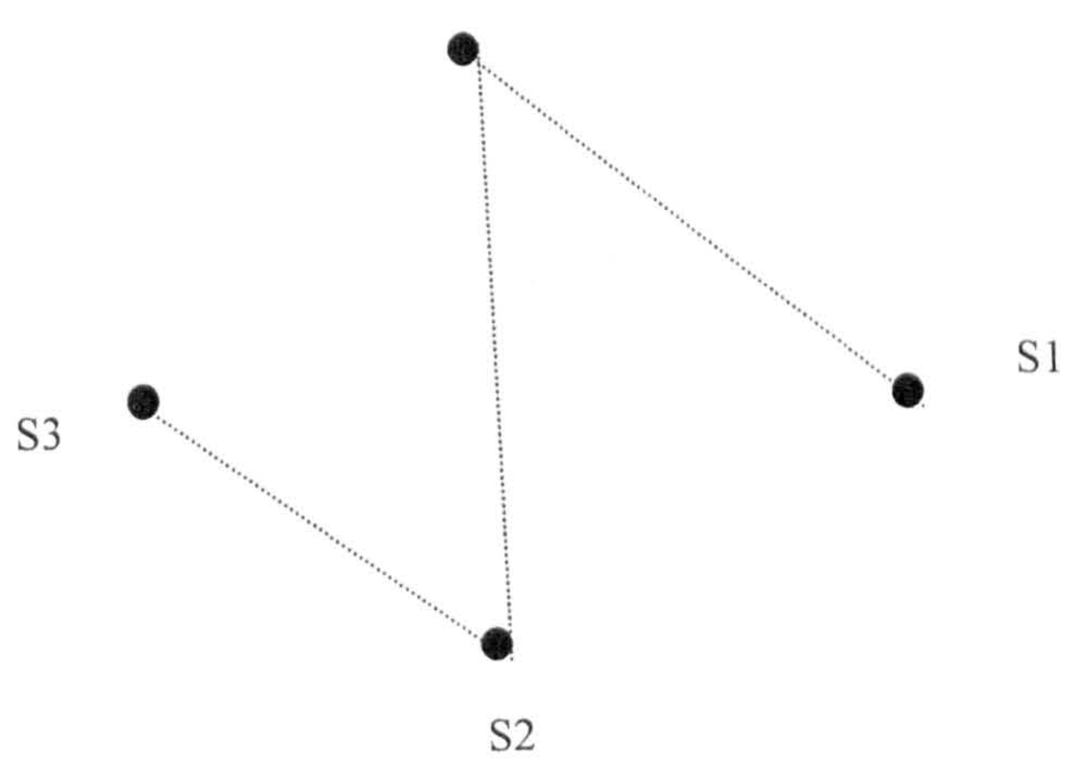
Thread – Cybermen & Cyberwomen

	Tutor	S1	S2	S3	CD(Pk)
Tutor		1	1	1	3
S1					0
S2					0
S3					0



Thread – The Internet Worm

	Tutor	S1	S2	S3	CD(Pk)
Tutor		1	1		2
S1					0
S2				1	1
S3					0



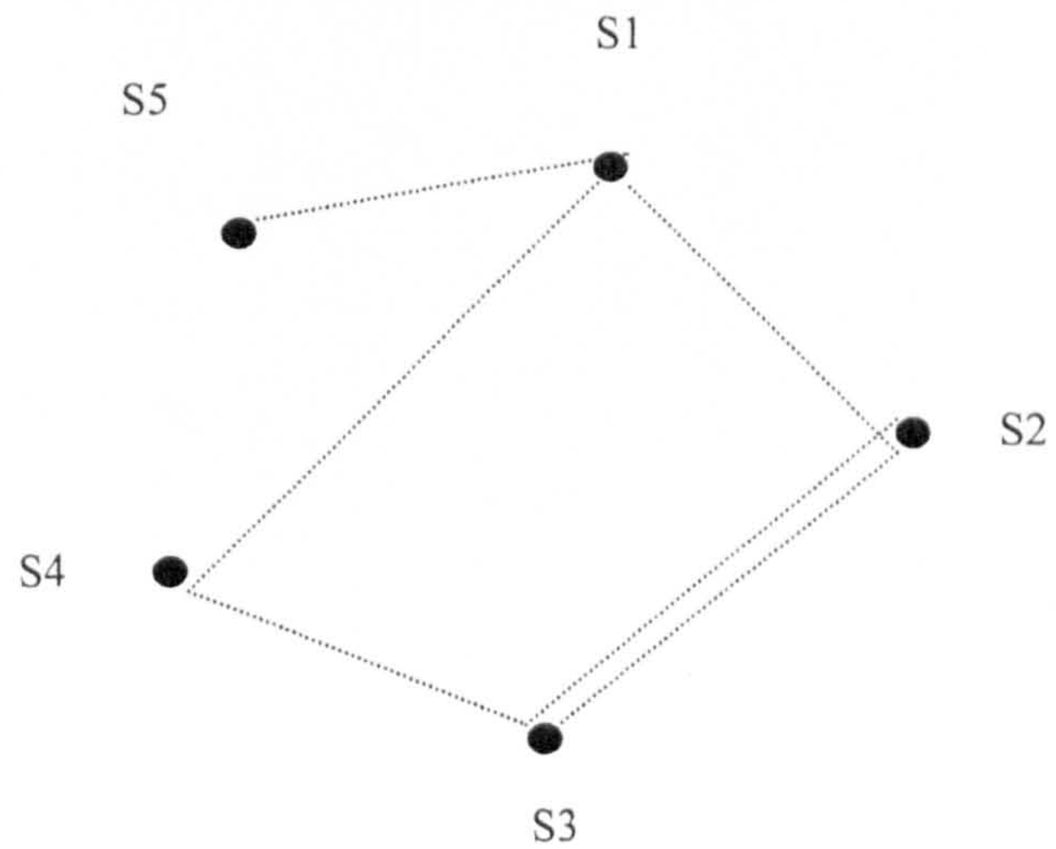
Tutor <u>not</u> involved in the discussions

Thread - Computer & Ethics

	S1	S2	S3	CD(Pk)
S1		1		1
S2			1	1
S3				0

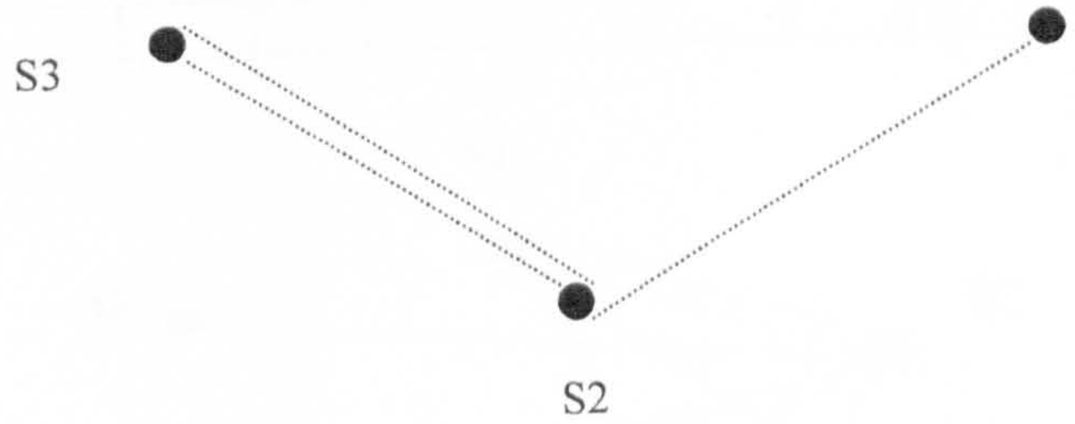
Thread - Covert Monitoring of WebCT

	S1	S2	S3	S4	S5	CD(Pk)
S1		1		1	1	3
S2			1			1
S3		1		1		2
S4						0
S5						0



Thread - Copyright

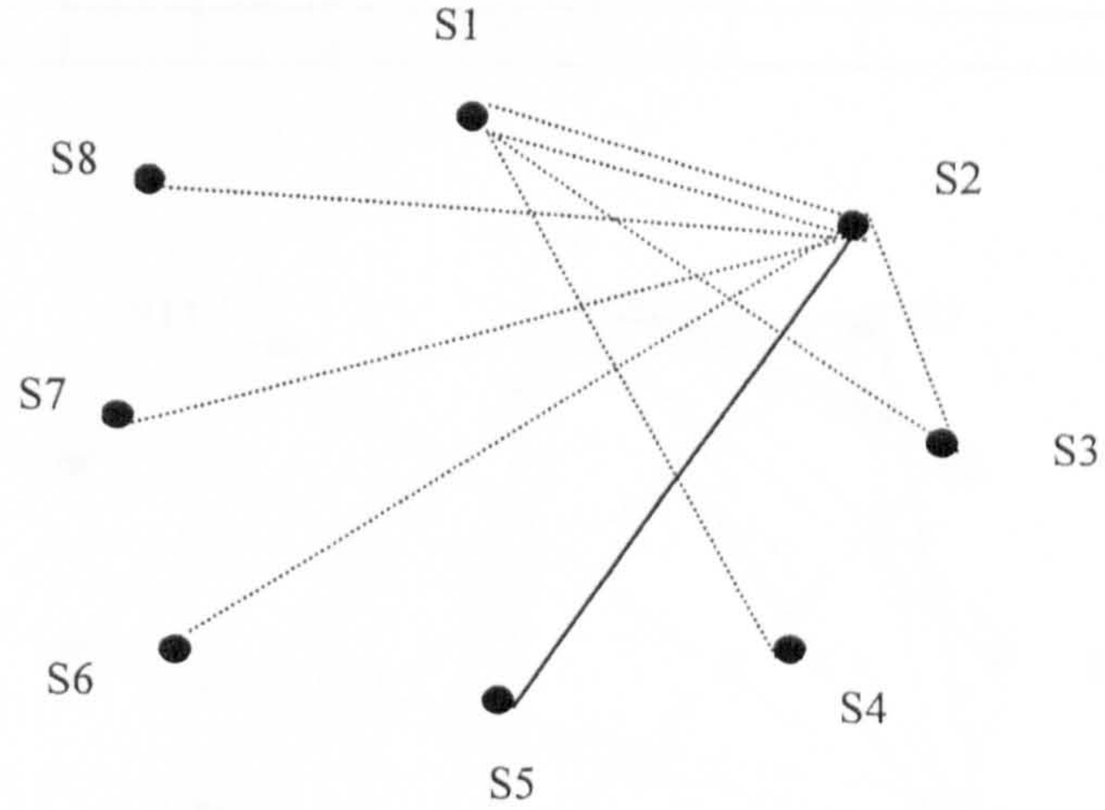
	S1	S2	S3	CD(Pk)
S1		1		1
S2			1	1
S3		1		1



Fieldwork Study 3 – Semester 2, 2001 – Leicester and Denmark

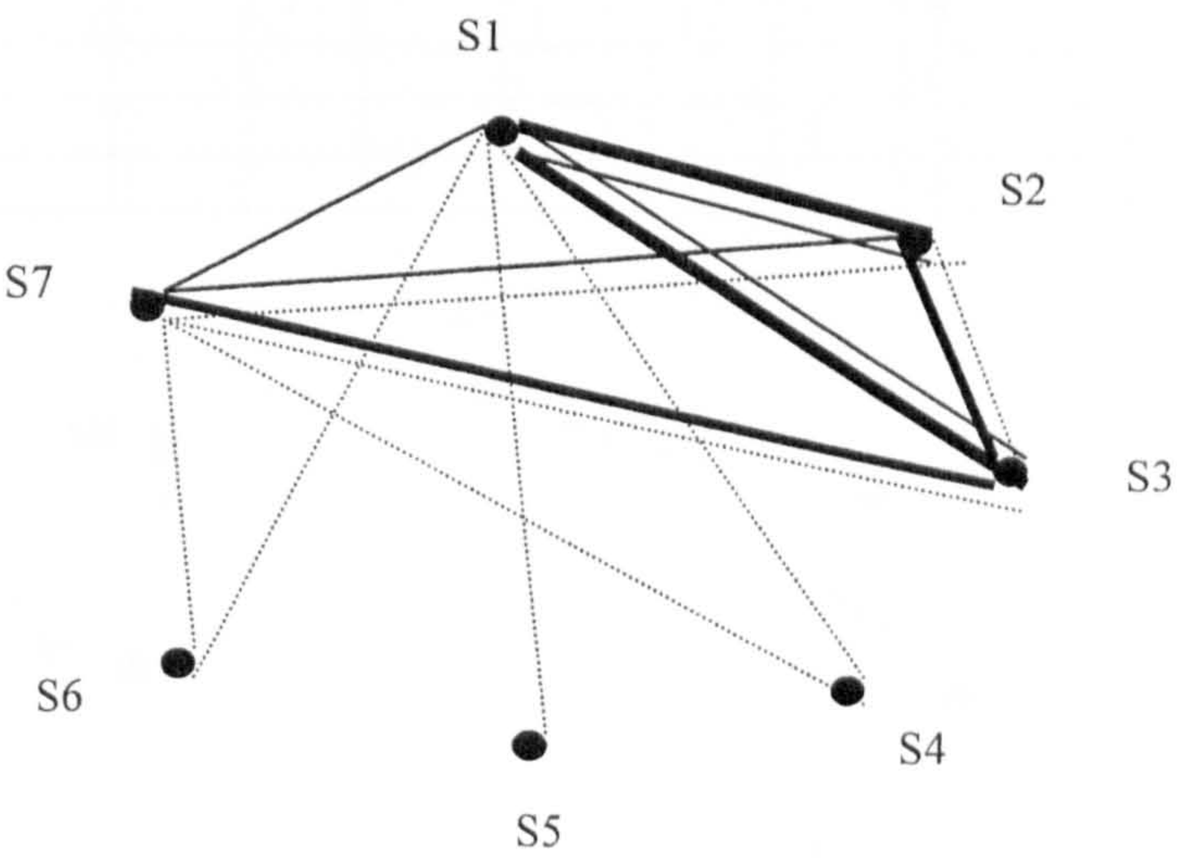
Thread – 1ST Message?

	S1	S2	S3	S4	S5	S6	S7	S8	CD(Pk)
S1		1		1					2
S2	1		1		2	1	1	1	6
S3	1								1
S4									0
S5									0
S6									0
S7									0
S8									0



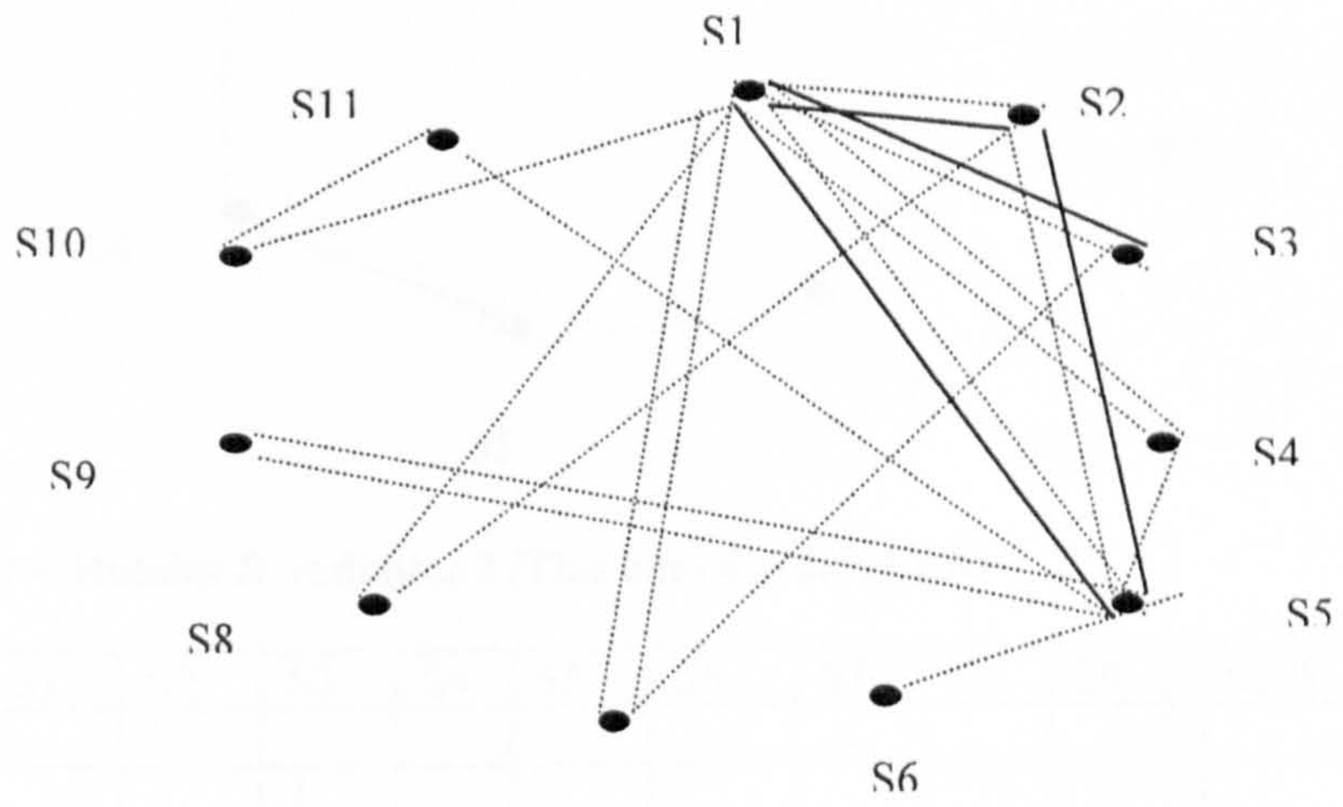
Thread – equality of access

	S1	S2	S3	S4	S5	S6	S7	CD(Pk)
S1		4	2	1	1	1		5
S2	2		3				1	3
S3	4	1					1	3
S4								0
S5								0
S6							1	1
S7	2	2	3	1				4



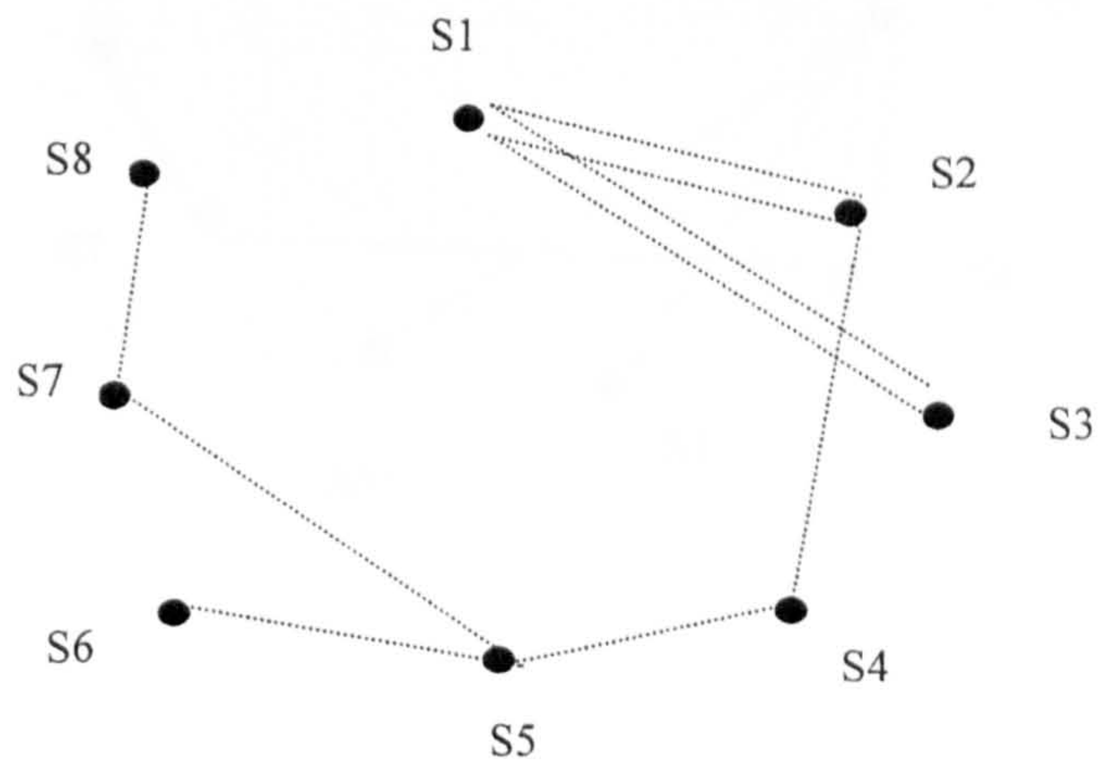
Thread – Case study 5.3

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	CD(Pk)
S1		2	2	1	2		1	1		1		7
S2	1				2							2
S3	1						1					2
S4	1											1
S5	1	1		1		1			1			5
S6												0
S7	1											1
S8		1										1
S9					1							1
S10											1	1
S11					1							1



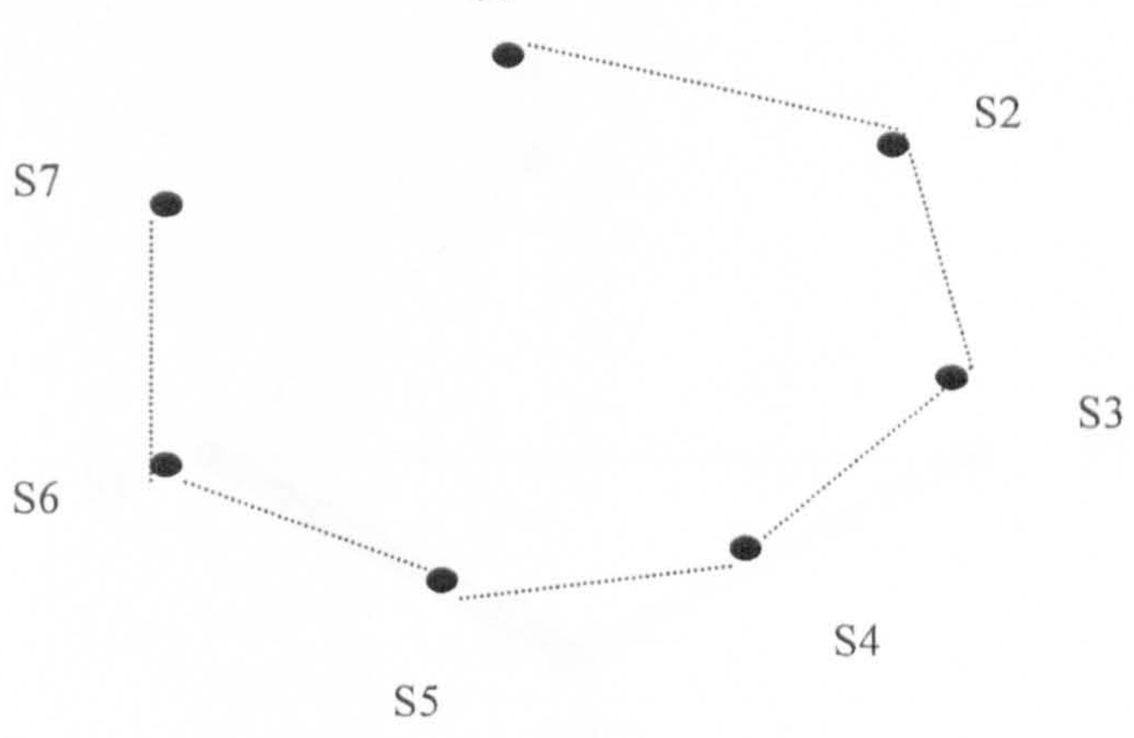
Thread – How about these CrAzY smart cards then!!!

	S1	S2	S3	S4	S5	S6	S7	S8	CD(Pk)
S1		1	1						2
S2	1			1					2
S3	1								1
S4					1				1
S5						1	1		2
S6									0
S7								1	1
S8									0



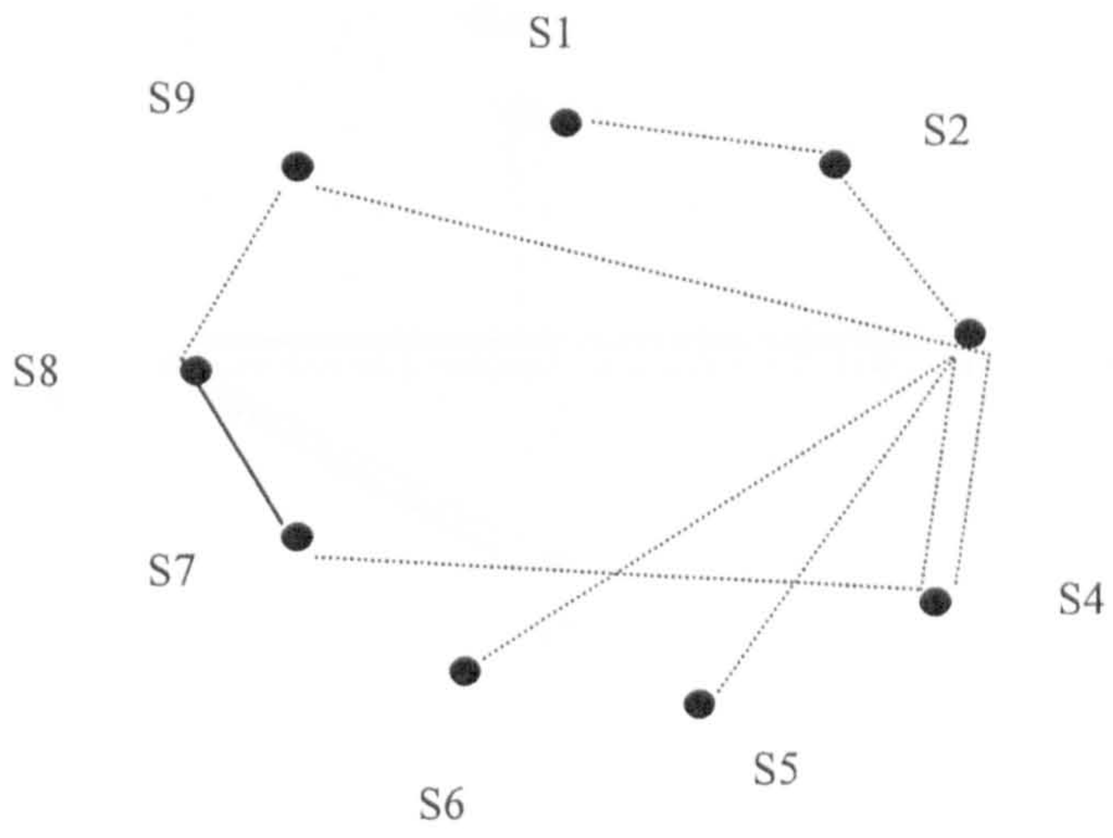
Thread – Some points regarding this course

	S1	S2	S3	S4	S5	S6	S7	CD(Pk)
S1		1						1
S2			1					1
S3				1				1
S4					1			1
S5						1		1
S6							1	1
S7								0



Thread – Mobiles & radiation? (This ones 4 u darren B)

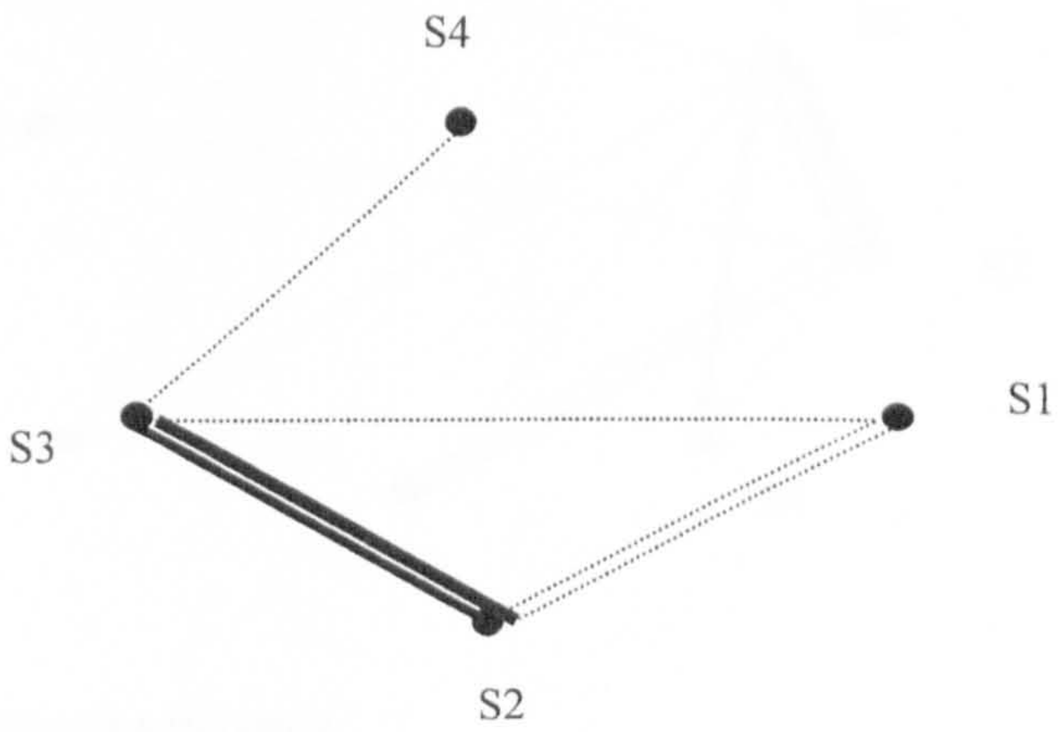
	S1	S2	S3	S4	S5	S6	S7	S8	S9	CD(Pk)
S1		1								1
S2			1							1
S3				1	1	1			1	4
S4			1				1			2
S5										
S6										
S7								2		1
S8										
S9								1		1



Fieldwork Study 4 – Semester 1, 2001 – MK and Leicester

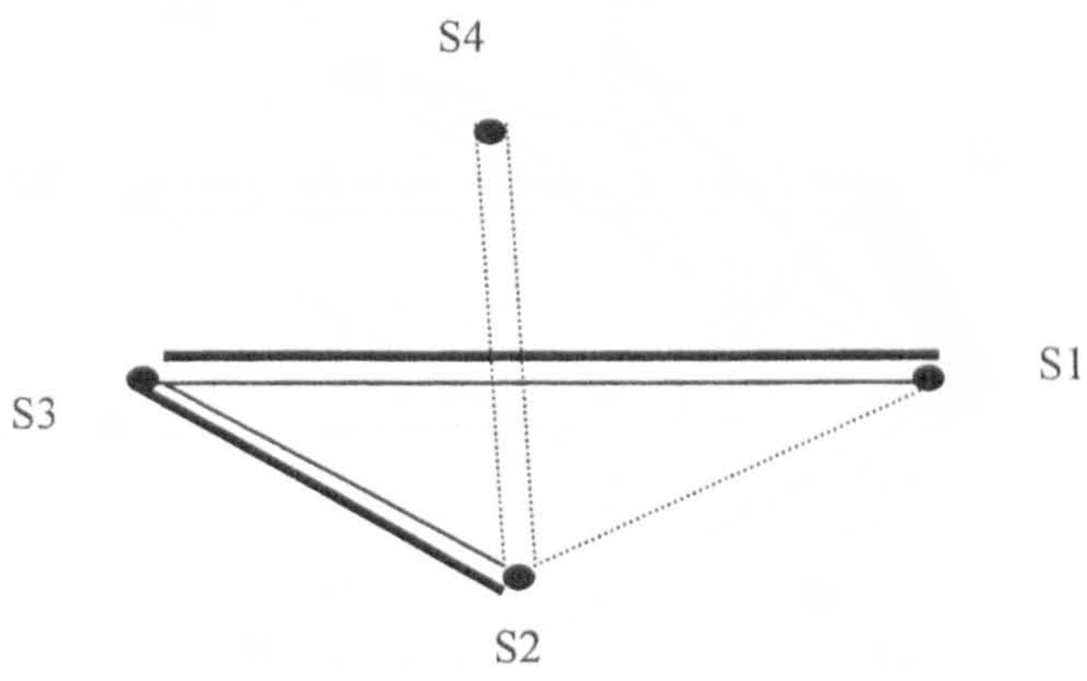
Thread – Cyberspace – Hell?

	S1	S2	S3	S4	CD(Pk)
S1		1	1		2
S2	1		4		2
S3		3		1	2
S4					0



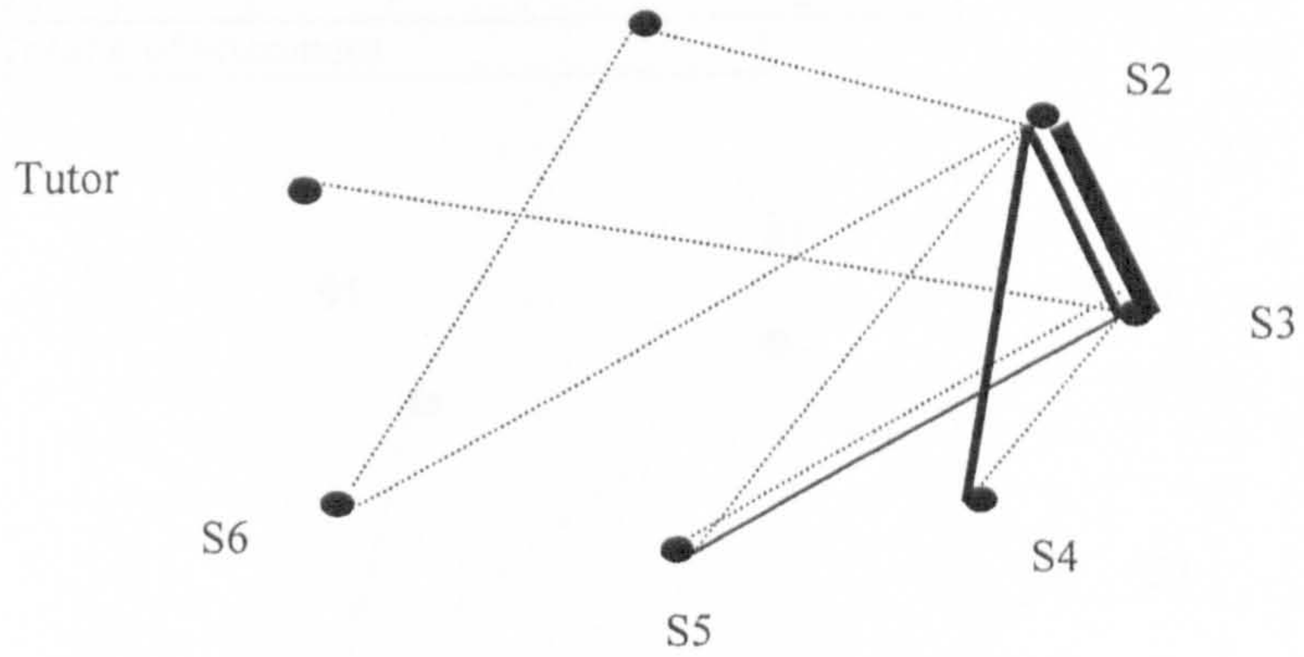
Thread – Ethical argument about anonimity

	S1	S2	S3	S4	CD(Pk)
S1			3		1
S2	1		2	1	3
S3	2	3			2
S4		1			1



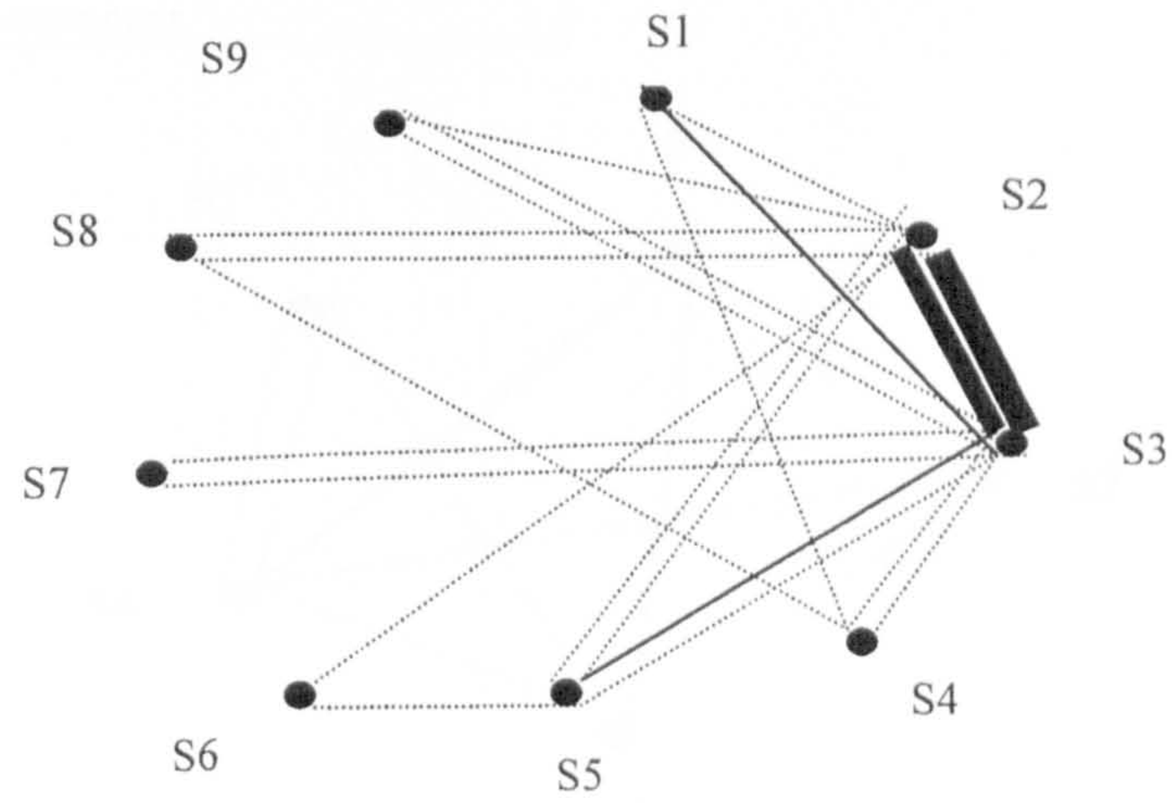
Thread Use of the Conferencing Facility

	S1	S2	S3	S4	S5	S6	Tutor	CD(Pk)
S1		1						1
S2			3	3	1	1		4
S3		6			1			2
S4			1					1
S5			2					1
S6	1							1
Tutor			1					1



Thread – Microsoft activation

	S1	S2	S3	S4	S5	S6	S7	S8	S9	CD(Pk)
S1			2							1
S2	1		4		1			1		4
S3		8		1	1		1		1	5
S4	1		1					1		3
S5		1	2			1				3
S6		1								1
S7			1							1
S8		1								1
S9		1	1							2



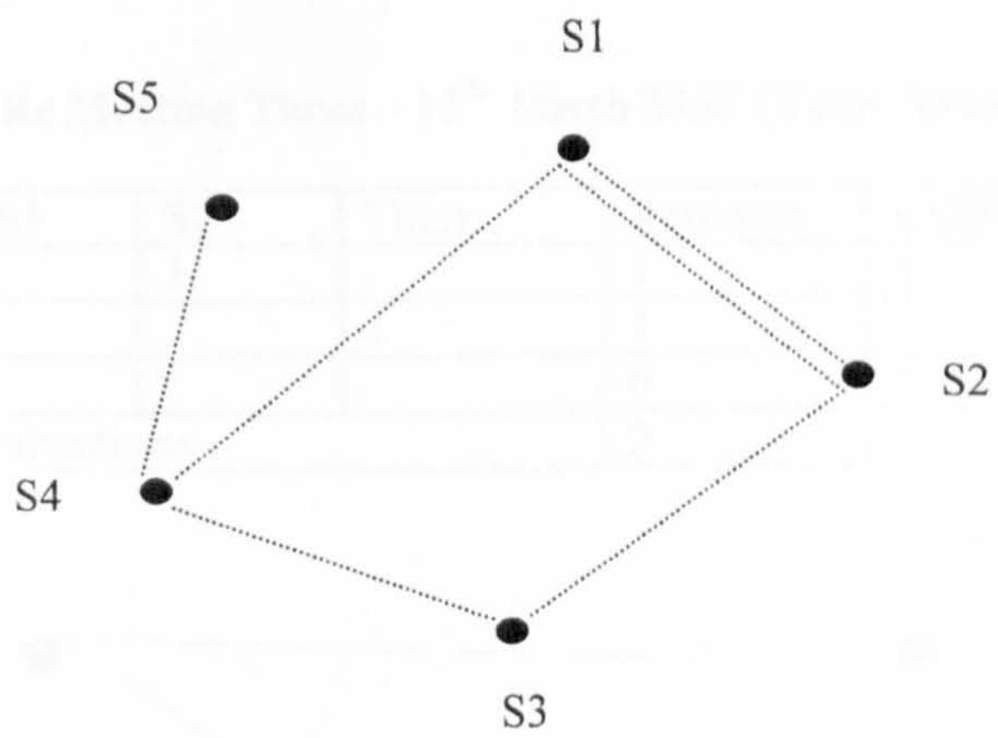
Fieldwork Study 5 – Semester 2, 2002 – MK, Limerick & USA

Transaction Analysis

INTERNATIONAL GROUP 1

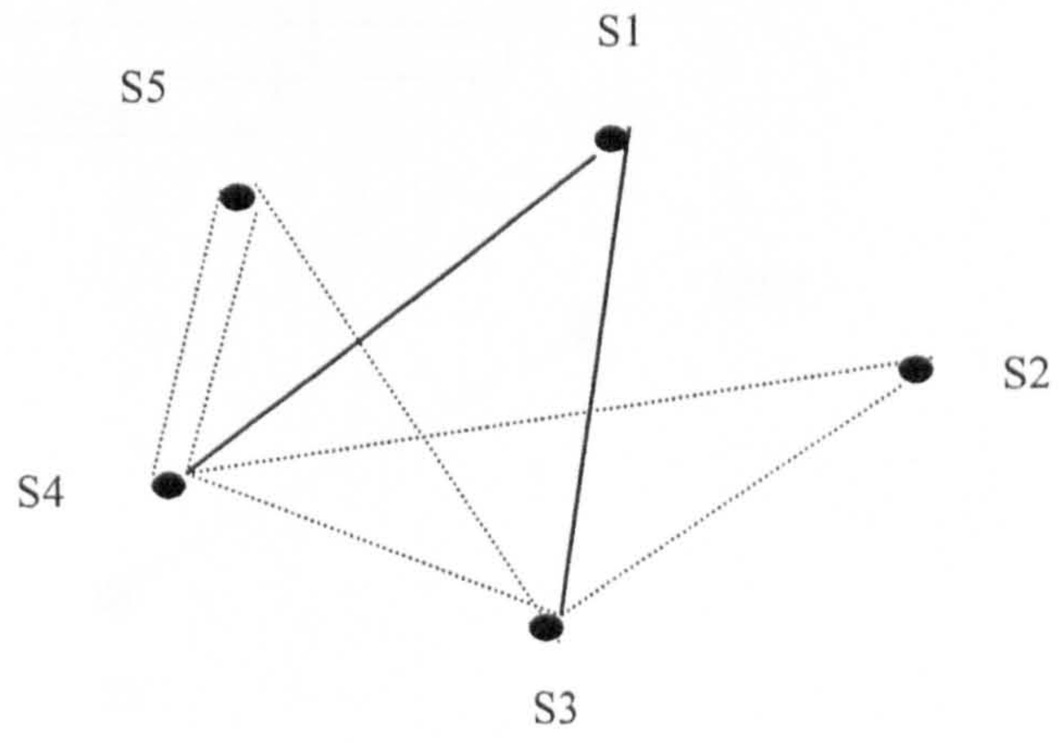
Thread – Areas for Investigation - 20th March 2002

	S1	S2	S3	S4	S5	CD(Pk)
S1		1	1			2
S2	1		1			2
S3		1		1		2
S4	1				1	2
S5						0
Total # of utterances						



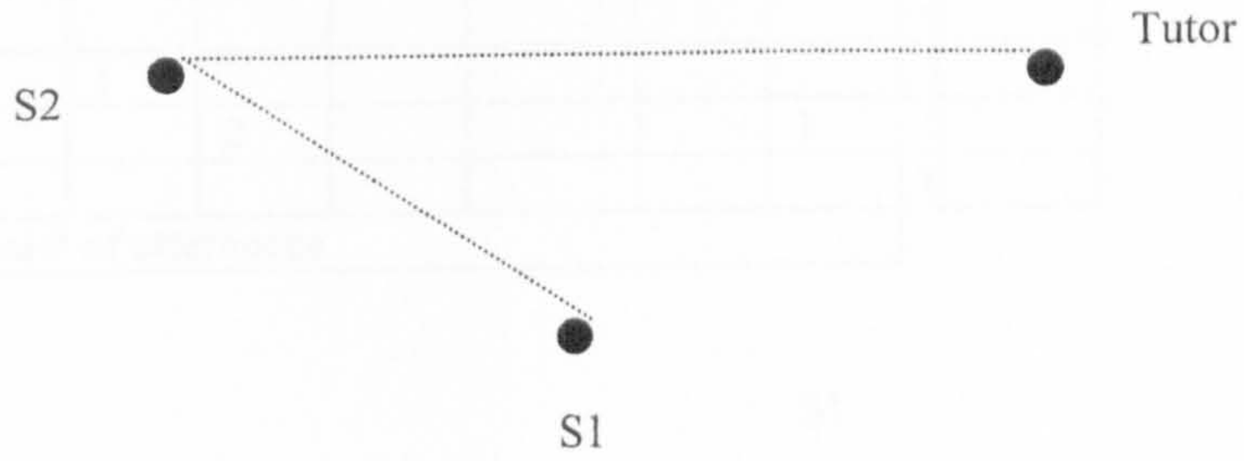
Thread – Ethical Issues on Cookies - 11th April 2002

	S1	S2	S3	S4	S5	CD(Pk)
S1			2			1
S2				1		1
S3		1		1	1	3
S4	2				1	2
S5				1		1
Total # of utterances						



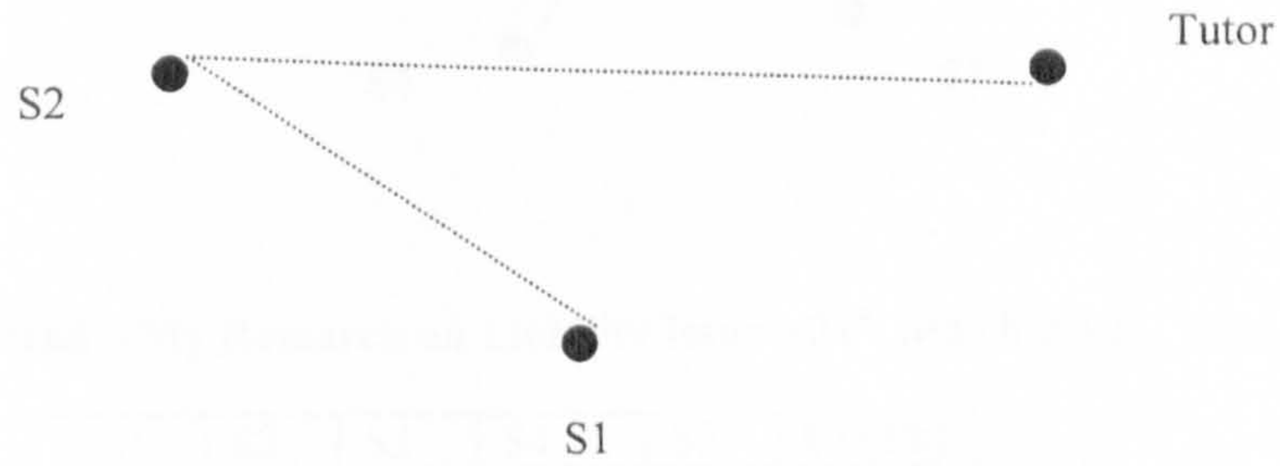
Thread – Regular Meeting Times – 12th March 2002 **(Tutor intervention)**

	S1	S2	Tutor	CD(Pk)
S1		1		1
S2			1	1
Tutor				0
Total # of utterances				



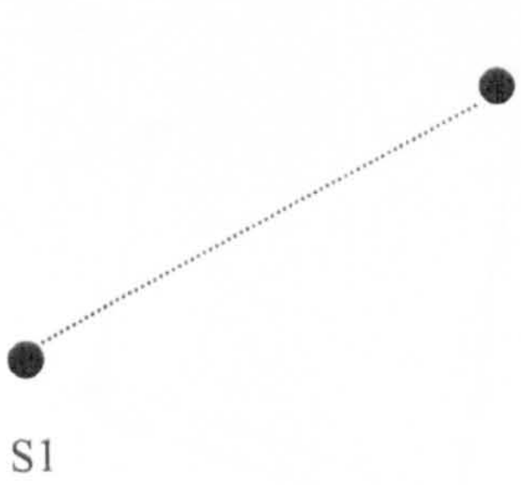
Thread – Re Meeting Times – 13th March 2002 **(Tutor intervention)**

	S1	S2	Tutor	Response	CD(Pk)
S1		1		1	1
S2			1	1	1
Tutor				0	0
Total # of utterances				2	



Thread – Cookie Hyperlinks – 22nd March 2002 **(Tutor intervention)**

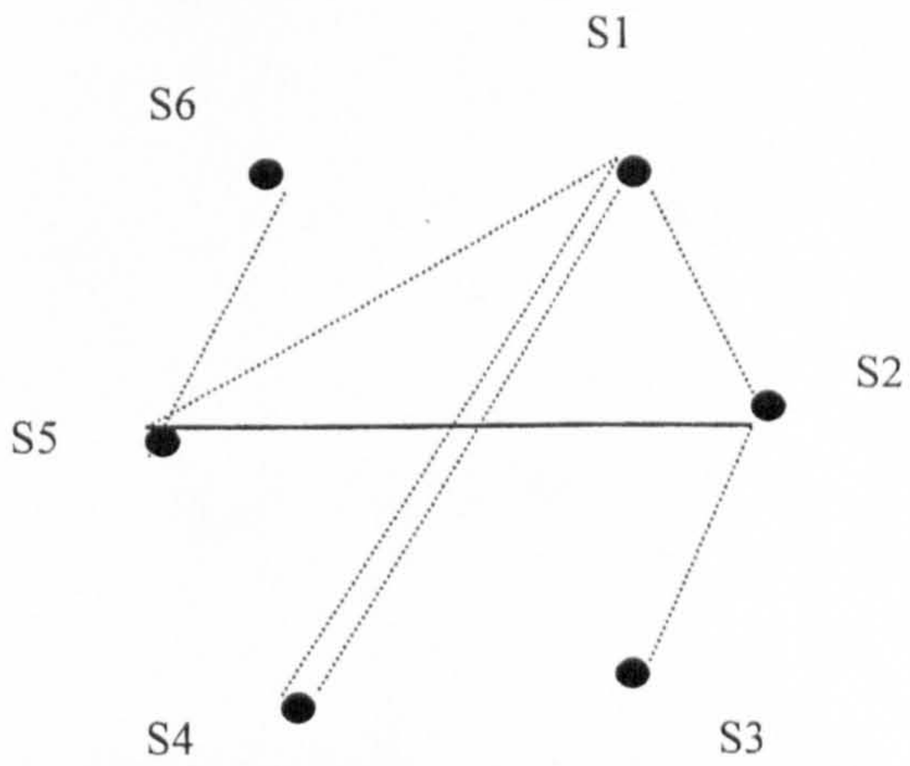
	S1	Tutor	CD(Pk)
S1		1	1
Tutor			0
Total # of utterances			



INTERNATIONAL GROUP 2

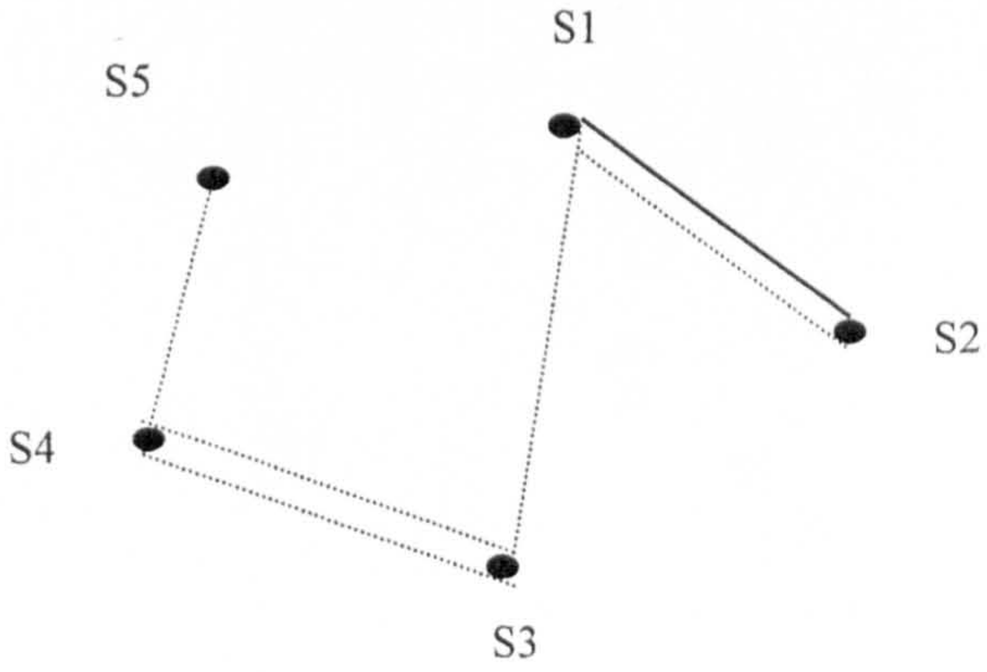
Thread – Scenario Topics - 6th March 2002

	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		1		1	1		3
S2			1				1
S3							0
S4	1						1
S5		2				1	2
S6							0
Total # of utterances							



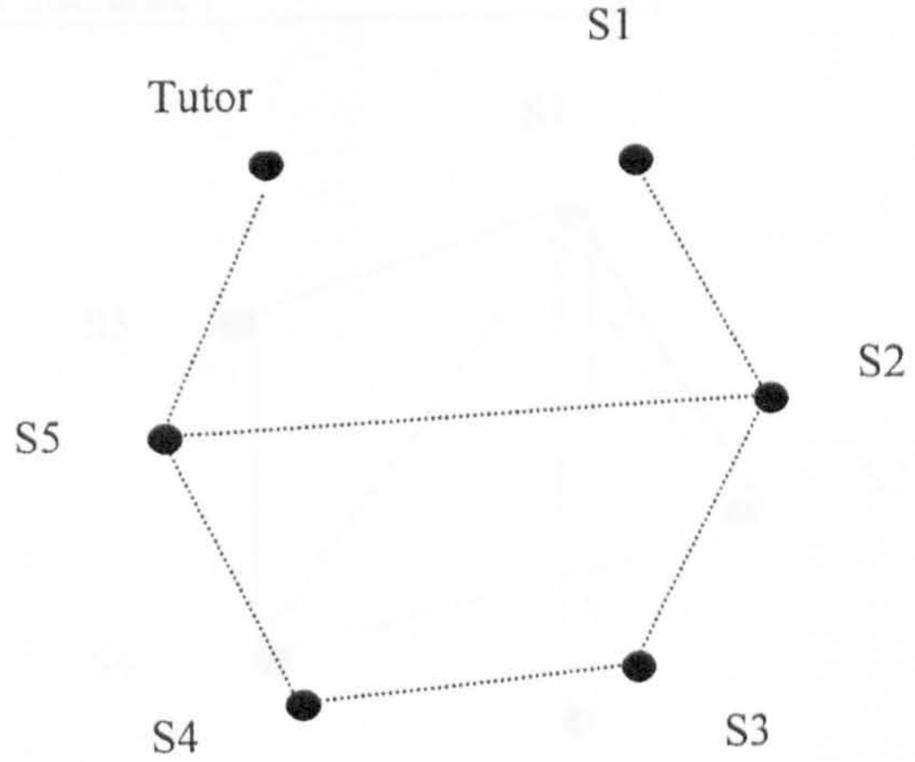
Thread – My Research on Liability Issue – 21st March 2002

	S1	S2	S3	S4	S5	CD(Pk)
S1		2	1			2
S2	1					1
S3				1		1
S4			1		1	2
S5						0
Total # of utterances						



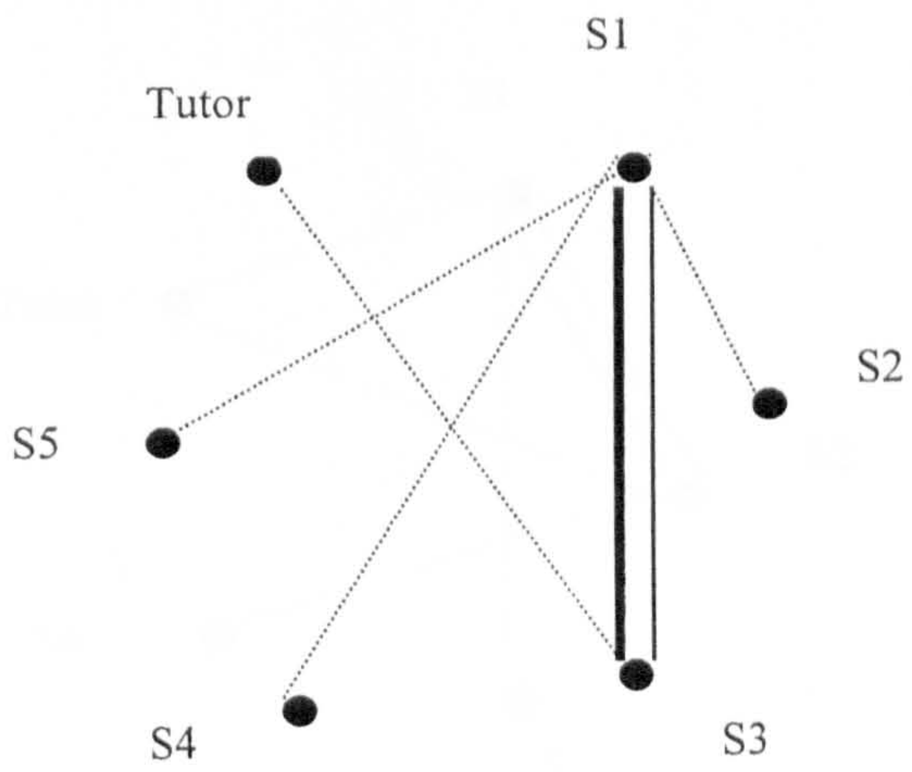
Thread – About Project - 27th February 2002 **(Tutor intervention)**

	S1	S2	S3	S4	S5	Tutor	CD(Pk)
S1		1					1
S2			1				1
S3				1			1
S4					1	1	2
S5		1					1
Tutor							0
Total # of utterances							



Thread – My Analysis of Scenario - 24th March 2002 **(Tutor intervention)**

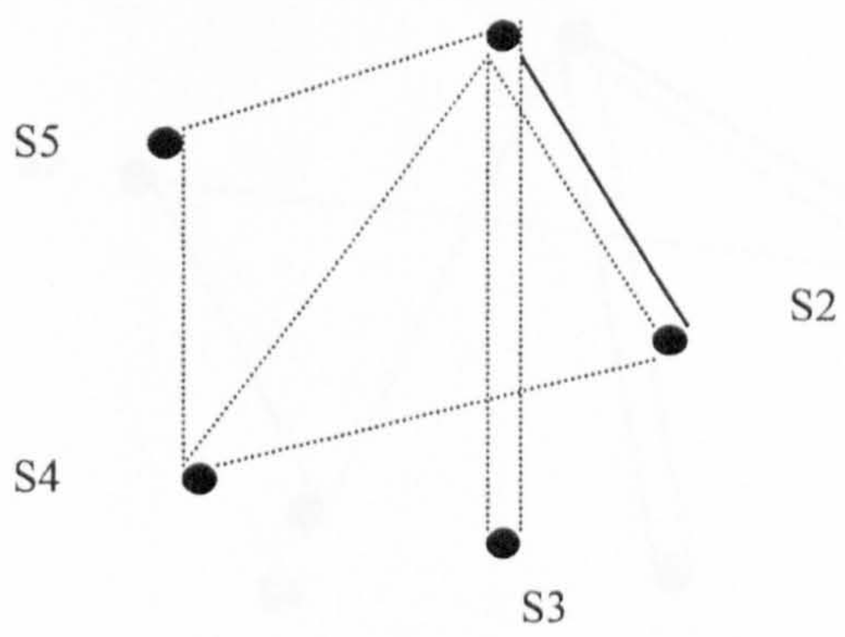
	S1	S2	S3	Tutor	S4	S5	CD(Pk)
S1		1	2		1	1	4
S2							0
S3	3			1			2
Tutor							0
S4							0
S5							0
							0
Total # of utterances							



INTERNATIONAL GROUP 4

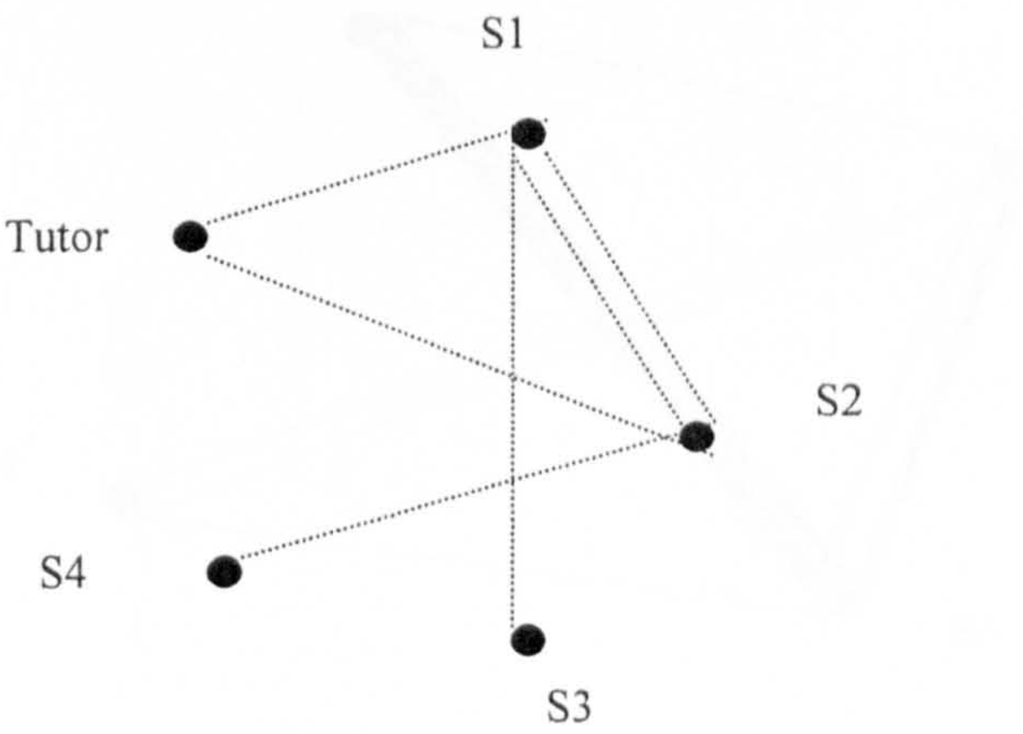
Thread – Cookies Scenario – Down 2 Business - 19th March 2002

	S1	S2	S3	S4	S5	CD(Pk)
S1		2	1		1	3
S2	1			1		2
S3	1					1
S4	1				1	2
S5						0
Total # of utterances						



Thread – Proposed Scenarios - 26th February 2002 **(Tutor intervention)**

	S1	S2	S3	S4	Tutor	CD(Pk)
S1		1	1		1	3
S2	1			1	1	3
S3						0
S4						0
Tutor						0
Total # of utterances						

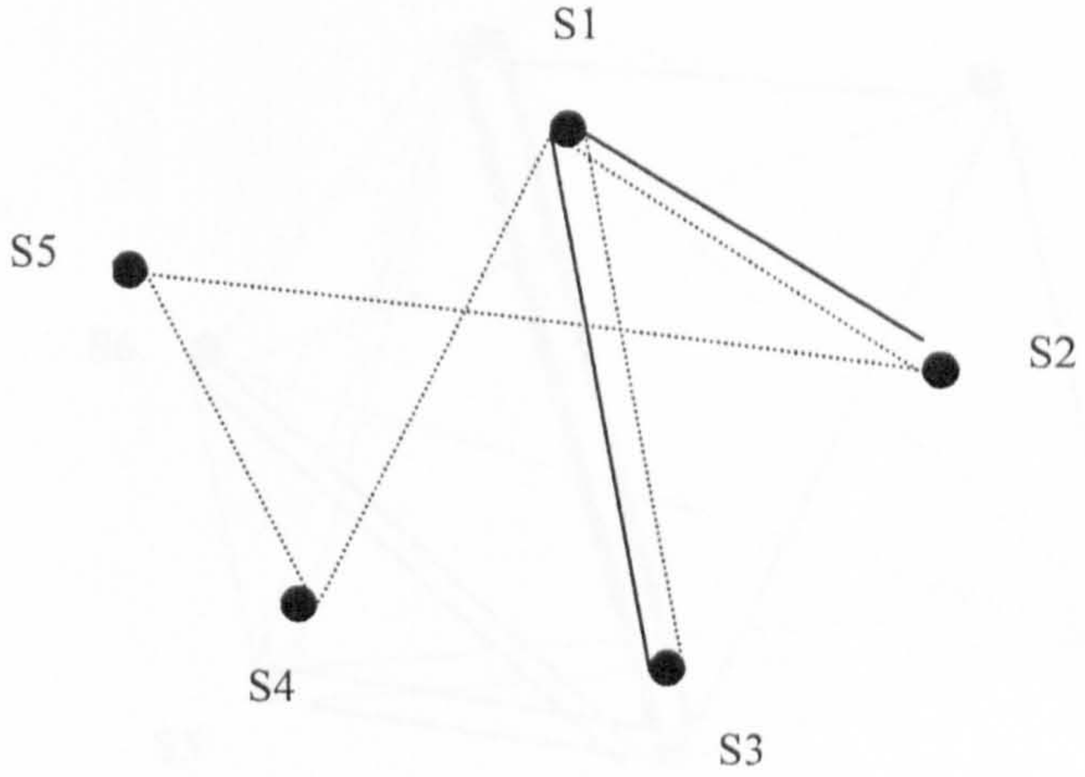


Fieldwork Study 6 – Semester 1, 2002 – MK, Leicester & USA

Group 1

Thread – Discussion 1

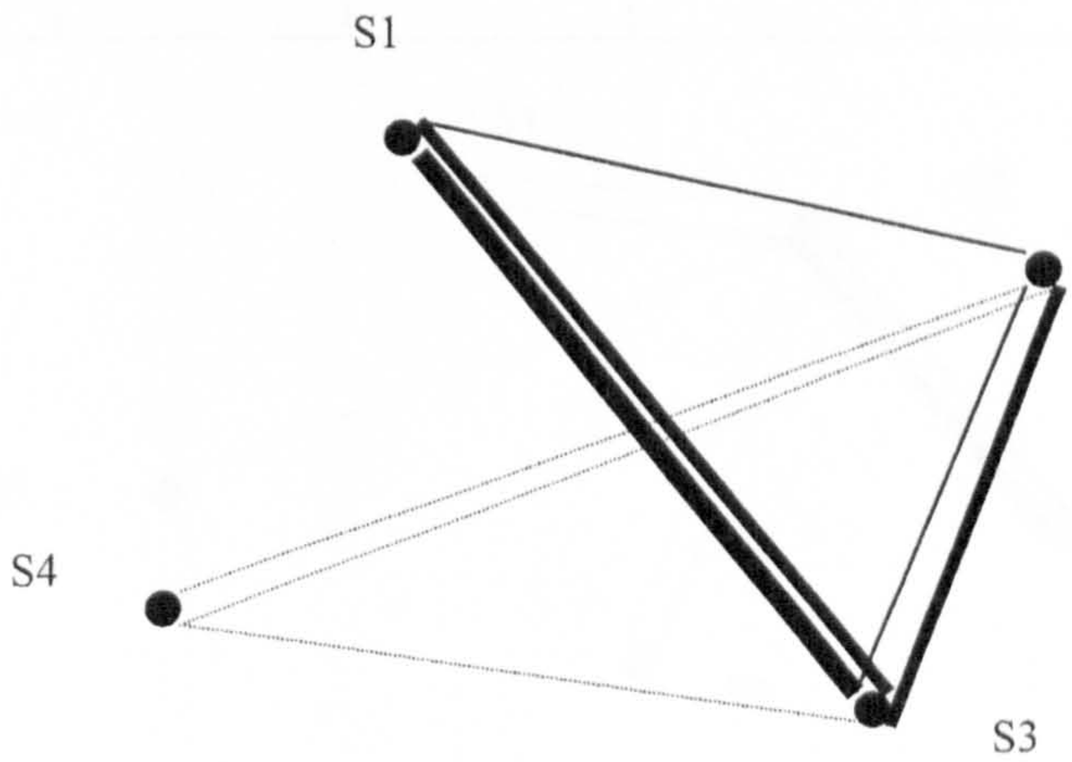
	S1	S2	S3	S4	S5	CD(Pk)
S1		1	2	1		3
S2	2					1
S3	1					1
S4					1	1
S5		1				1



Group 2

Thread – Criteria

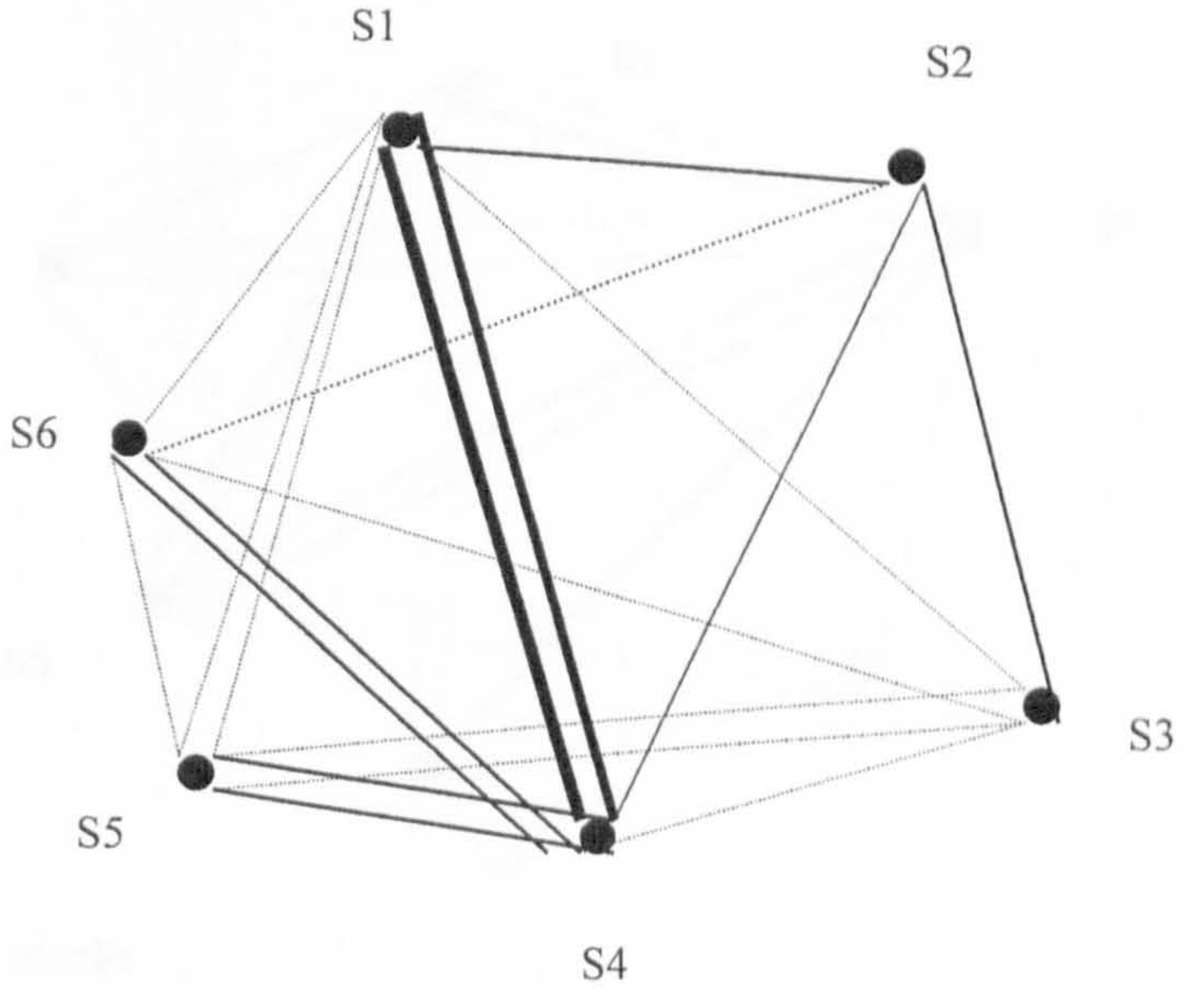
	S1	S2	S3	S4	CD(Pk)
S1		2	4		2
S2			4	1	2
S3	5	2		1	3
S4		1			1



Group 3

Thread – Literary Works

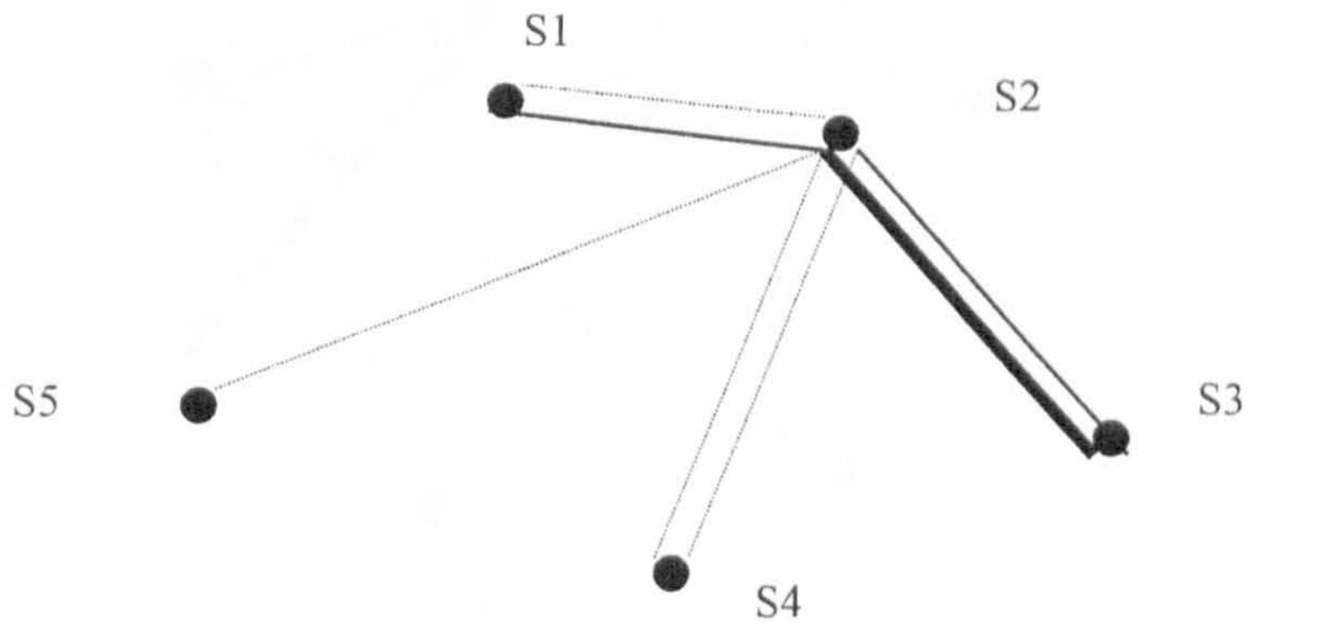
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		2	1	3	1		4
S2				2		1	2
S3				1	1	1	3
S4	3				2	2	3
S5	1		1				2
S6	1			2	1		3



Group 7

Thread – Full Reviews

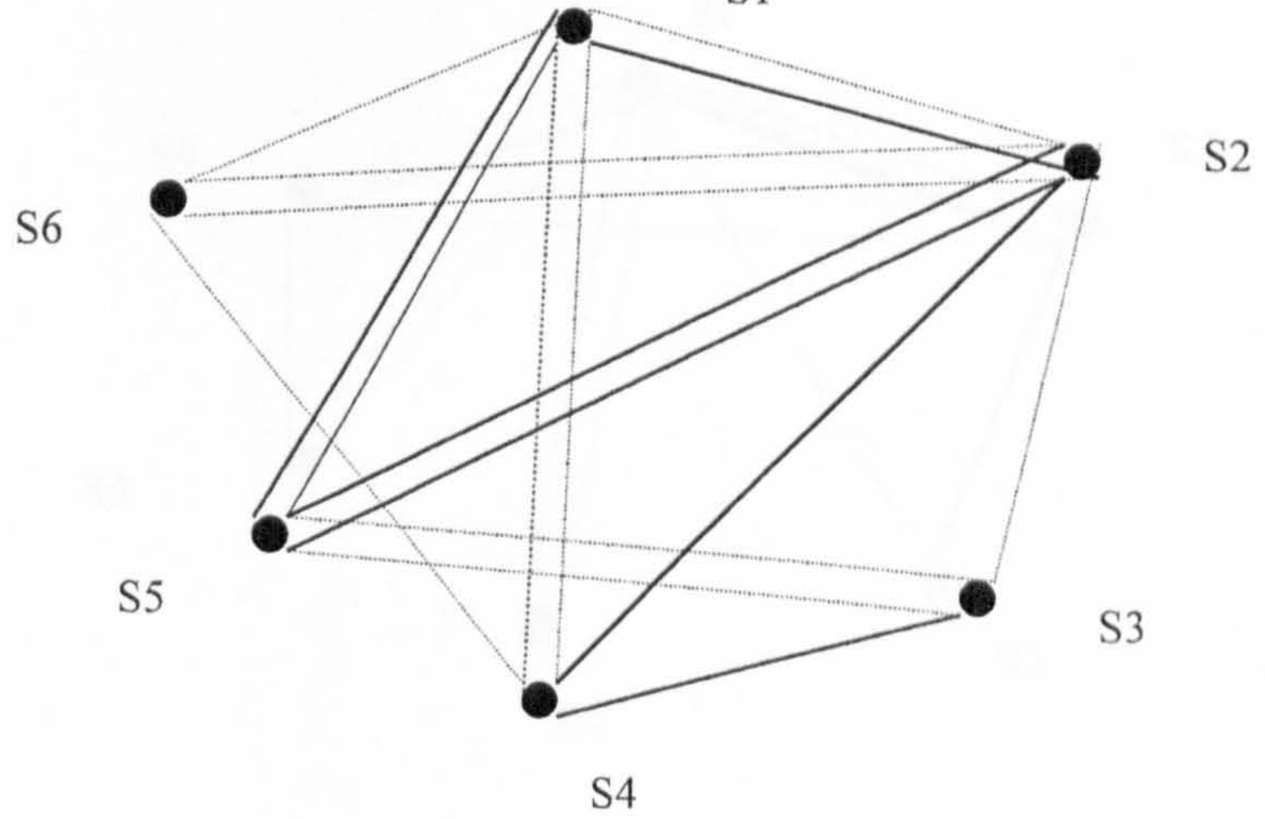
	S1	S2	S3	S4	S5	CD(Pk)
S1		2				1
S2	1		4	1	1	4
S3		2				1
S4		1				1
S5						0



Group 8

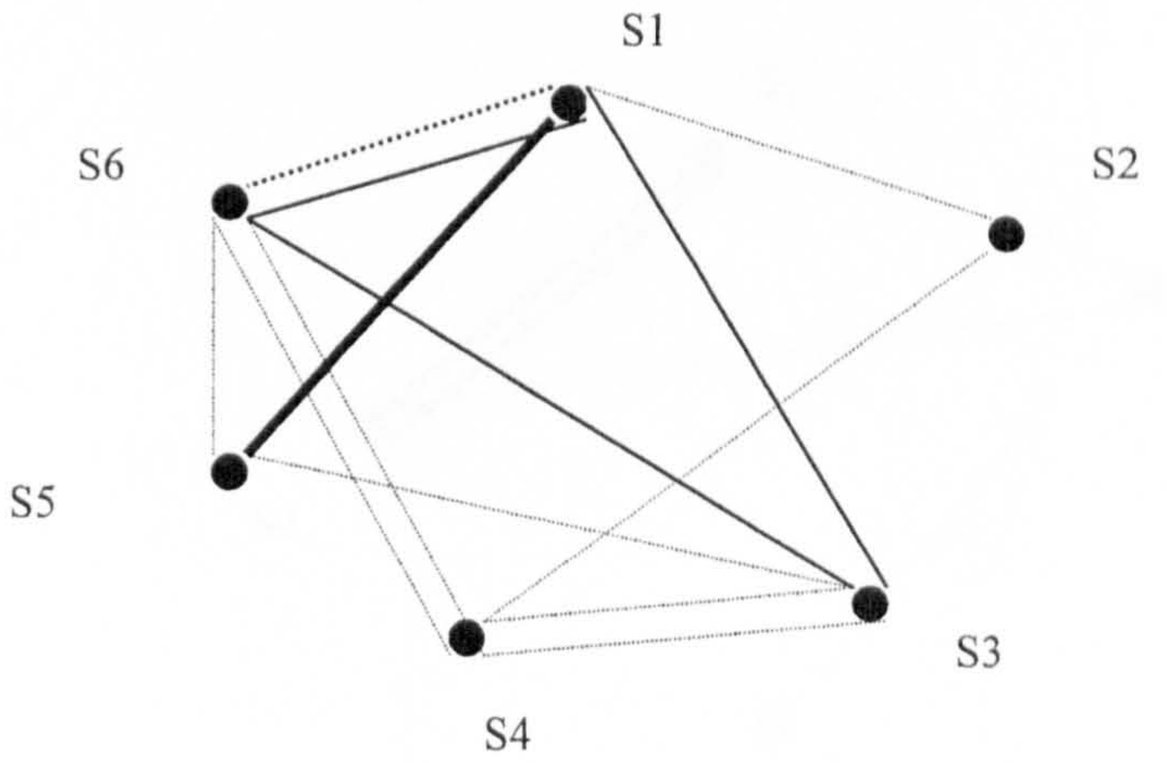
Thread – Criteria suggestions

	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		1		1	2	1	4
S2	2		1		2	1	4
S3				2	1		2
S4	1	2				1	2
S5		2	1				3
S6		1					1



Thread – Paper marks

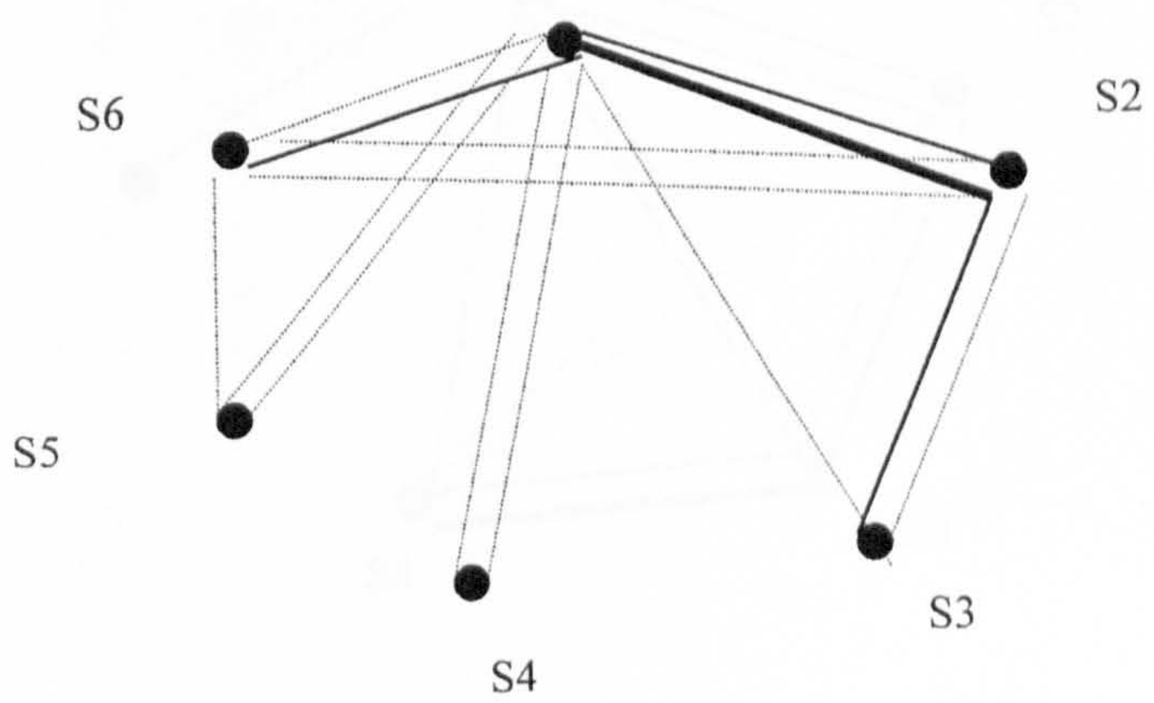
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		1			3	1	3
S2				1			1
S3	2			1			2
S4			1			1	2
S5			1			1	2
S6	2		2	1			3



Group 10

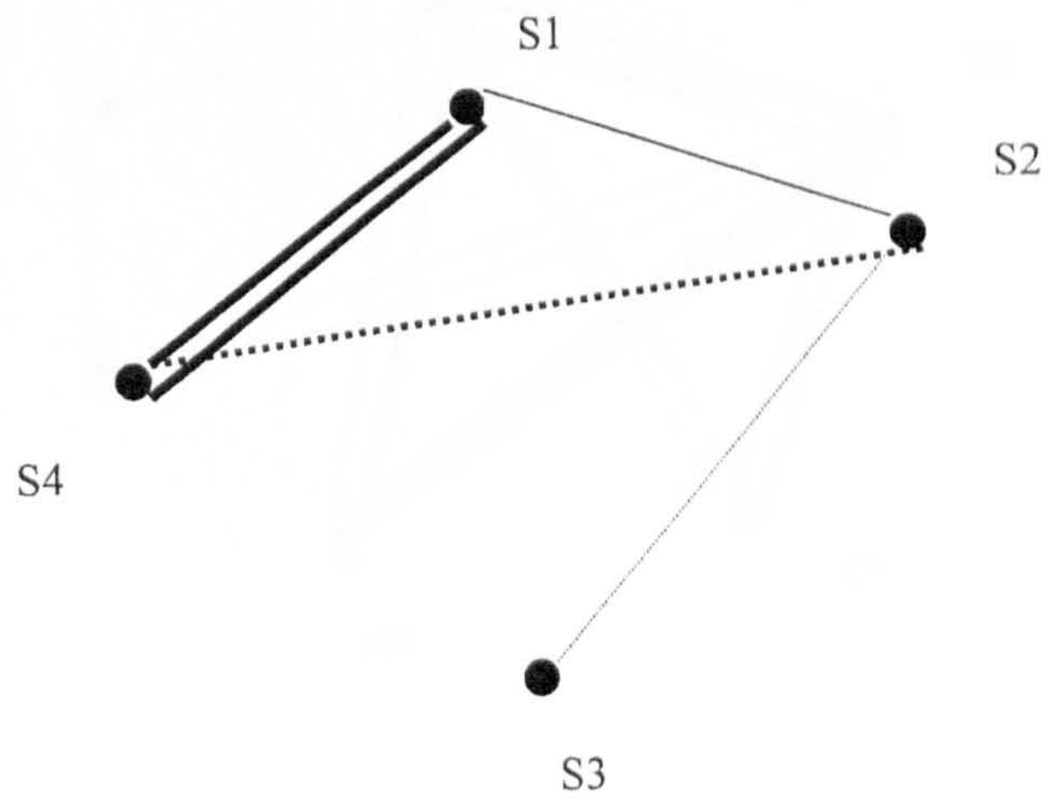
Thread – Marking Criteria discussion

	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		3		1	1	2	4
S2	2		2			1	3
S3	1	1					2
S4	1						1
S5	1						1
S6	1	1			1		3



Thread – Emufaq website

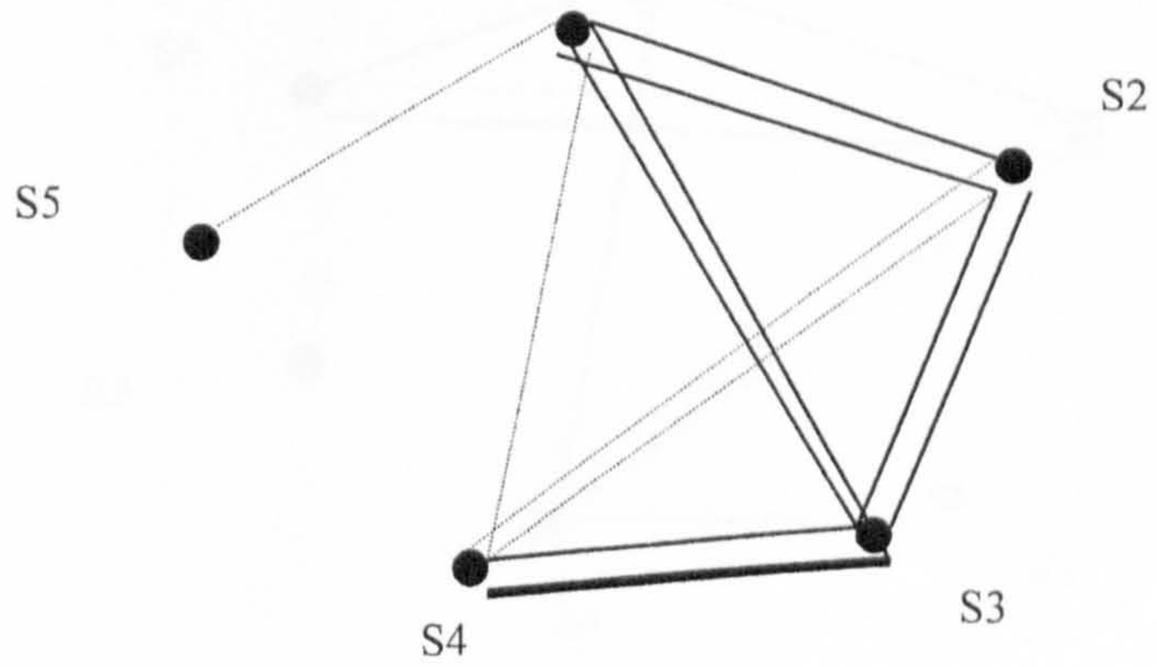
	S1	S2	S3	S4	CD(Pk)
S1				3	1
S2				1	1
S3		1			1
S4	3				1



Group 11

Thread – not able to view attachments

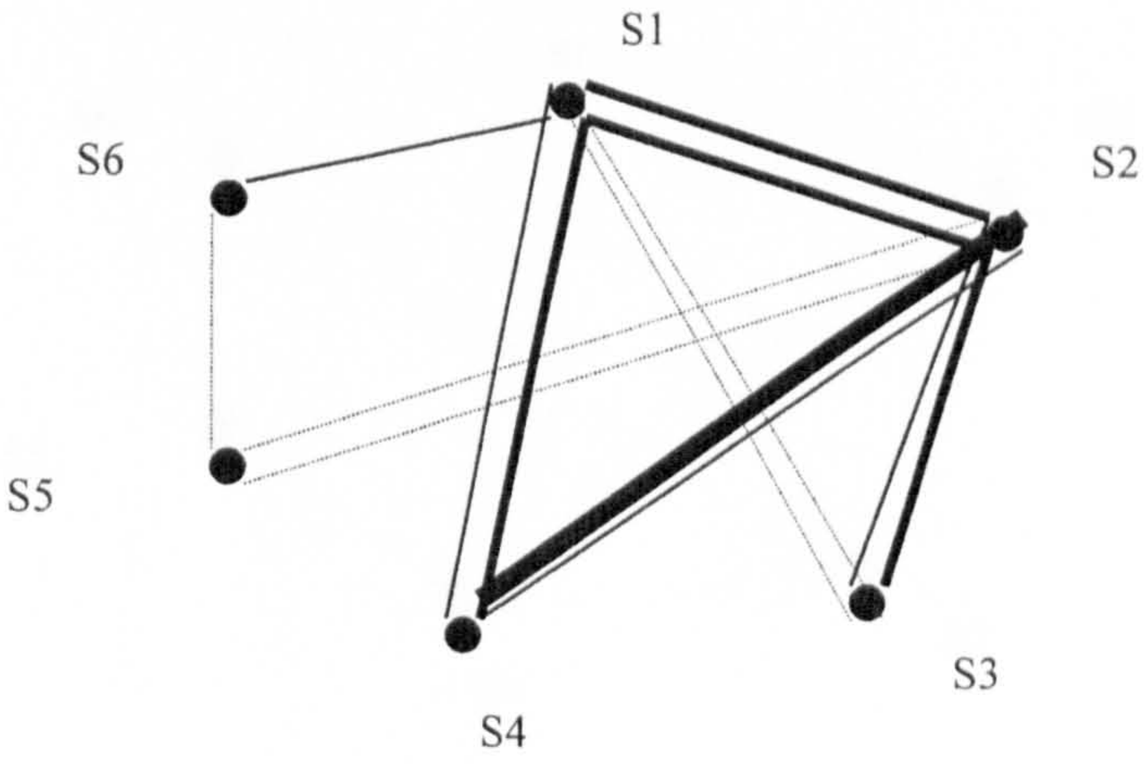
	S1	S2	S3	S4	S5	CD(Pk)
S1		2	2		1	3
S2	2		2	1		3
S3	2	2		3		3
S4	1	1	2			3
S5						0



Group 12

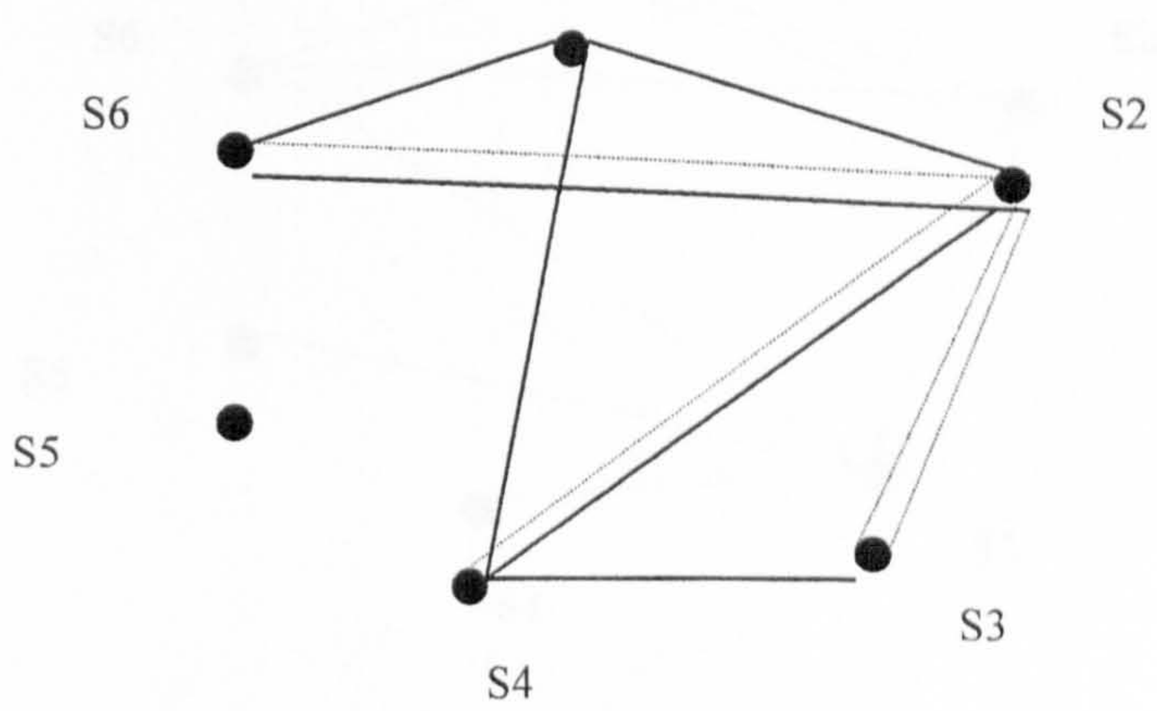
Thread – Assignment

	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		3	1	2			3
S2	3		2	6	1		4
S3	1	3					2
S4	3	2					2
S5		1				1	2
S6	2						1



Thread – Criteria

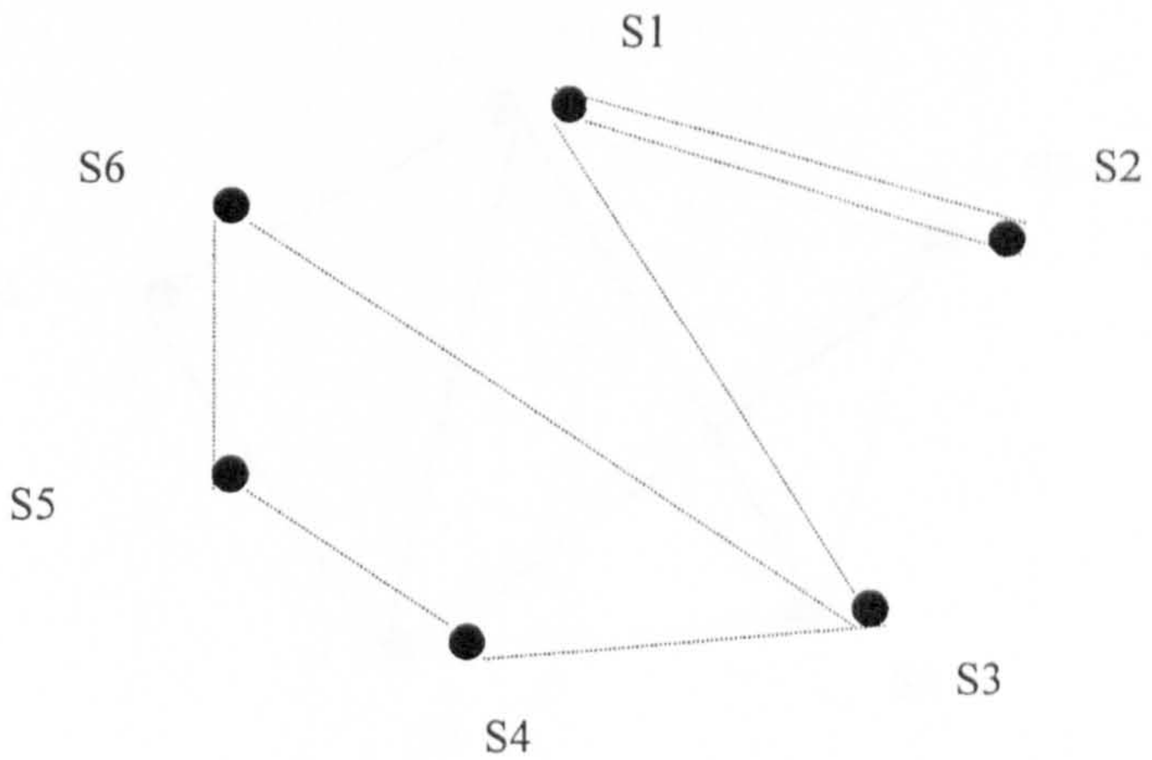
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1				2			1
S2	2		1	1		2	4
S3		1					1
S4		2	2				2
S5							0
S6	2	1					2



Group 14

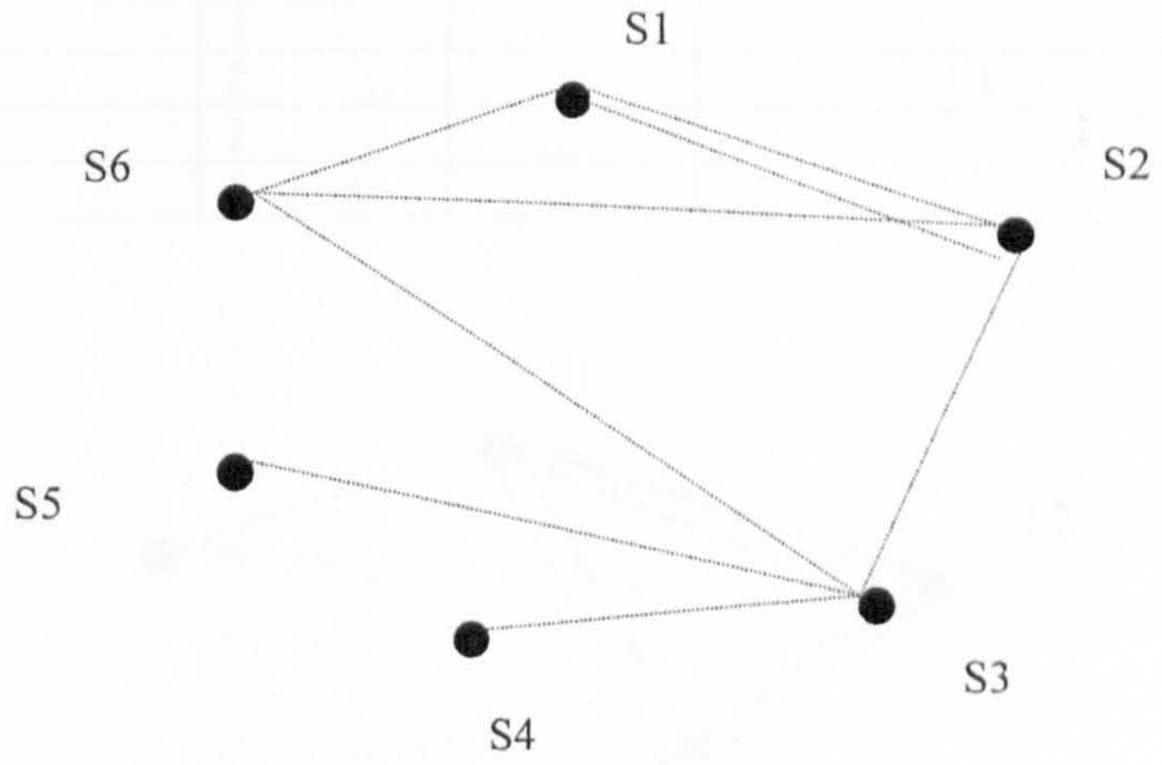
Thread – Criteria

	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		1	1				2
S2	1						1
S3				1			1
S4					1		1
S5						1	1
S6			1				1



Thread – Best Group Paper

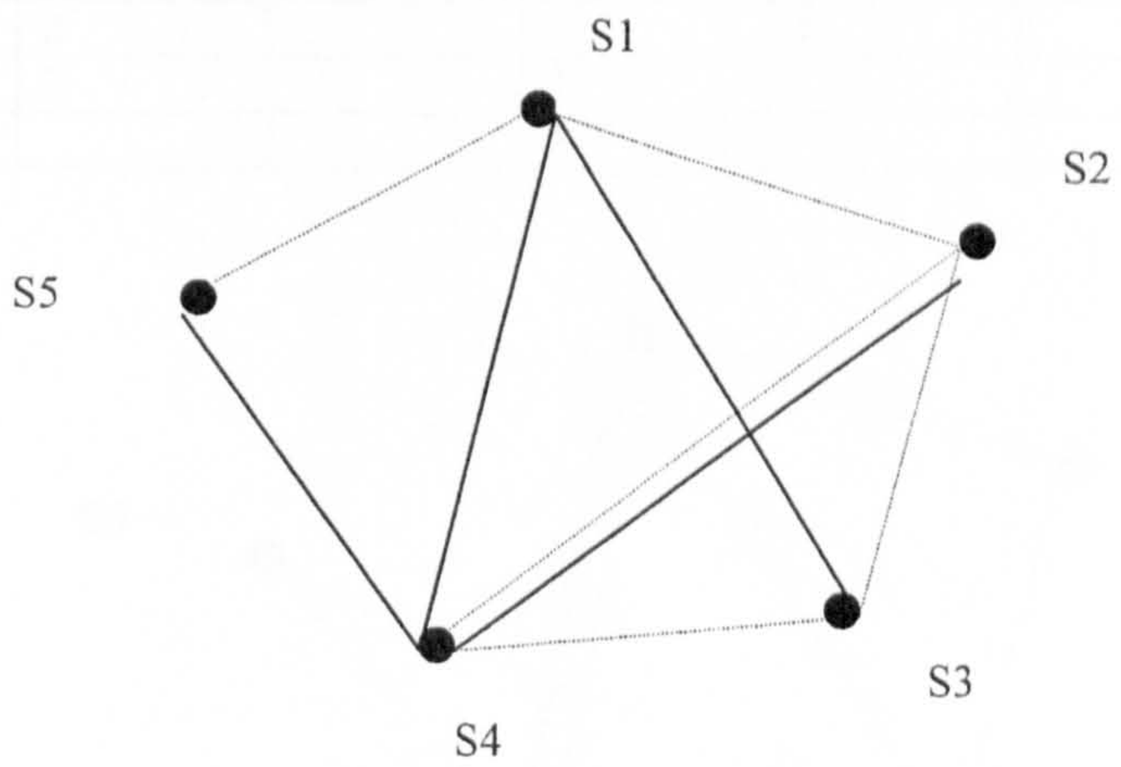
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		1				1	2
S2	1		1				2
S3				1	1	1	3
S4							0
S5							0
S6		1					1



Group 19

Thread – Second Round Results

	S1	S2	S3	S4	S5	CD(Pk)
S1		1		2		2
S2			1	2		2
S3	2					1
S4		1	1		2	3
S5	1					1

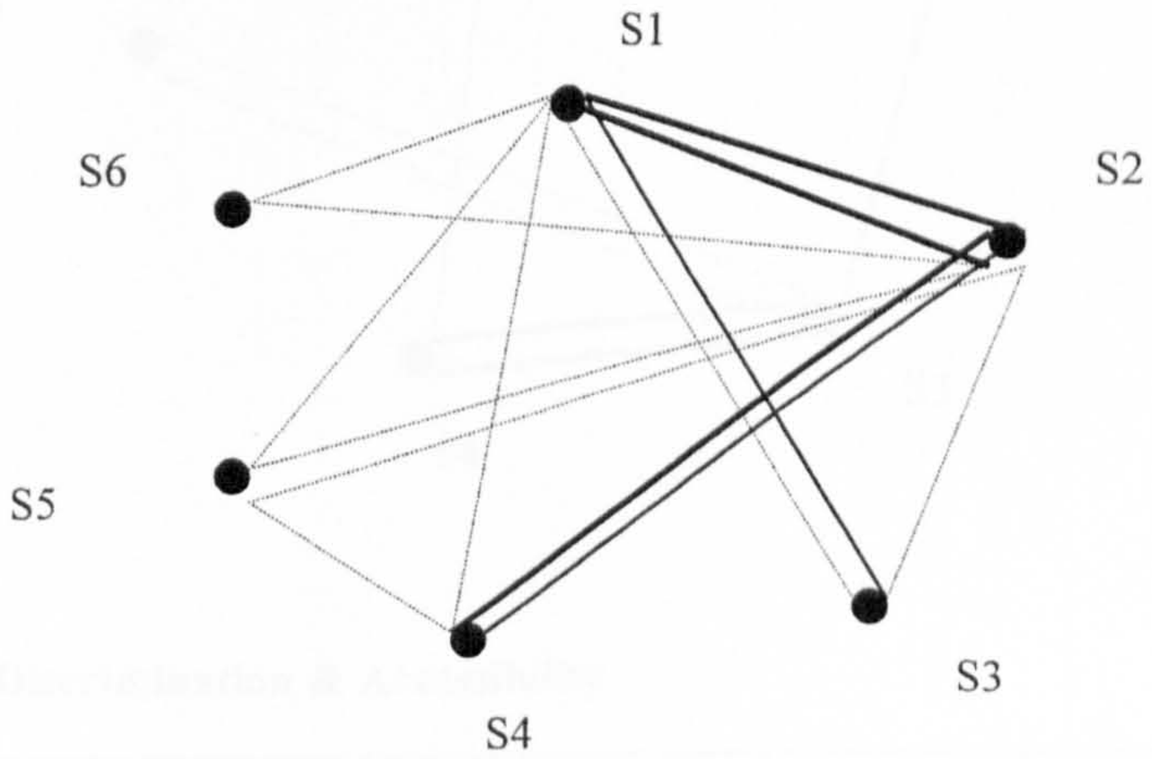


Fieldwork Study 7 – Semester 2, 2003 – MK, Limerick & USA

Group 1

Thread - Final Report

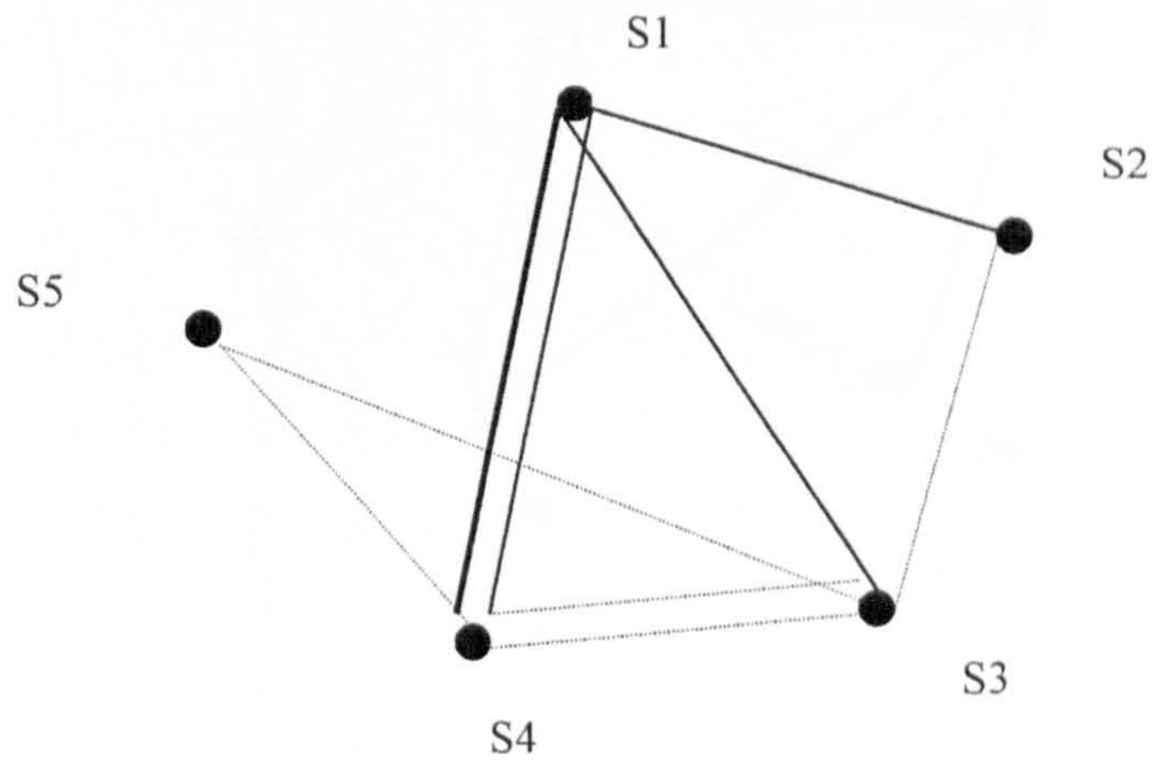
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		3	2		1	1	4
S2	3			3	1		3
S3	1	1					2
S4	1	2			1		3
S5		1					1
S6		1					1



Group 2

Thread – Free Speech & Ethical Theory

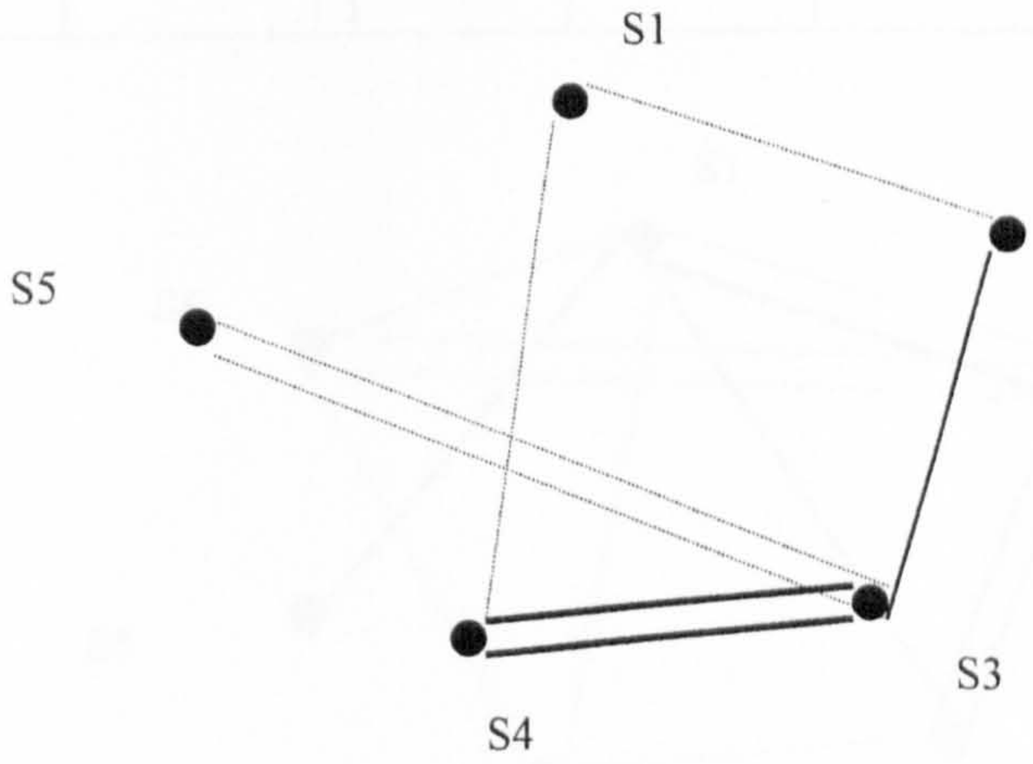
	S1	S2	S3	S4	S5	CD(Pk)
S1		2		3		2
S2			1			1
S3	2			1		2
S4	2		1		1	3
S5			1			1



Group 3

Thread – Scenario

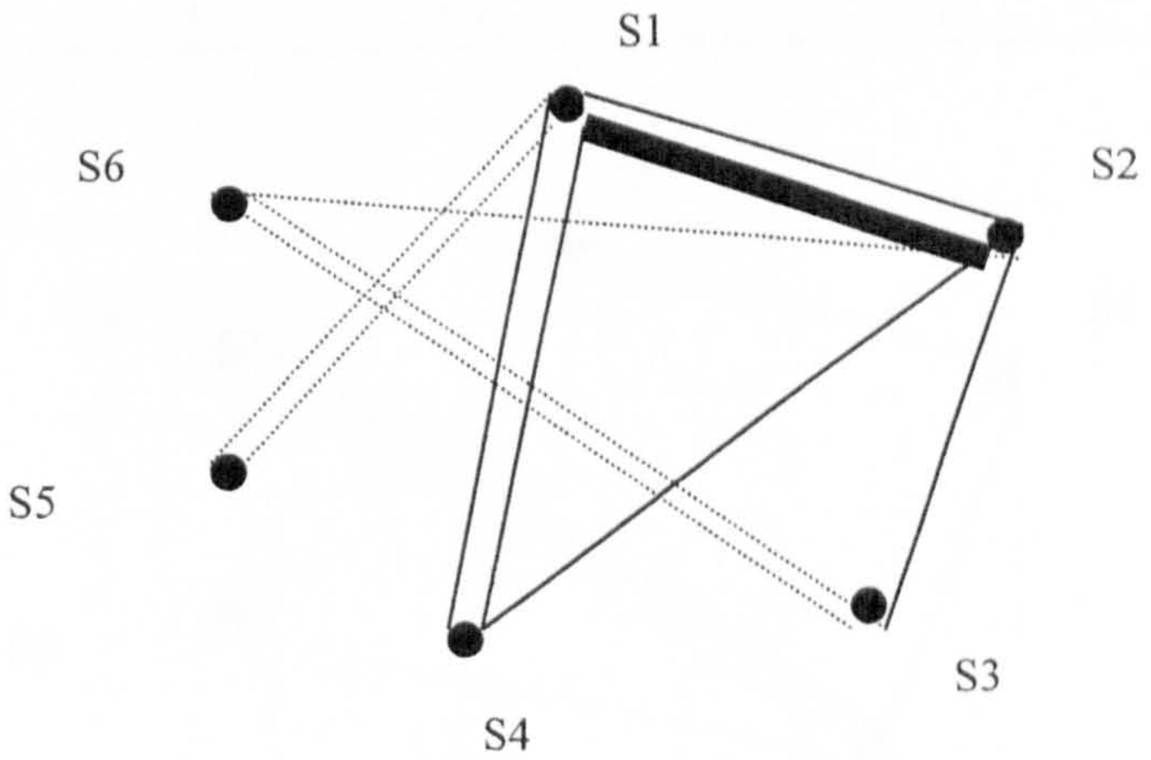
	S1	S2	S3	S4	S5	CD(Pk)
S1		1		1		2
S2			2			1
S3				3	1	2
S4			3			1
S5			1			1



Group 5

Thread – Discrimination & Accessibility

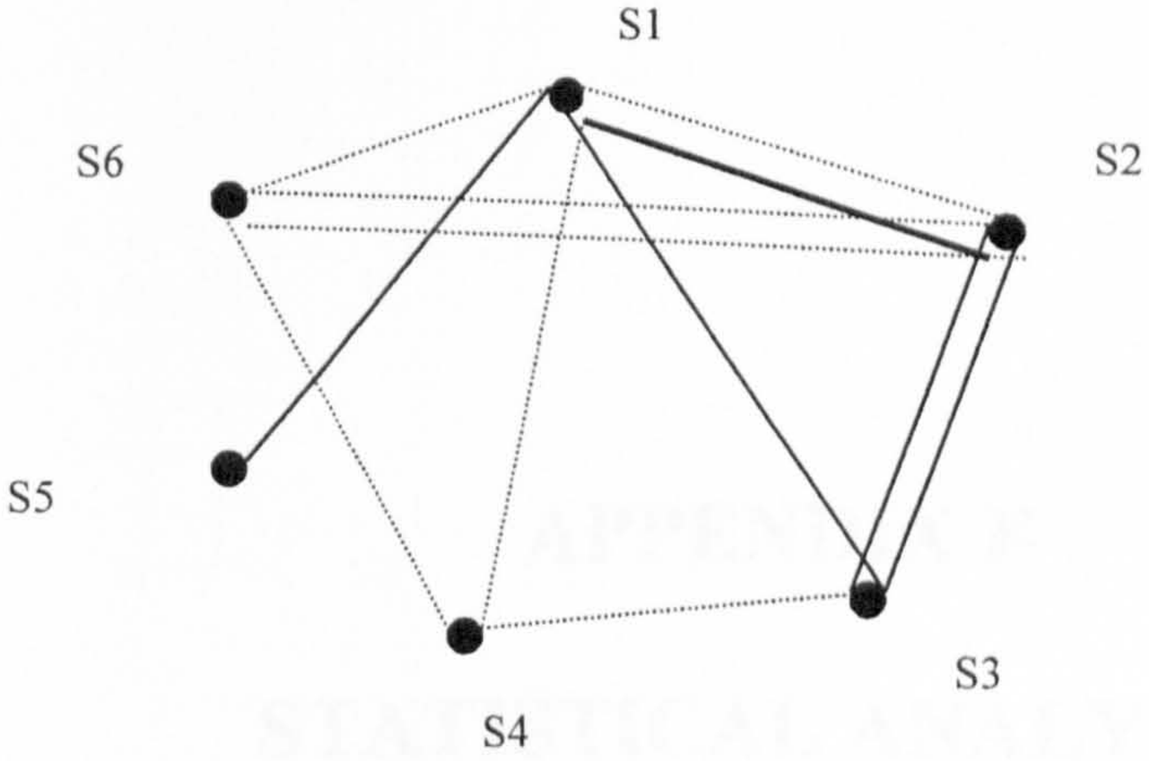
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		8		2	1		3
S2	2		2	2		1	4
S3						1	1
S4	2						1
S5	1						1
S6			1				1



Group 6

Thread – Ethical discussion Thread

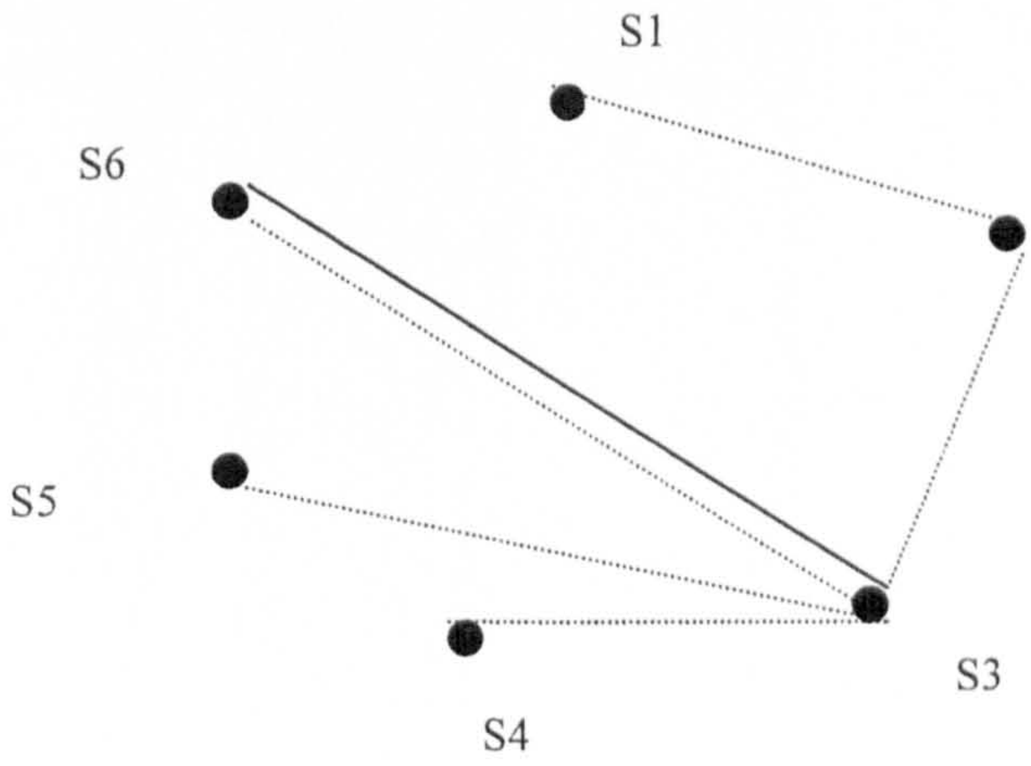
	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		3	2			1	3
S2	1		2	1		1	4
S3		2					1
S4	1					1	2
S5	2						1
S6		1					1



Group 8

Thread – Left over detail

	S1	S2	S3	S4	S5	S6	CD(Pk)
S1		1					1
S2			1				1
S3				1	1	2	3
S4							0
S5							0
S6			1				1



APPENDIX F

STATISTICAL ANALYSES

APPENDIX F

Statistical Analysis

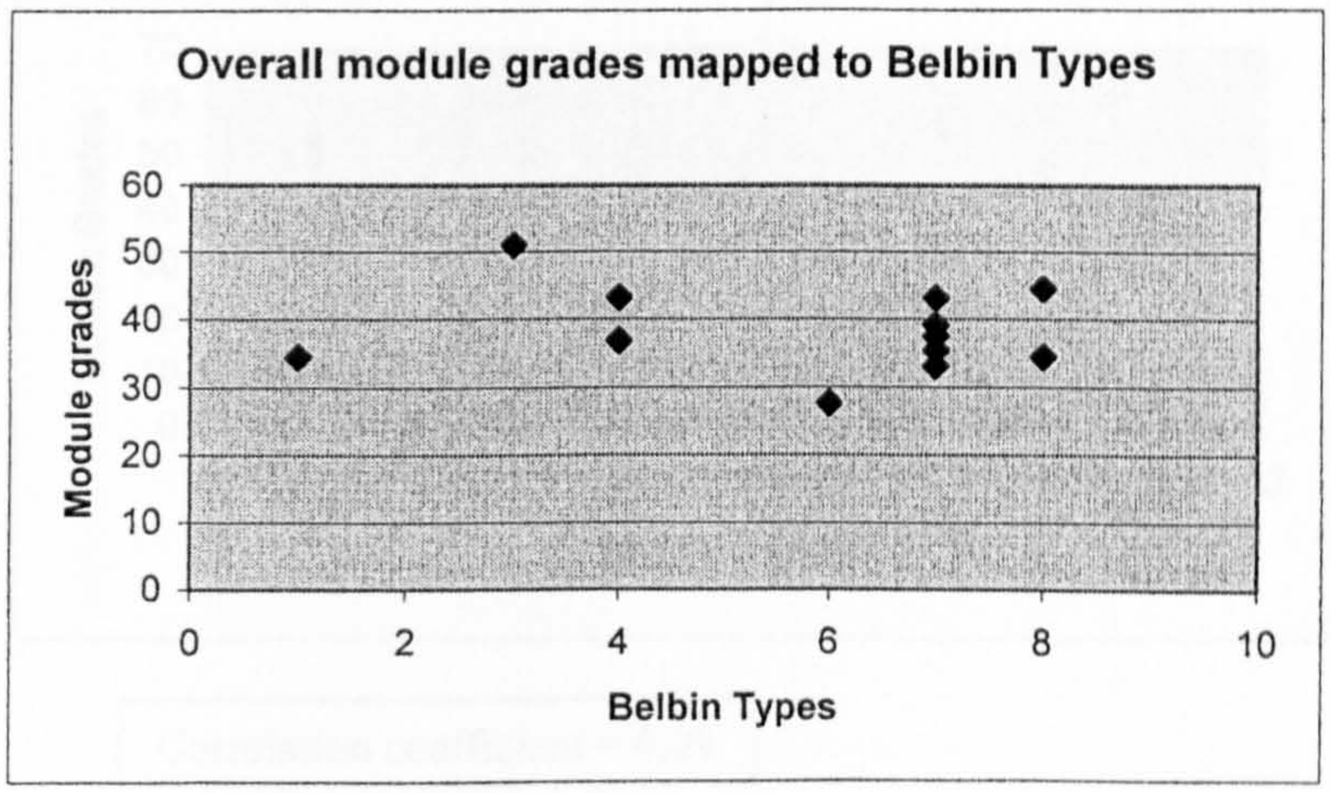
Fieldwork study 2 - Semester 1, 2000 – Milton Keynes Only

Students – Usage Mapped to Learning Style and Assessment

Student	*Learning Style*	*Read*	*Contribution*	*Coursework Grade*	*Exam*
S1	Enthusiastic	5	1	B-	D
S2	Imaginative	15	1	D	38
S3	Imaginative	17	1	D-	D+
S4	Imaginative	20	0	32	D
S5	Imaginative	16	1	36	D
S6	Imaginative	35	3	D	D
S7	Imaginative	53	2	21	X
S8	Imaginative	15	3	D+	D
S9	Imaginative/Logical	30	1	32	30
S10	Imaginative/Logical	29	1	D	35
S11	Logical	0	0	D	C
S12	Logical	50	3	C-	D+
S13	Logical	50	1	C-	D
S14	Logical	44	4	38	D
S15	Logical	36	2	D	38
S16	Logical	33	7	A-	C+
S17	Logical	8	1	A	C+
S18	Logical	10	0	B-	C+
S19	Logical	5	0	35	27
S20	Logical	5	1	C+	C
S21	Logical	24	0	D	B+
S22	Logical	30	2	B-	C-
S23	Logical	57	3	33	29
S24	Logical	41	2	B-	B-
S25	Logical	2	2	B-	C+
S26	Logical	25	1	C-	C-
S27	Logical	2	0	B	33
S28	Practical	38	6	B-	32

Module grades mapped to Belbin Types

Fieldwork Study 4

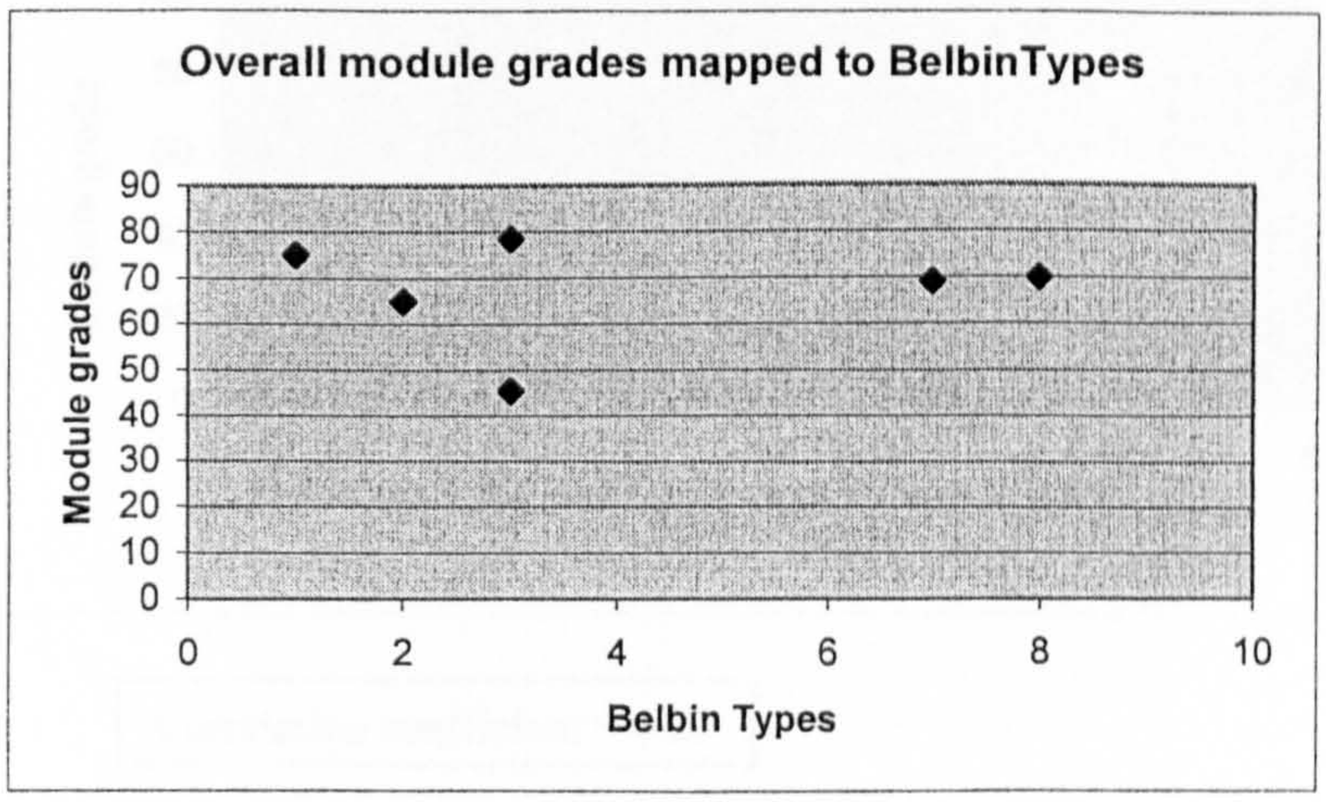


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.02

Fieldwork Study 5

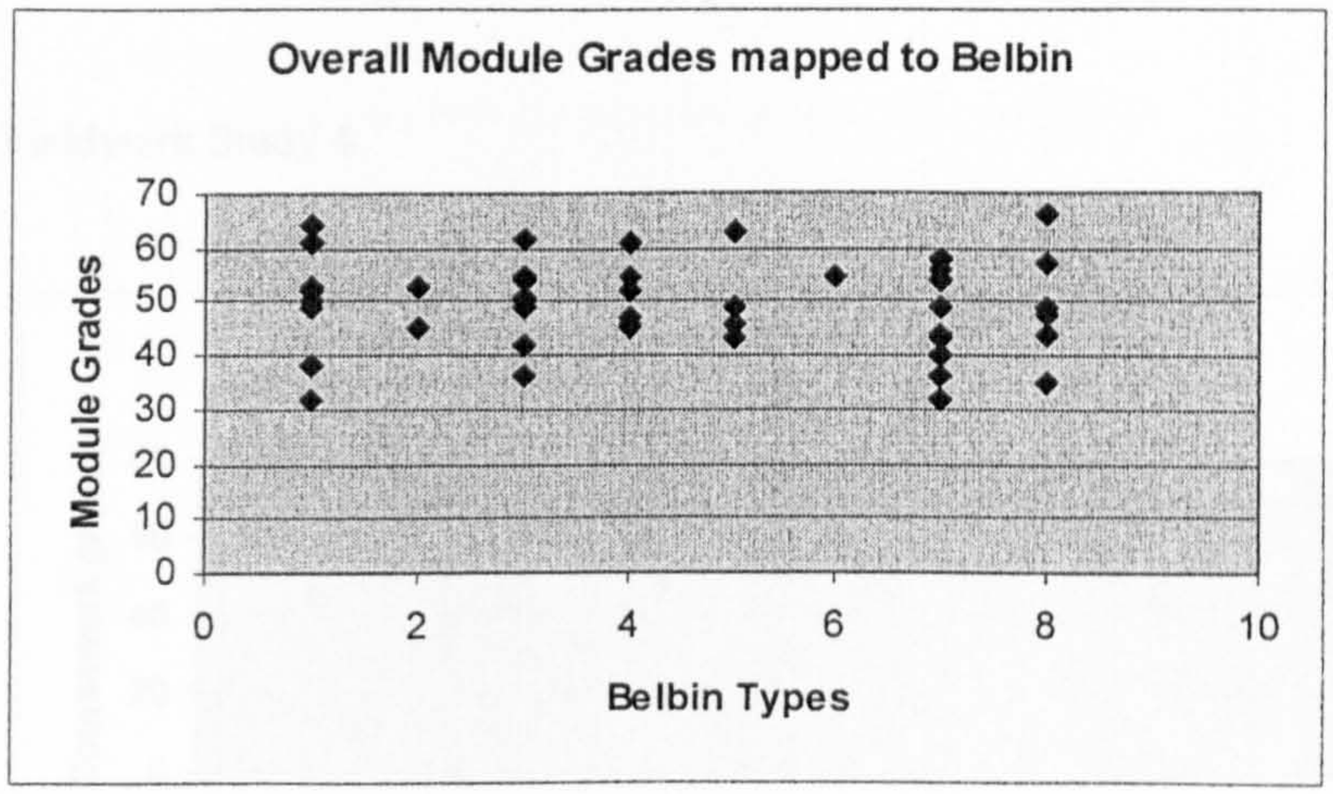


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.05

Fieldwork Study 6

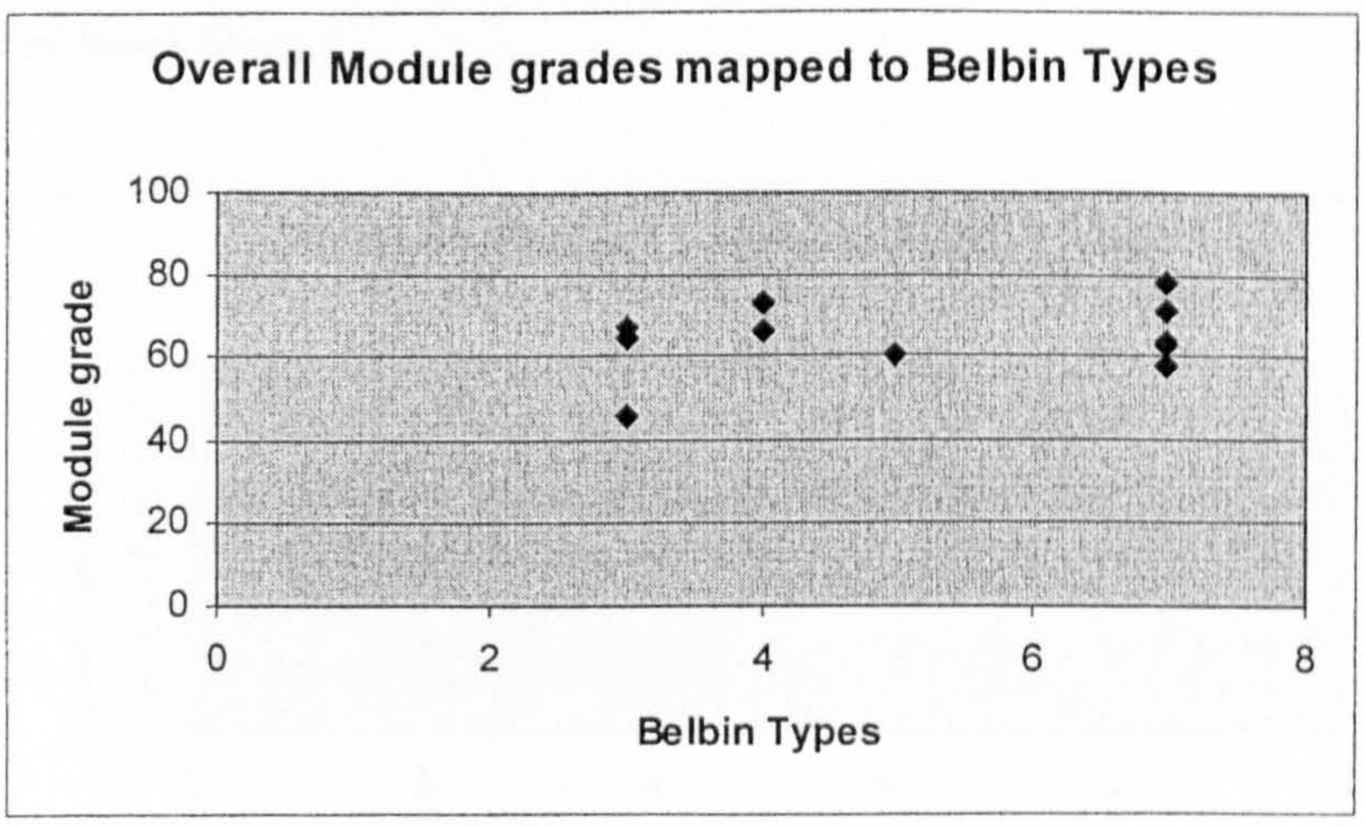


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.09

Fieldwork Study 7



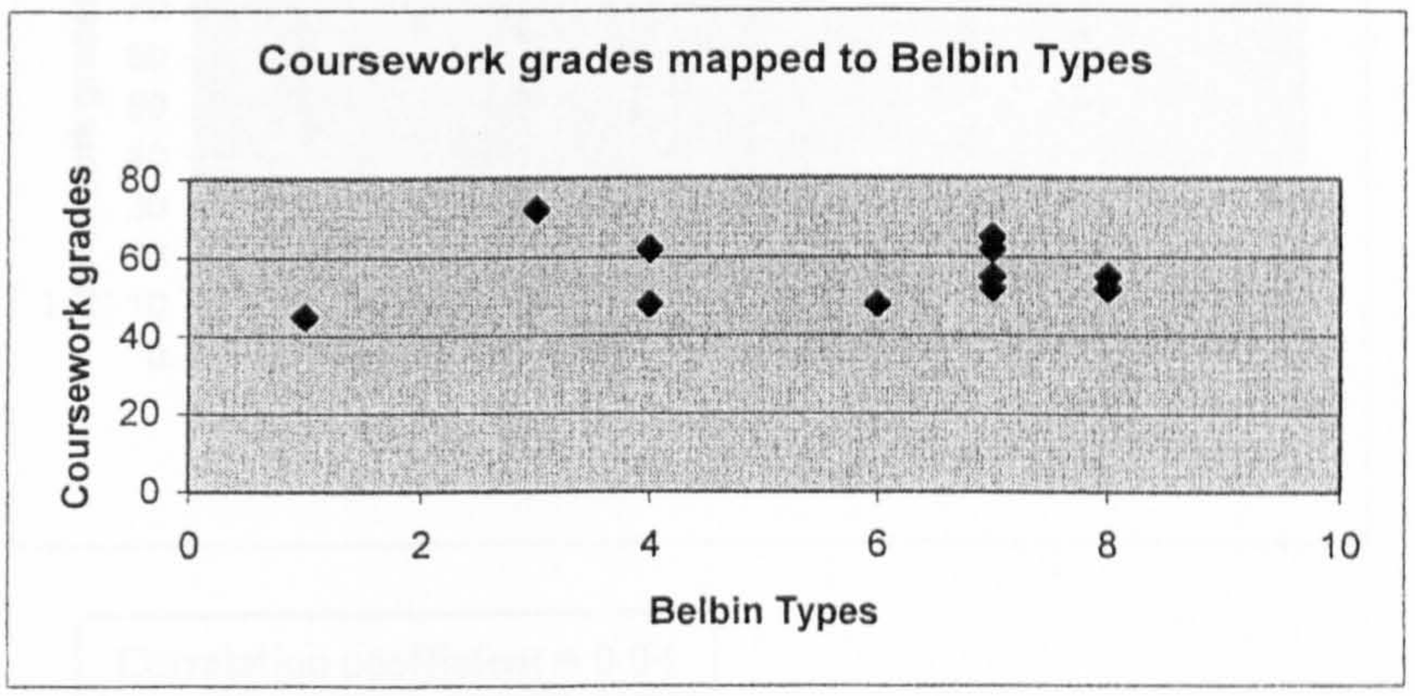
Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.27

Coursework grades mapped to Belbin types

Fieldwork Study 4

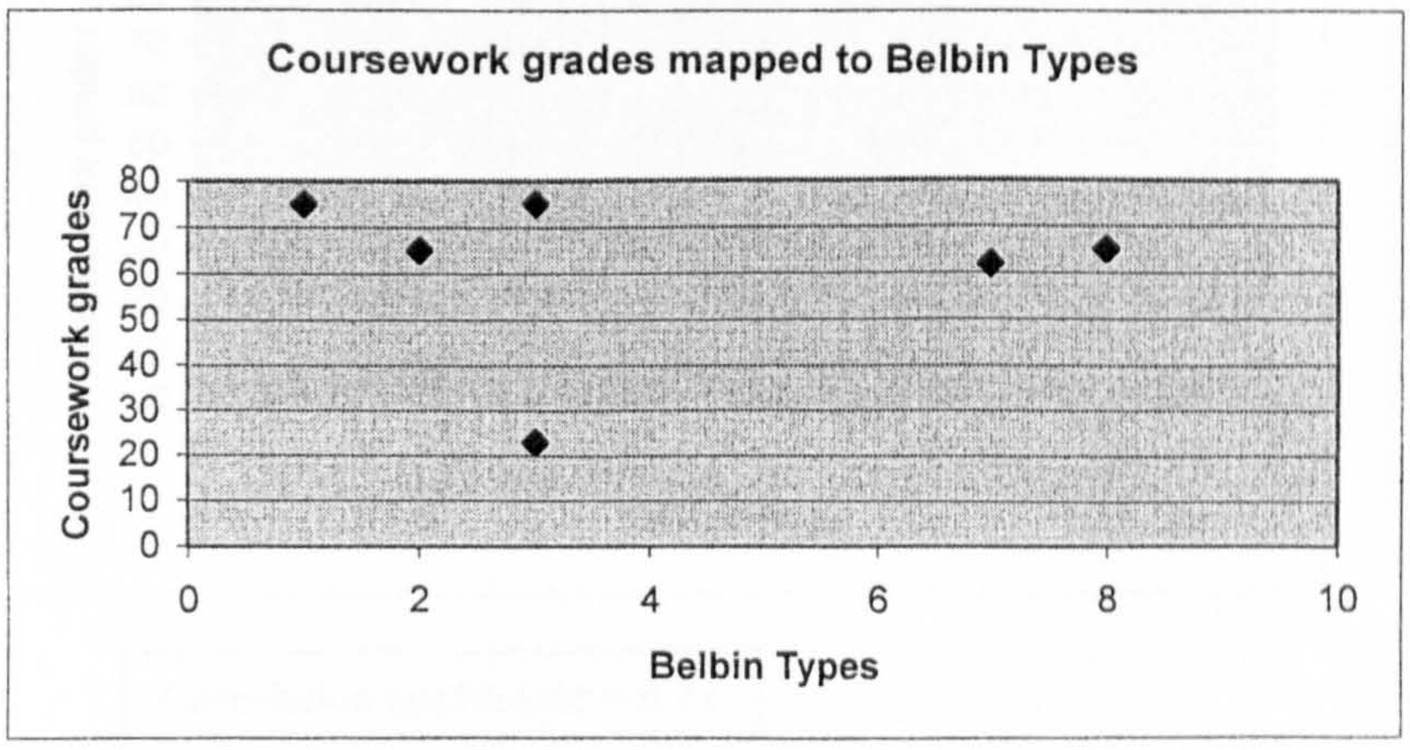


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.05

Fieldwork Study 5

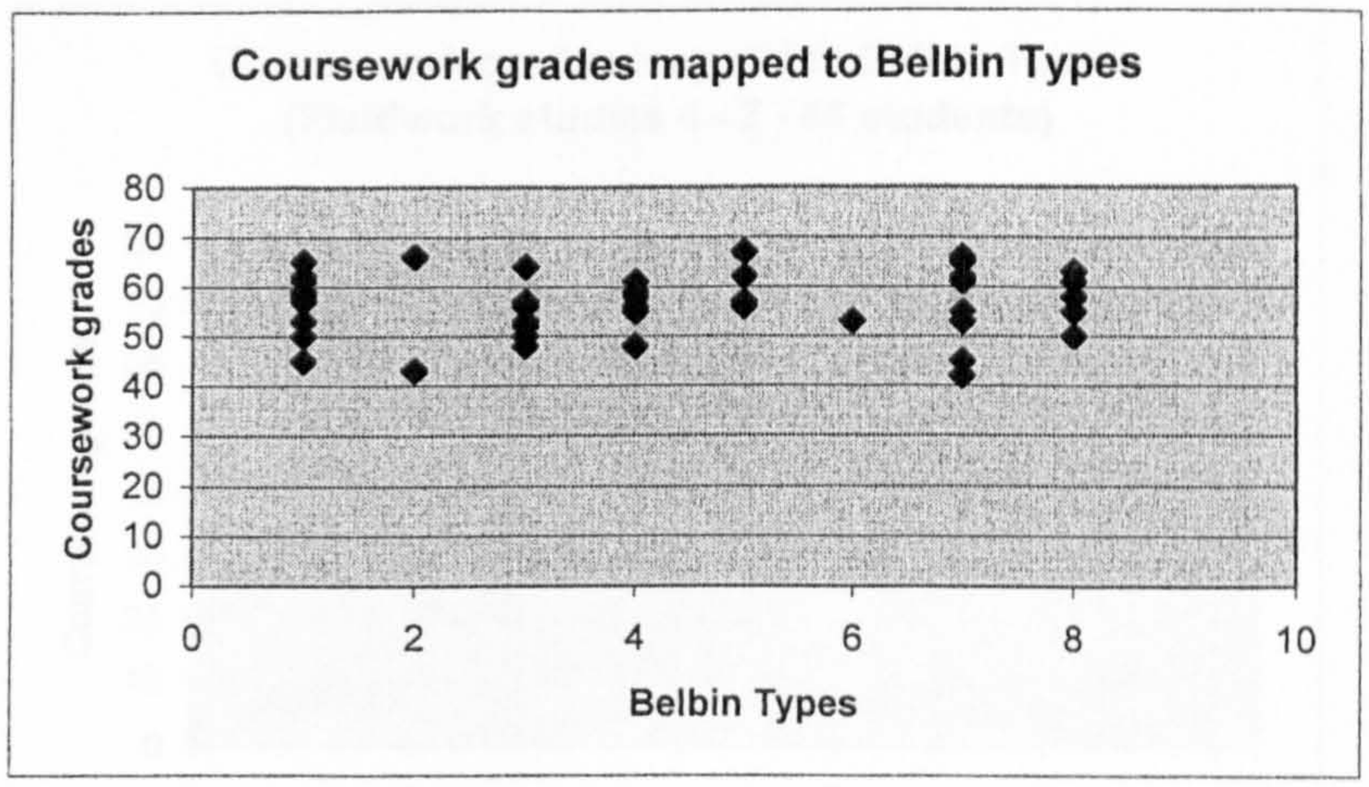


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.02

Fieldwork Study 6

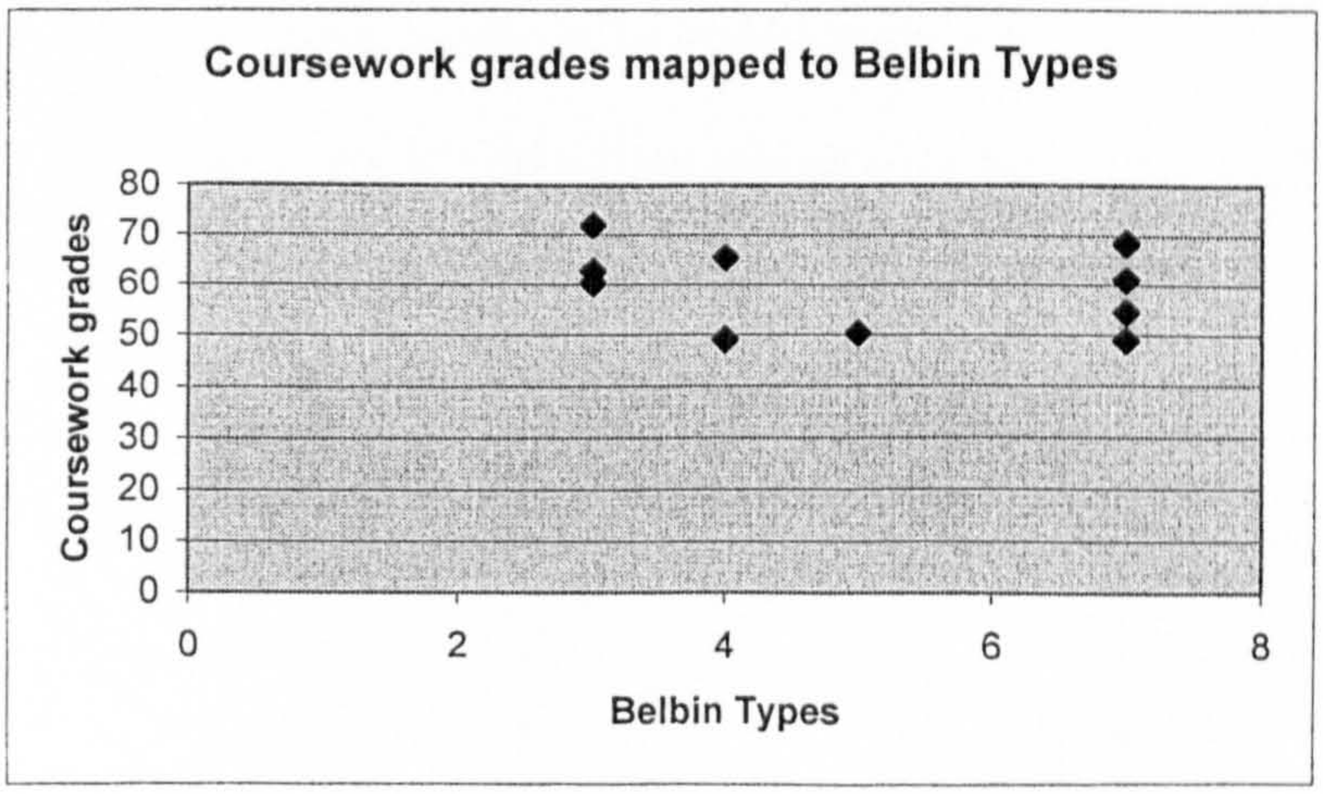


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.04

Fieldwork Study 7

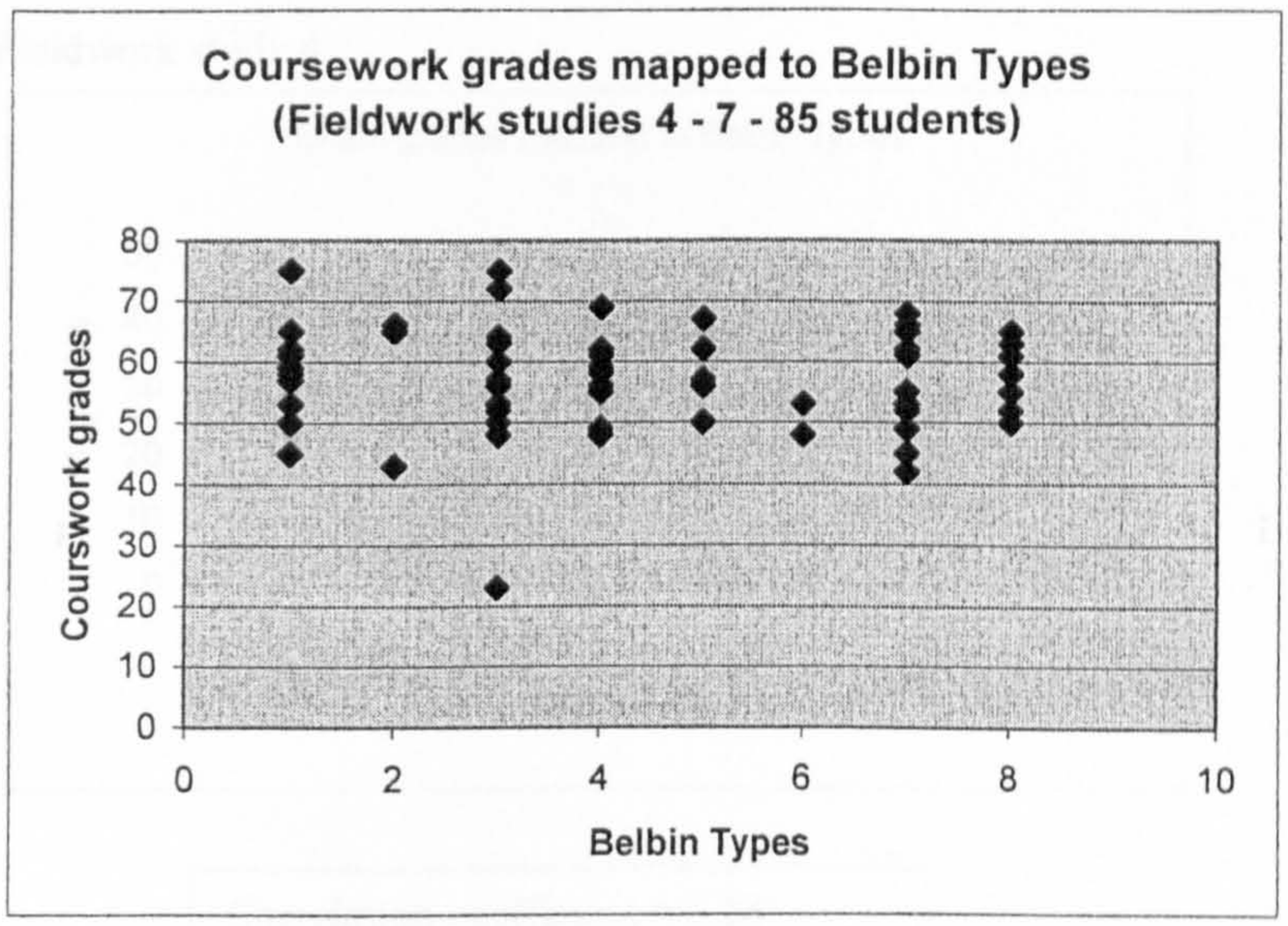


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.21

All Fieldwork studies – Coursework grades mapped to Belbin Types



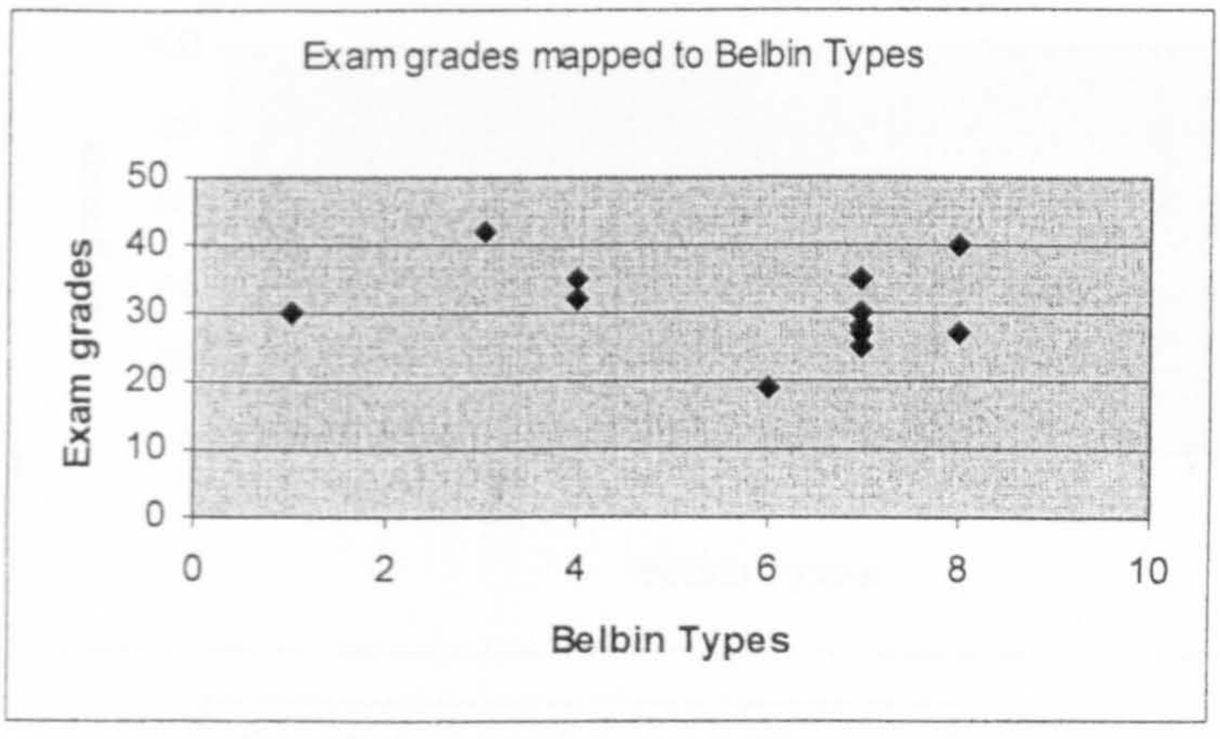
Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.0006

Exam grades mapped to Belbin Types

Fieldwork study 4

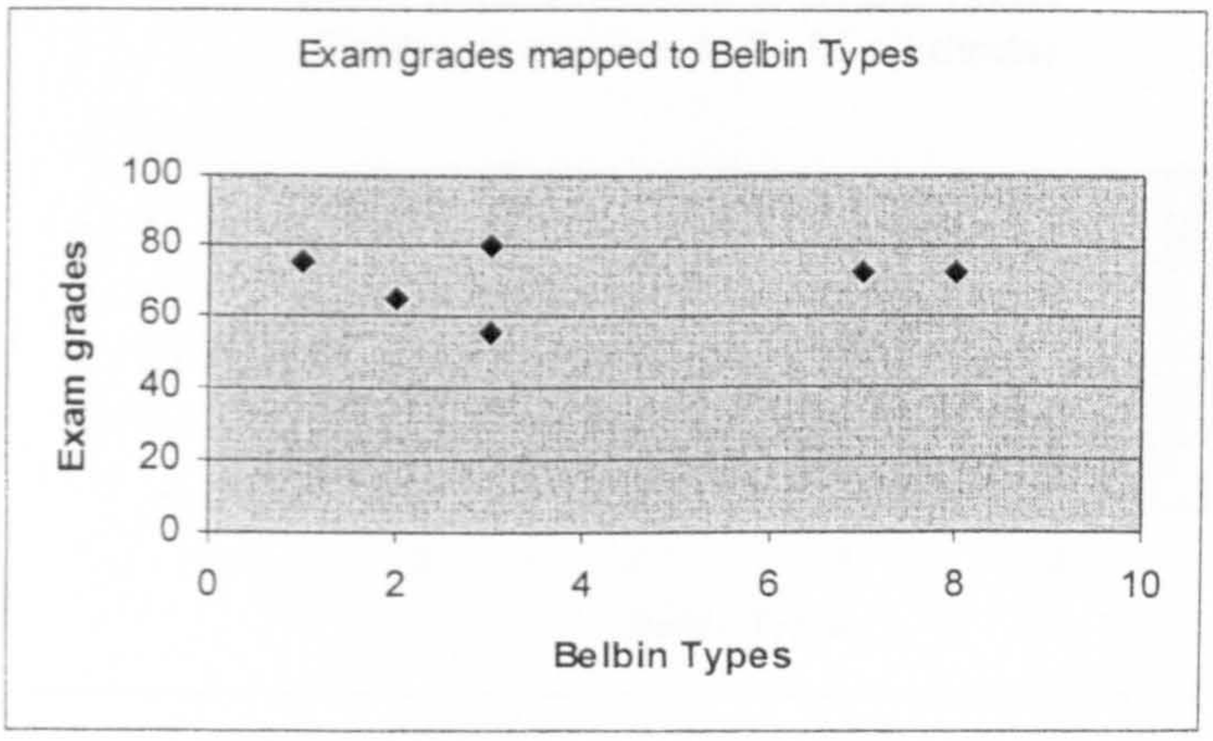


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.24

Fieldwork study 5

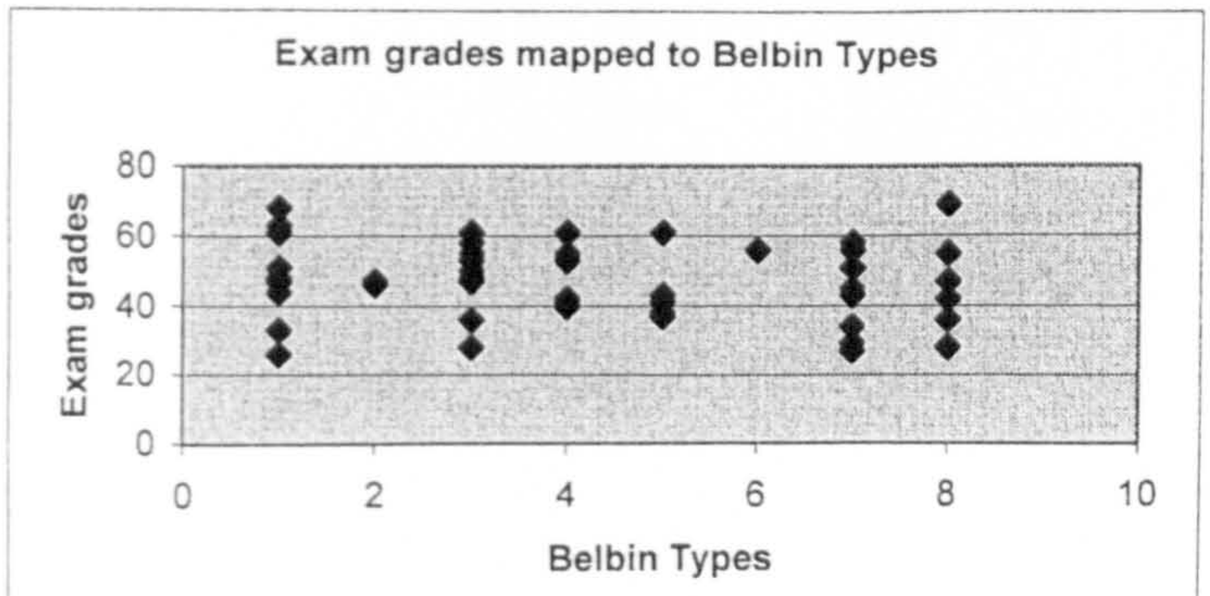


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.11

Fieldwork study 6

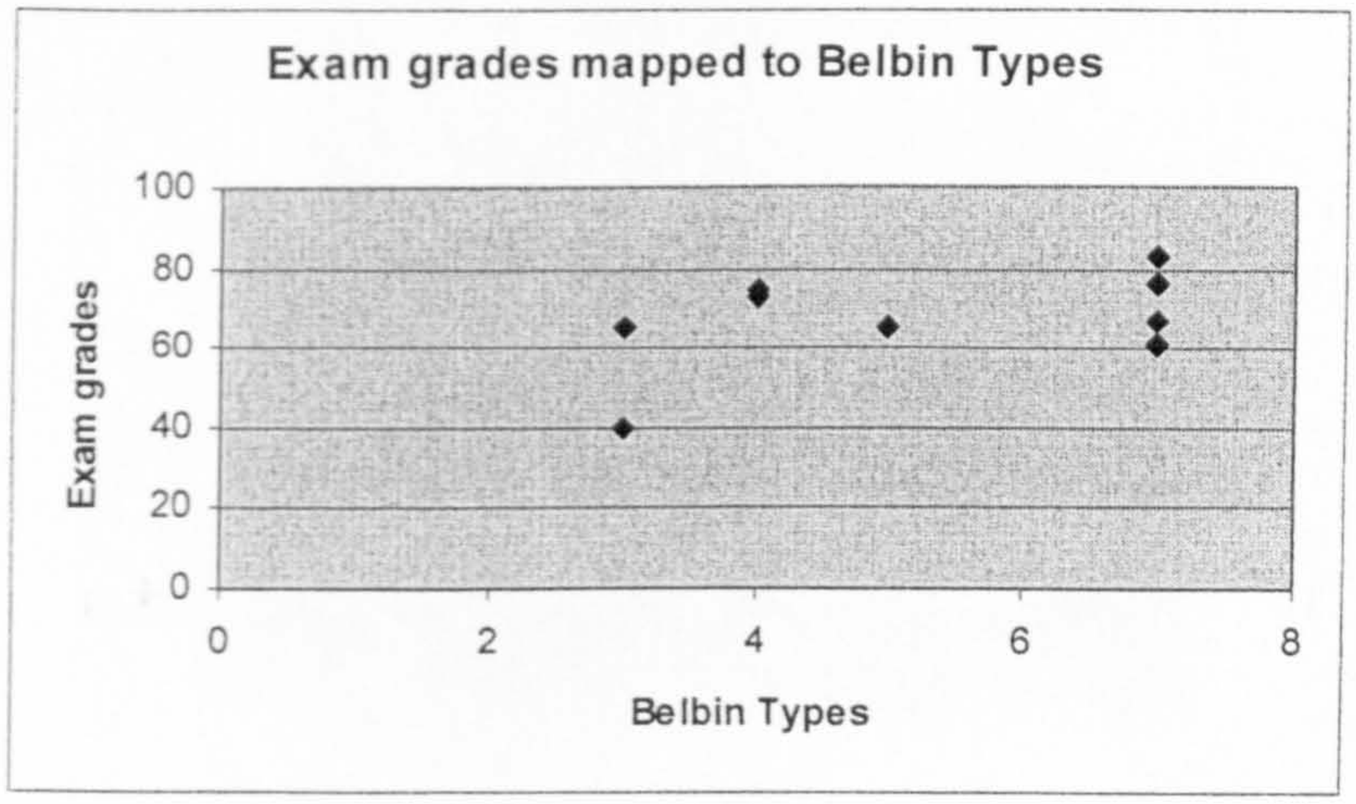


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.08

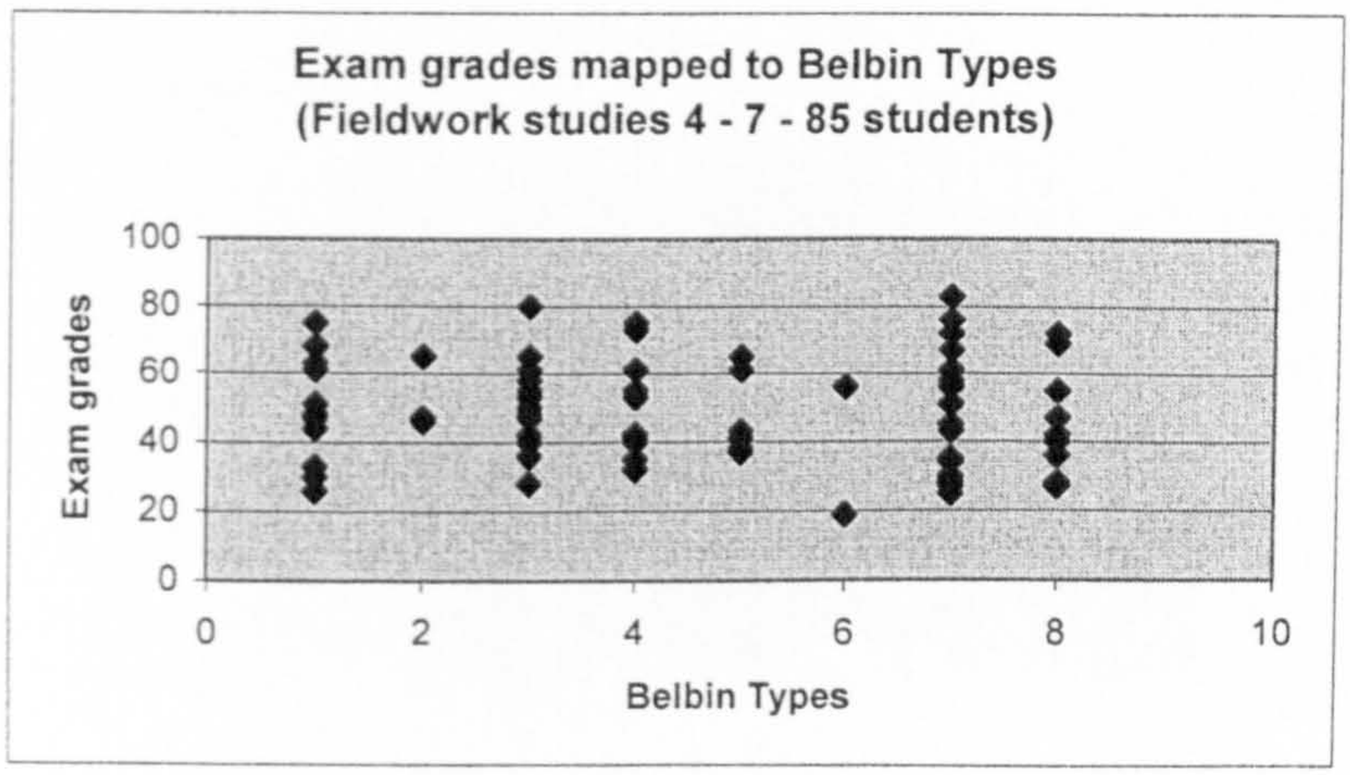
Fieldwork Study 7



Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.37



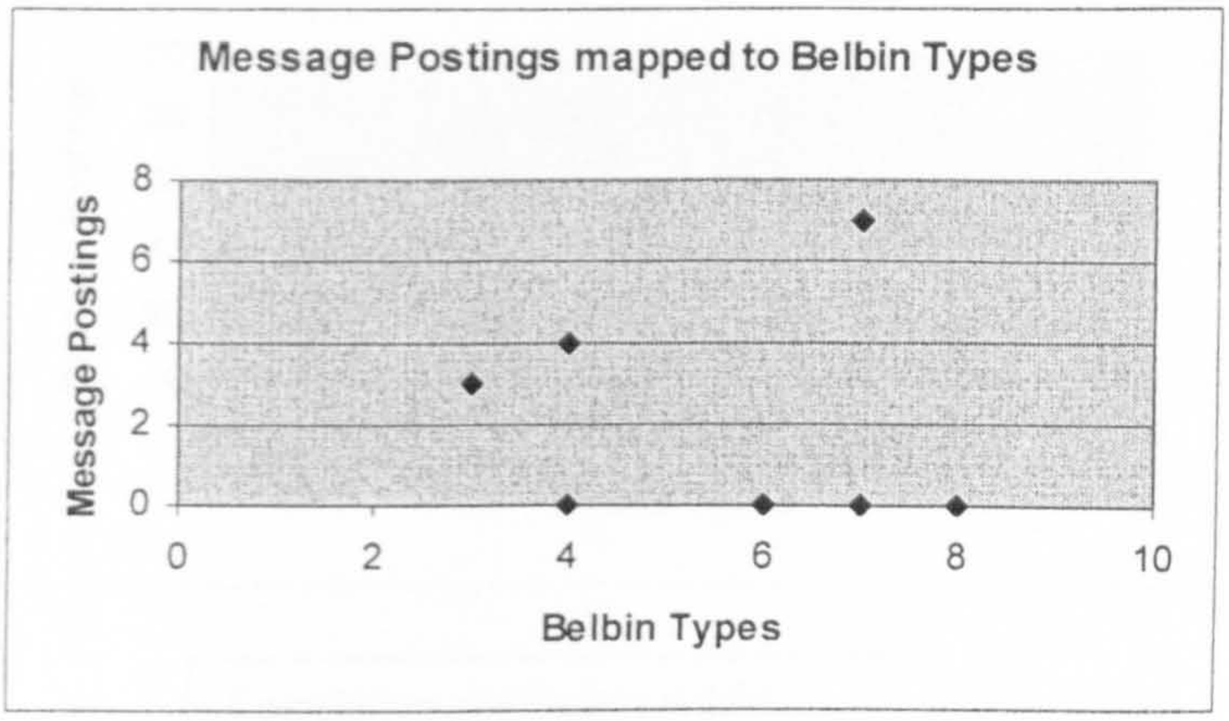
Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.07

Message Postings mapped to Belbin Types

Fieldwork Study 4

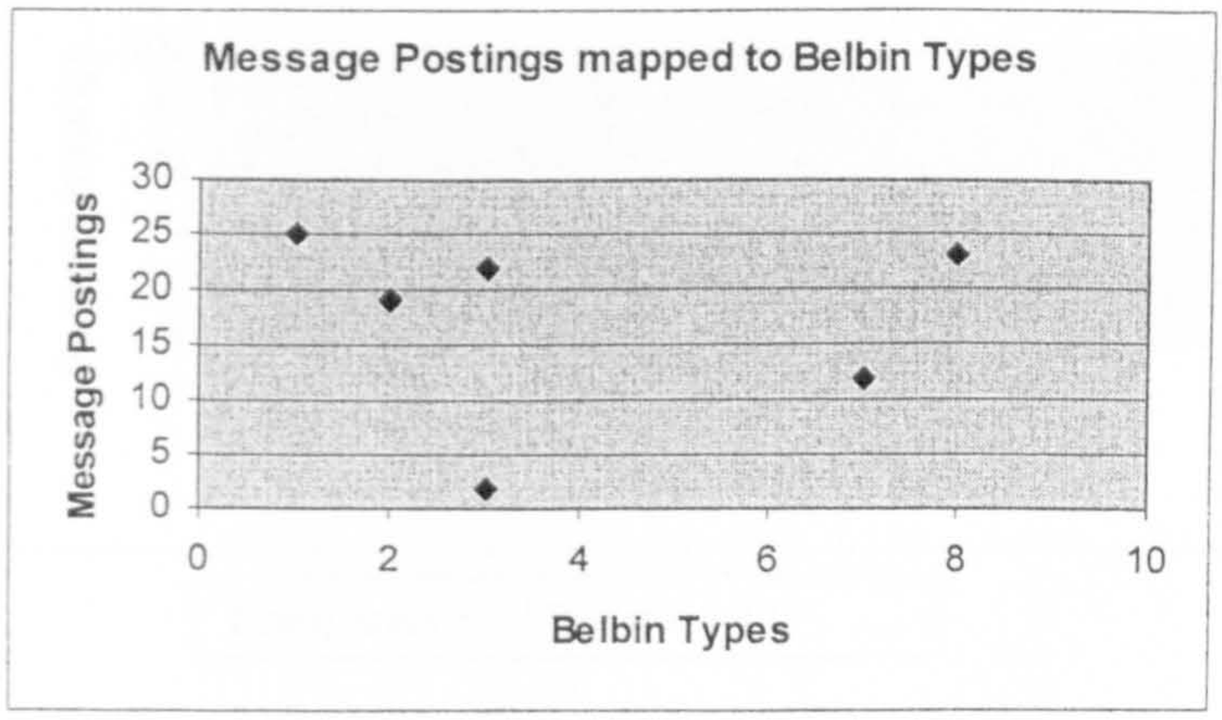


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.68

Fieldwork Study 5

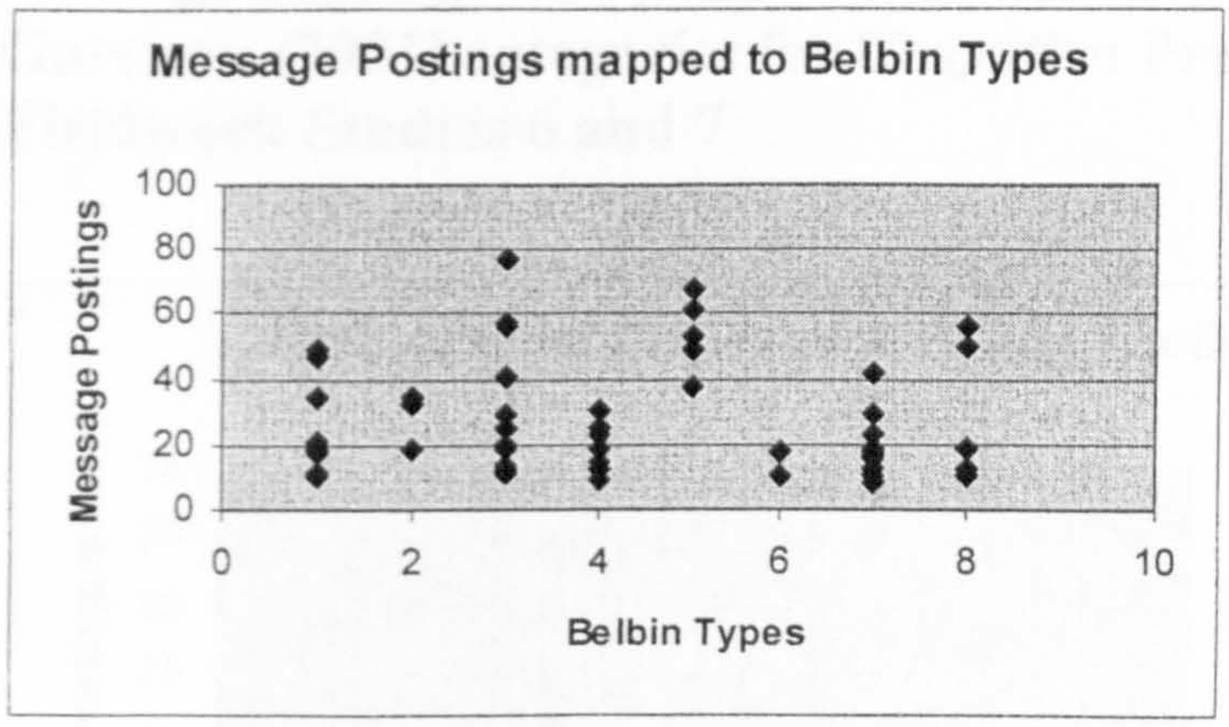


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.07

Fieldwork Study #6

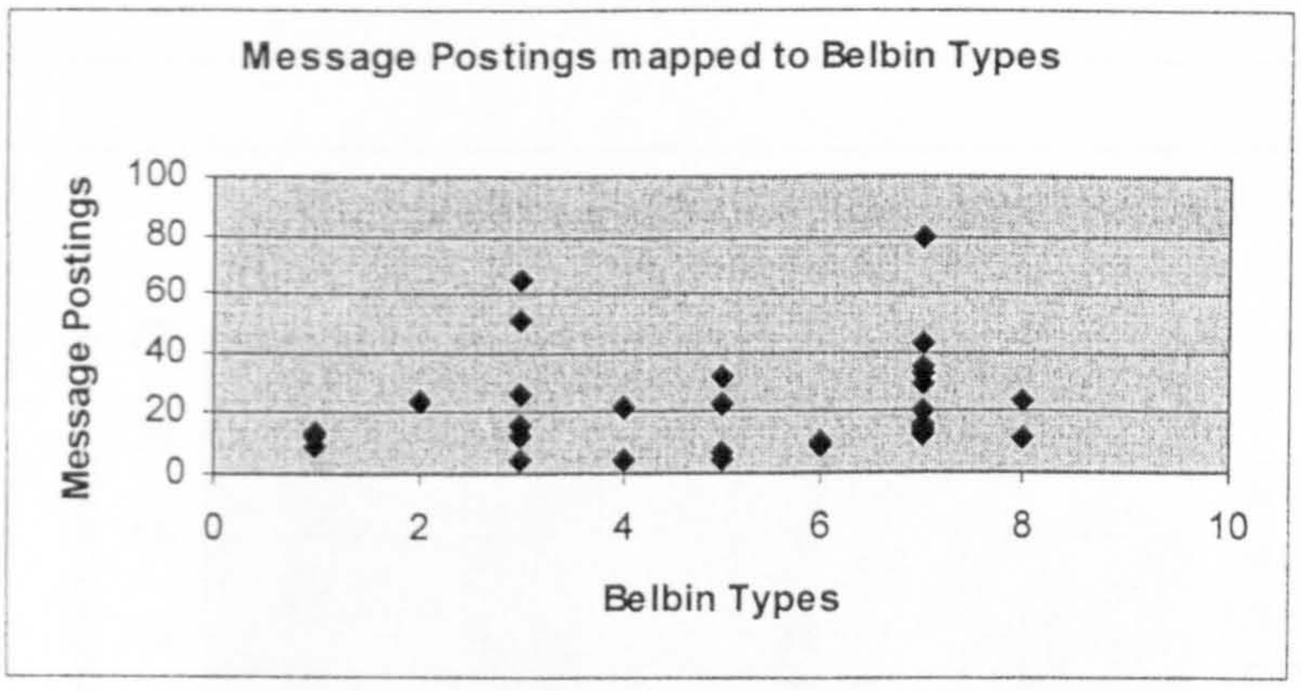


Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.04

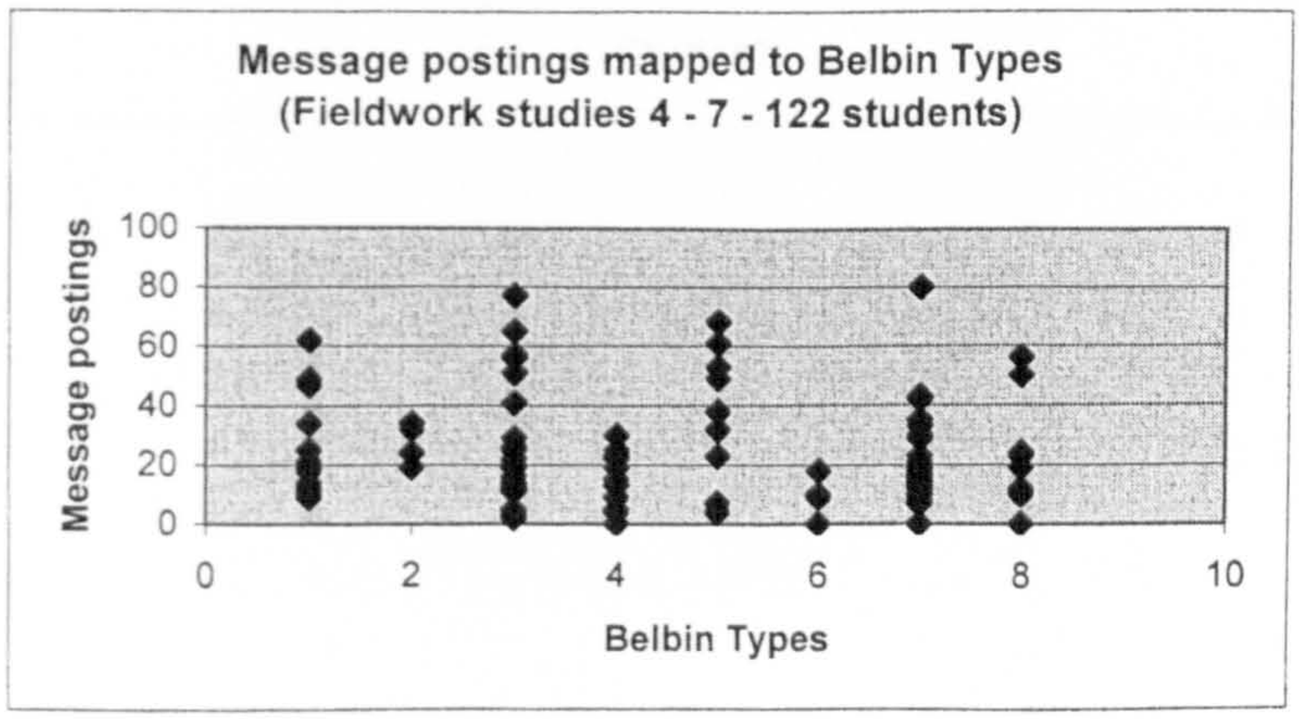
Fieldwork Study 7



Key

1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

Correlation coefficient = 0.37

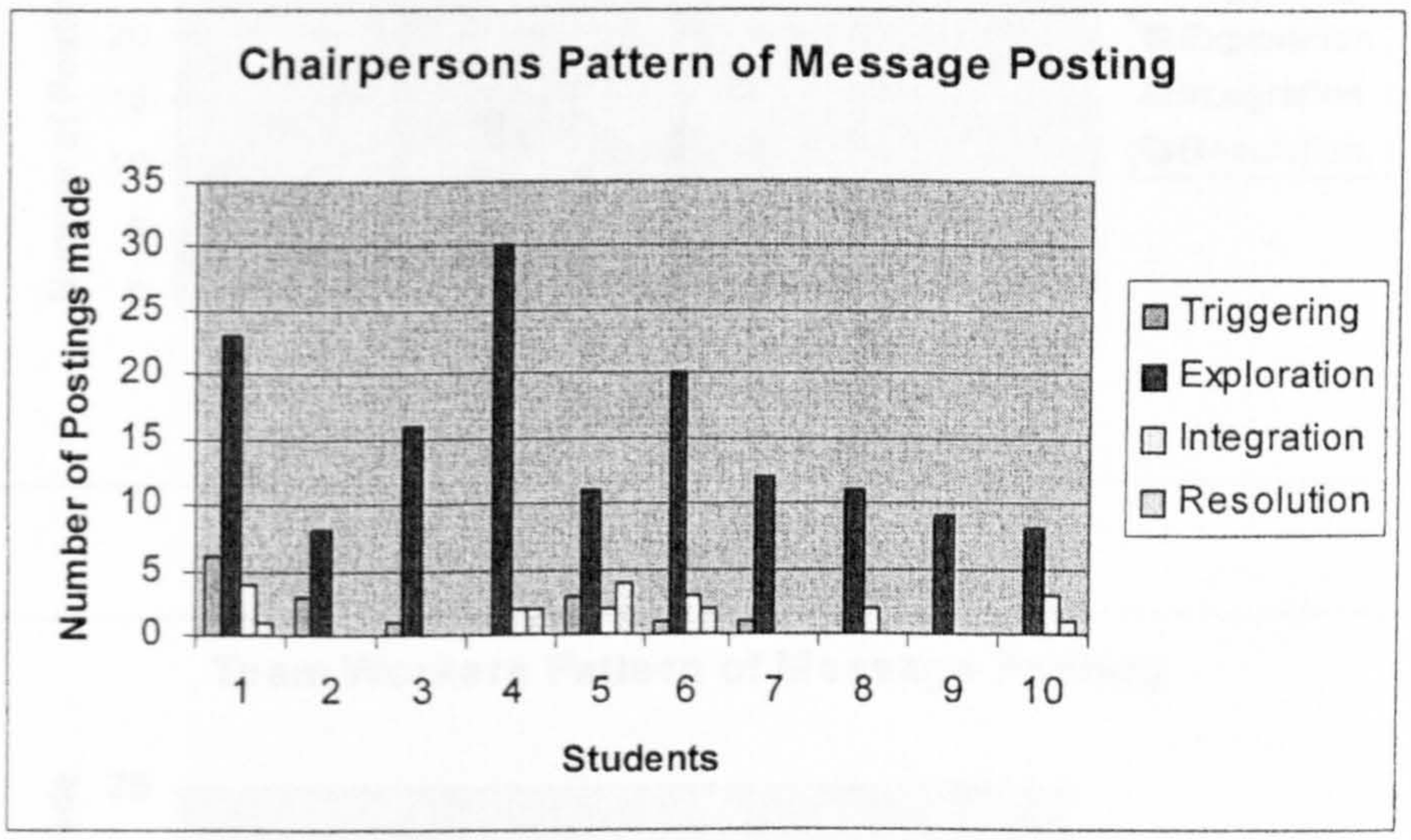


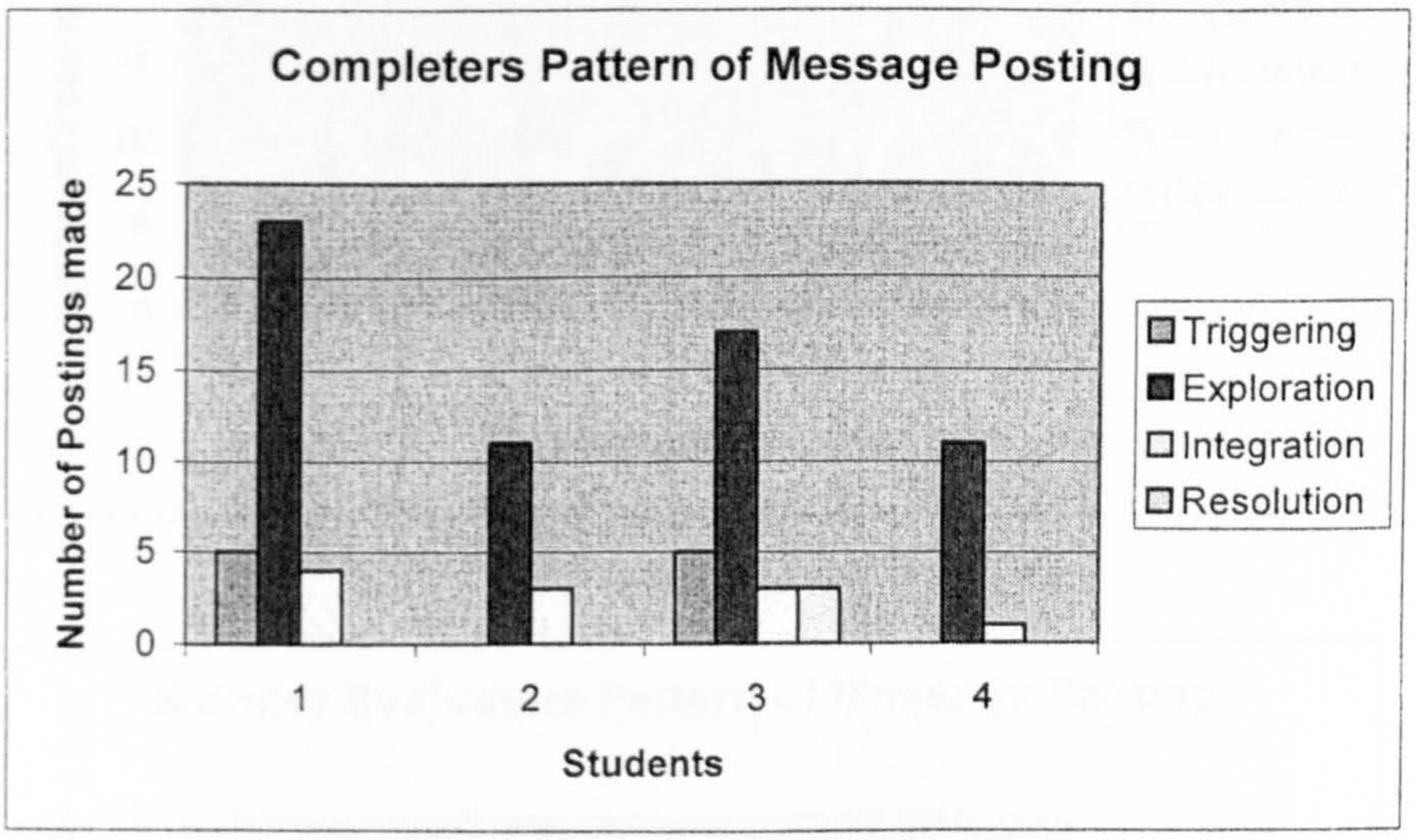
Key

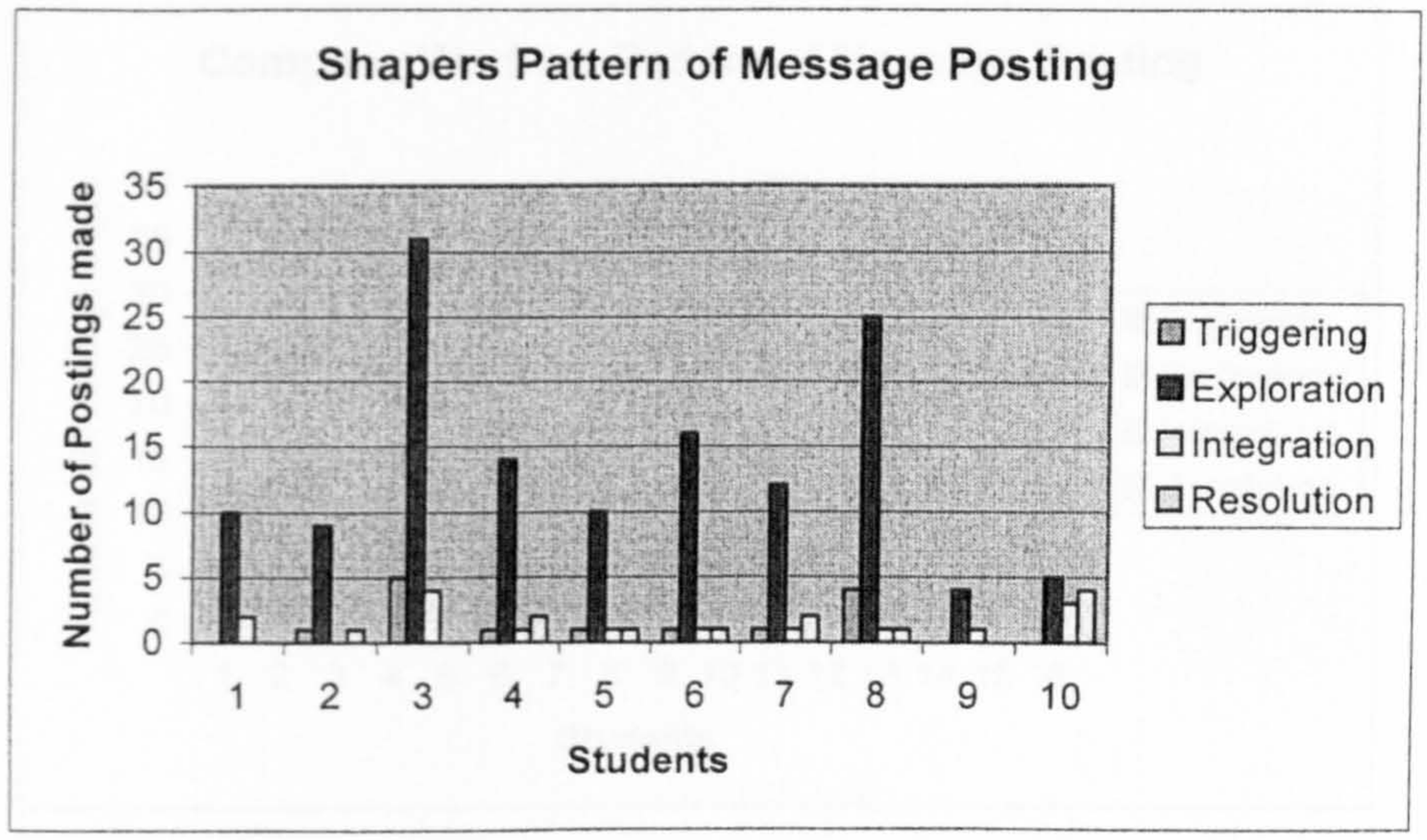
1 = Chairperson
2 = Completer
3 = Shaper
4 = Team worker
5 = Resource Investigator
6 = Monitor Evaluator
7 = Company worker
8 = Plant

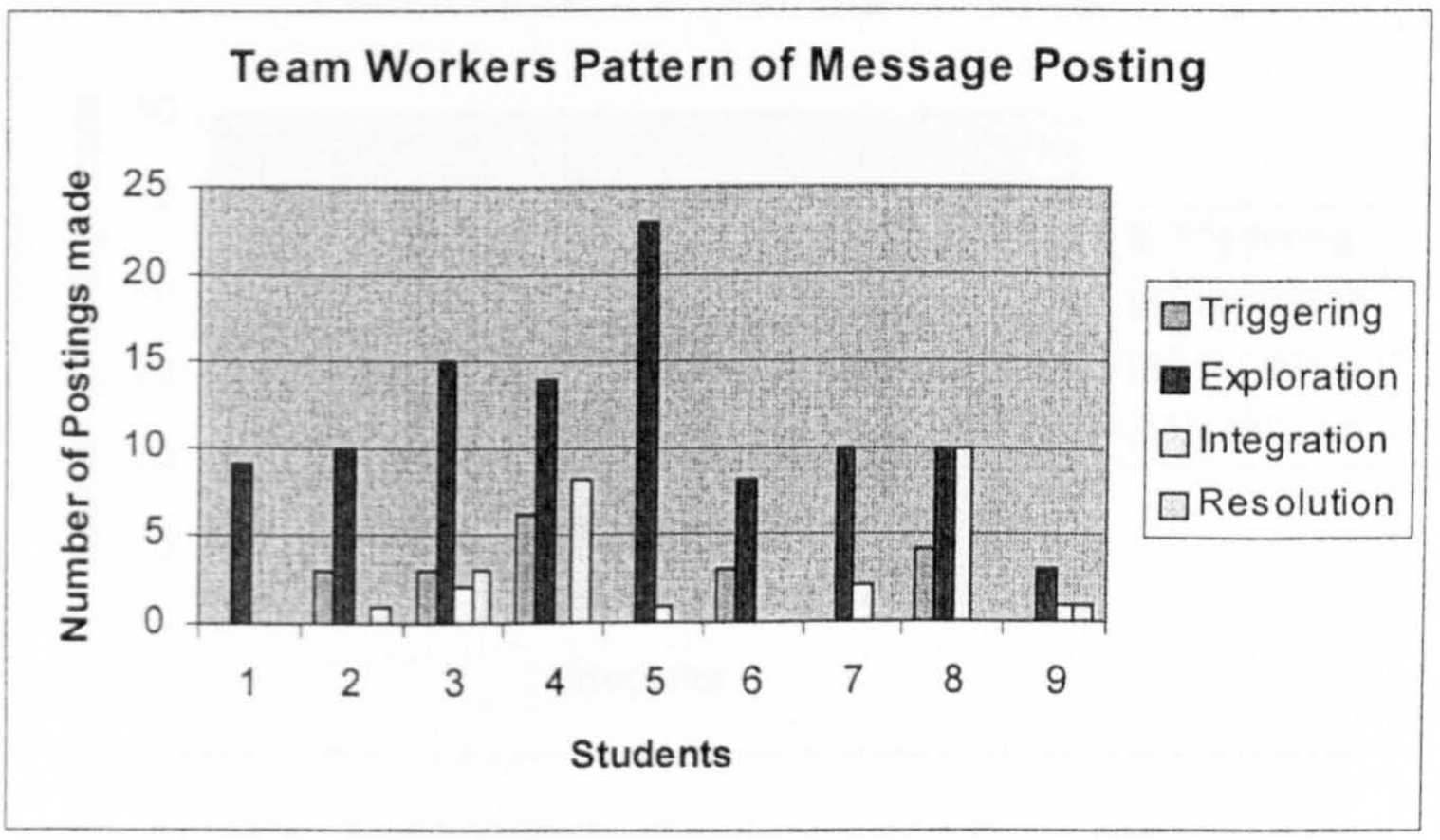
Correlation coefficient = 0.13

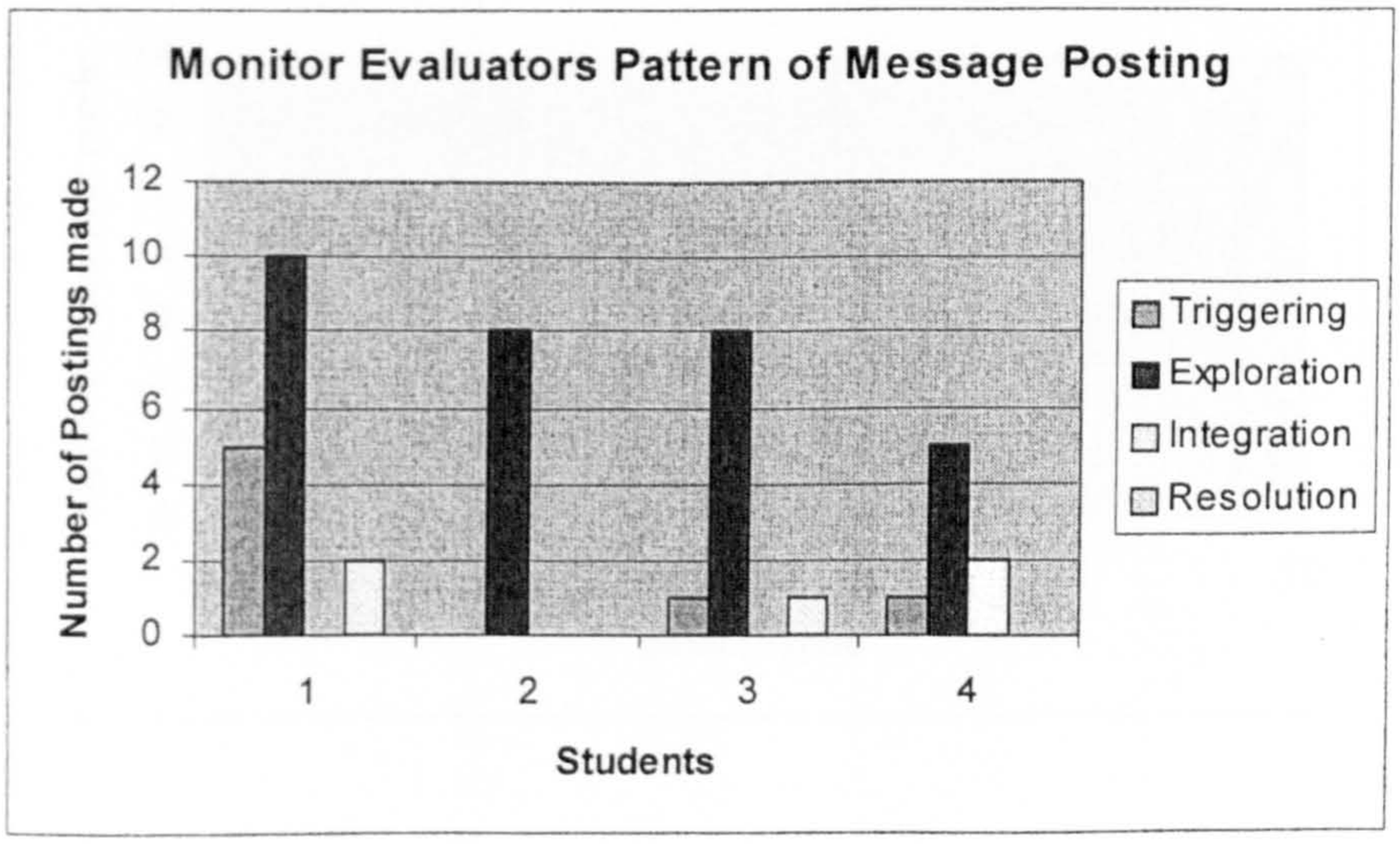
Message Postings mapped between Belbin (1981) Types and the Garrison (2001) categories for Cognitive Presence - Findings from Fieldwork Studies 6 and 7

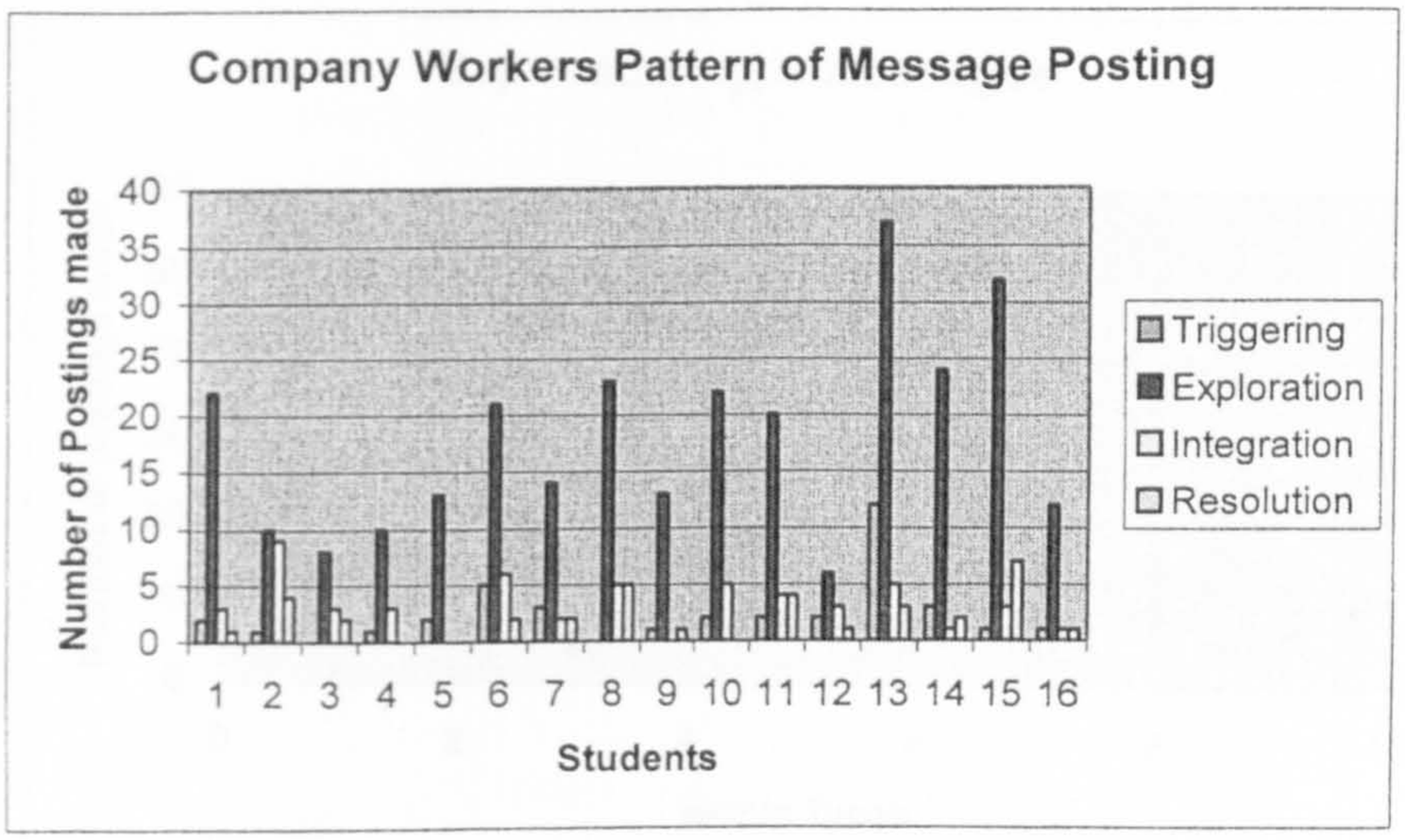


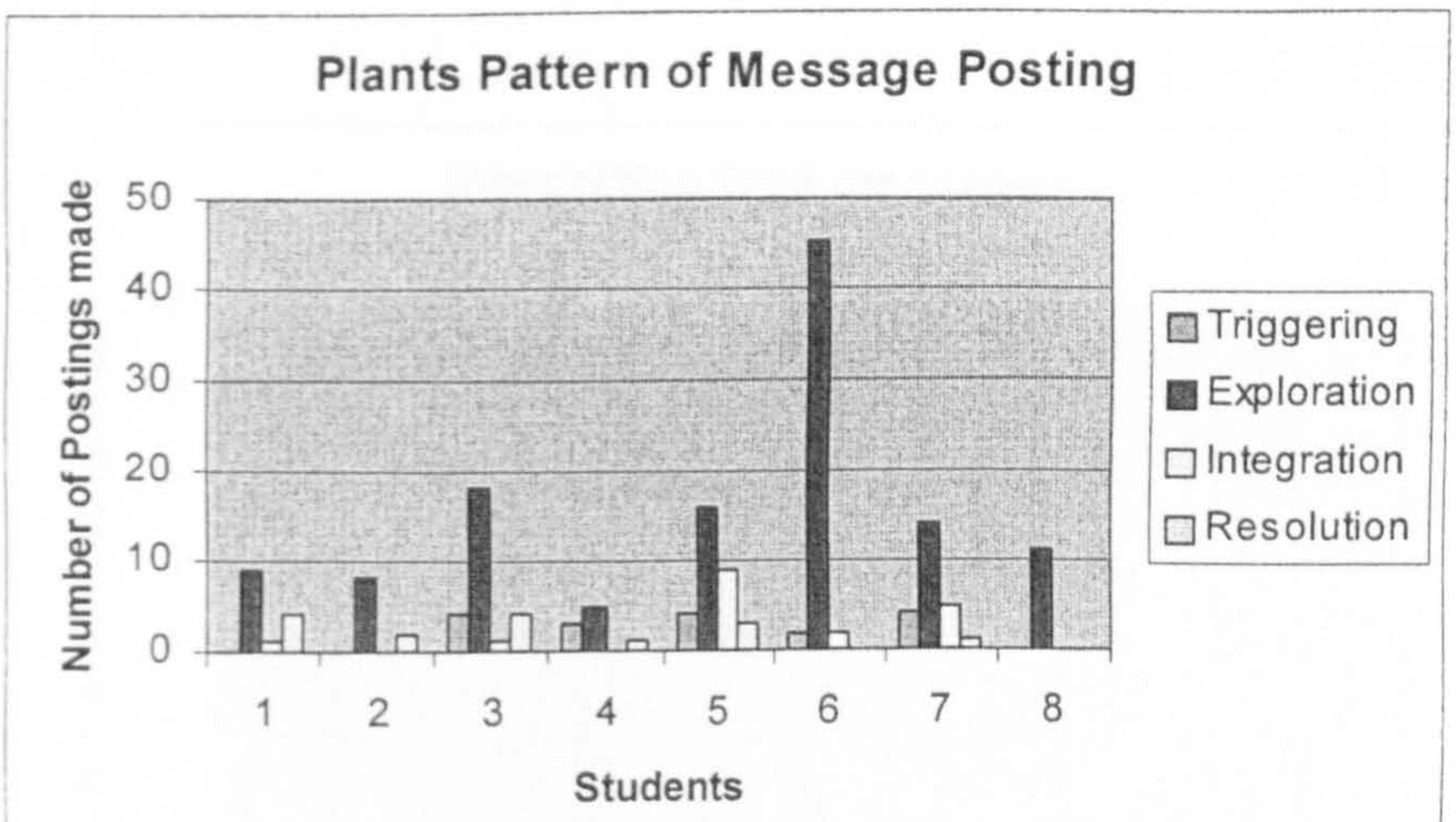


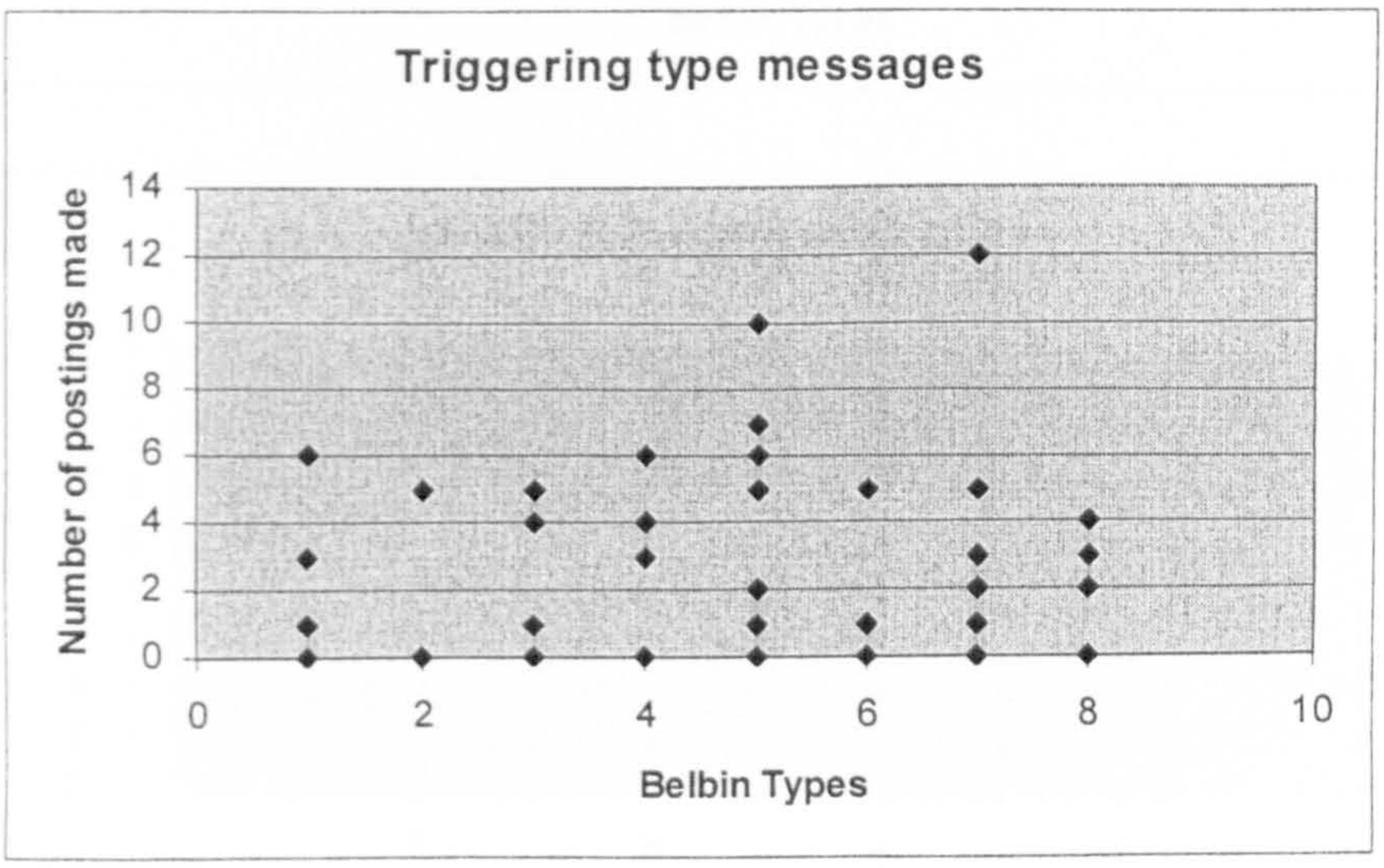

Shapers Pattern of Message Posting
Number of Postings made
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10
Students
Triggering
Exploration
Integration
Resolution

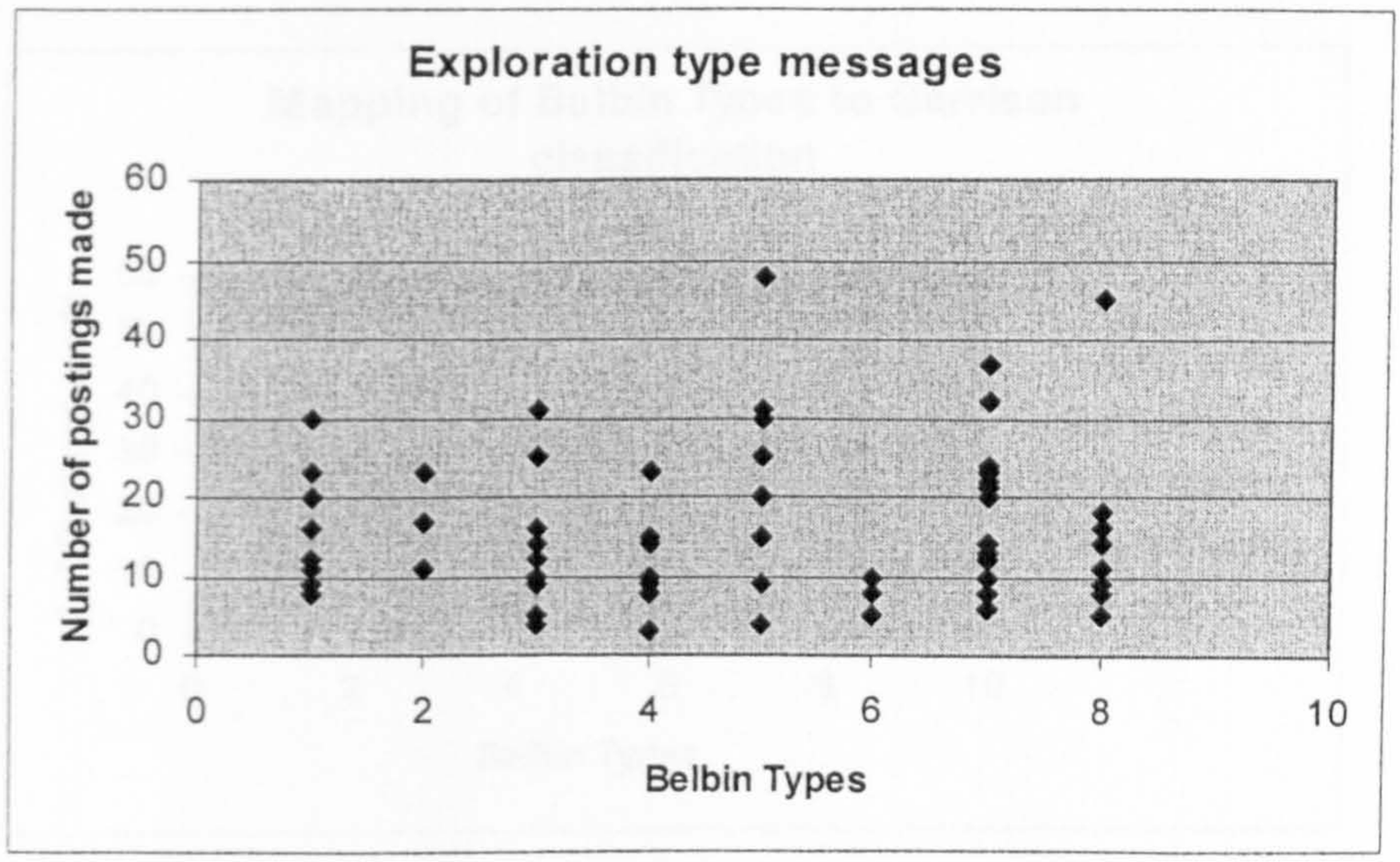

Team Workers Pattern of Message Posting
Number of Postings made
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9
Students
Triggering
Exploration
Integration
Resolution

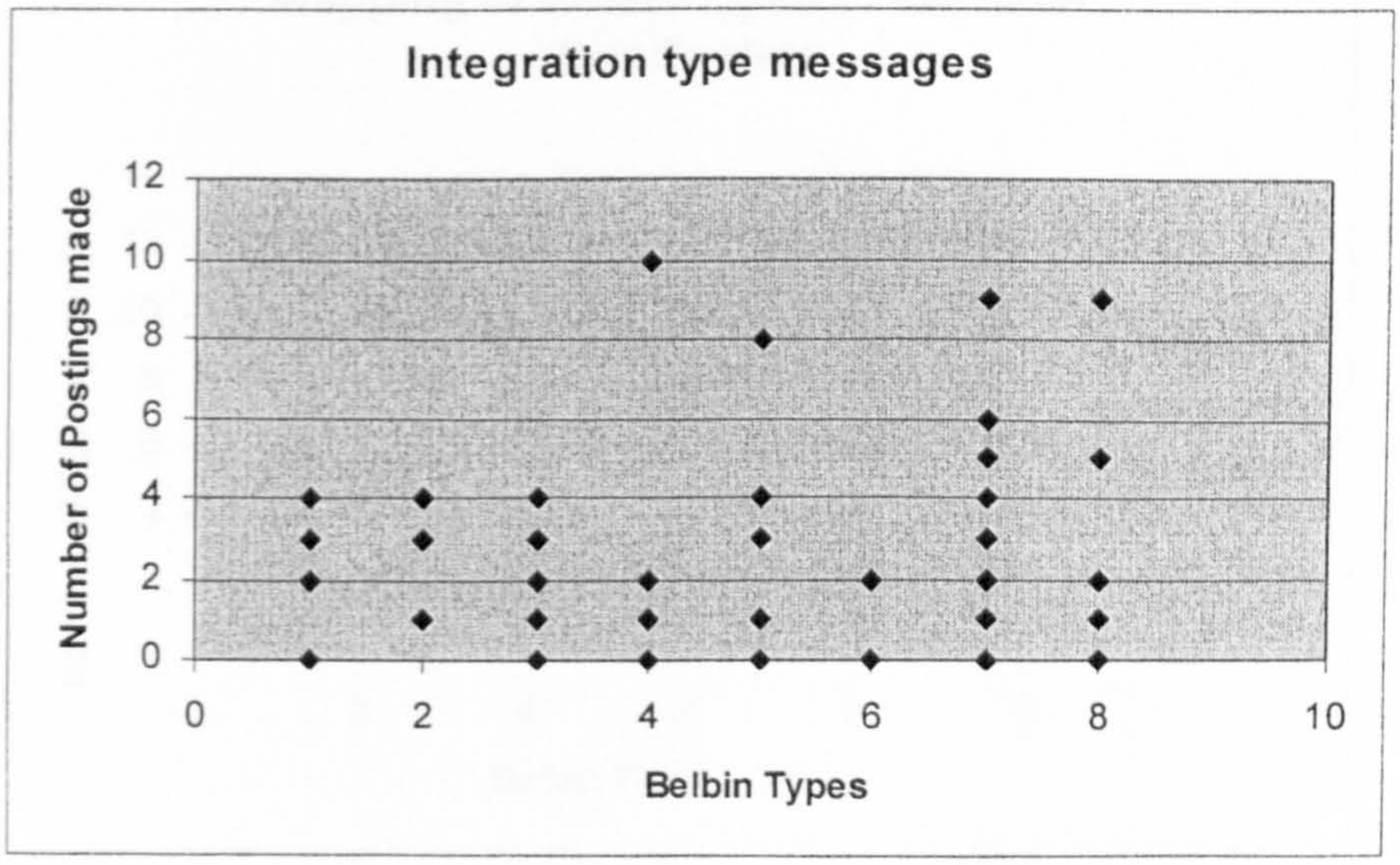

Monitor Evaluators Pattern of Message Posting
Number of Postings made
12
10
8
6
4
2
0
1 2 3 4
Students
Triggering
Exploration
Integration
Resolution

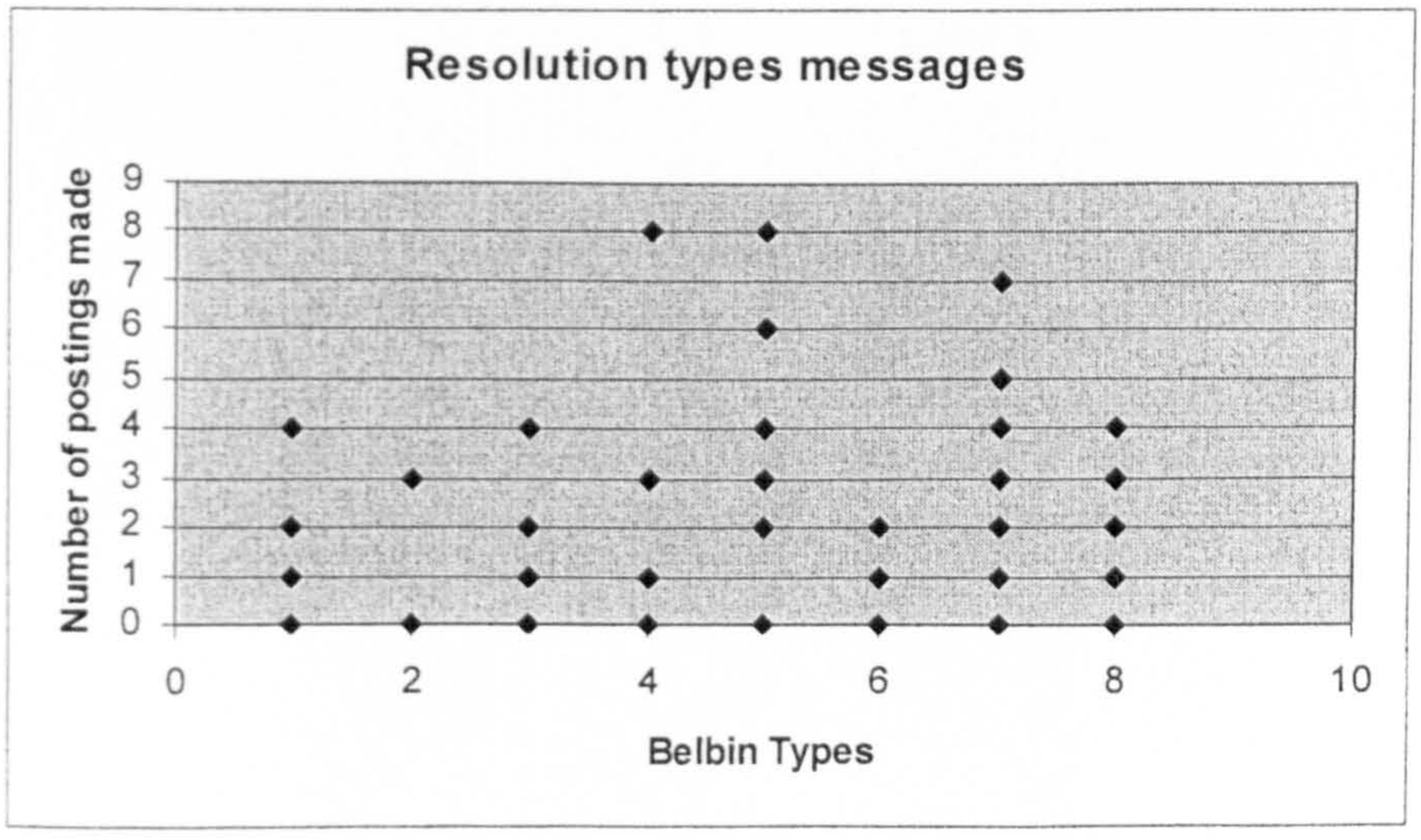

Company Workers Pattern of Message Posting
Number of Postings made
40
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Students
Triggering
Exploration
Integration
Resolution

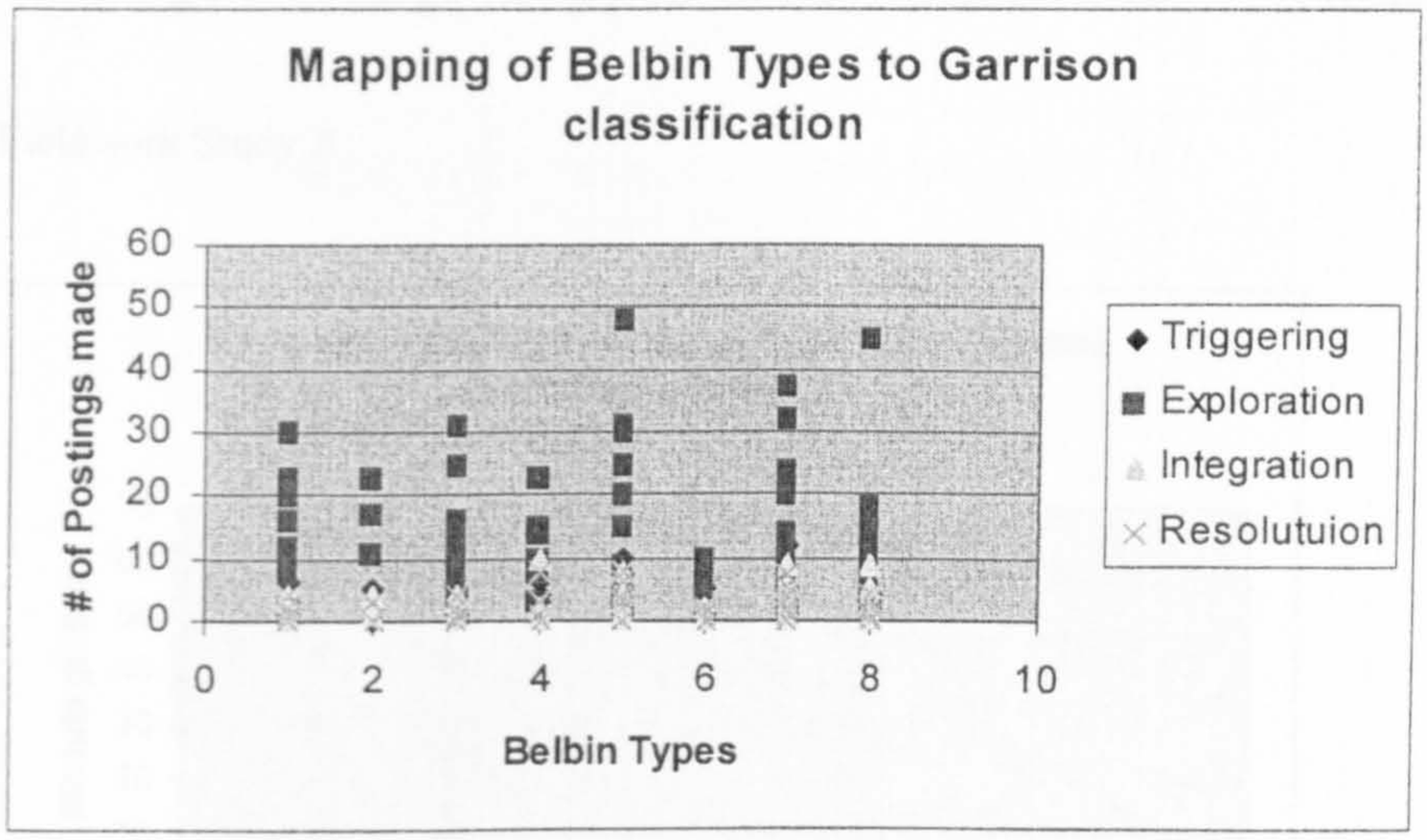

Plants Pattern of Message Posting
Number of Postings made
50
40
30
20
10
0
1 2 3 4 5 6 7 8
Students
Triggering
Exploration
Integration
Resolution

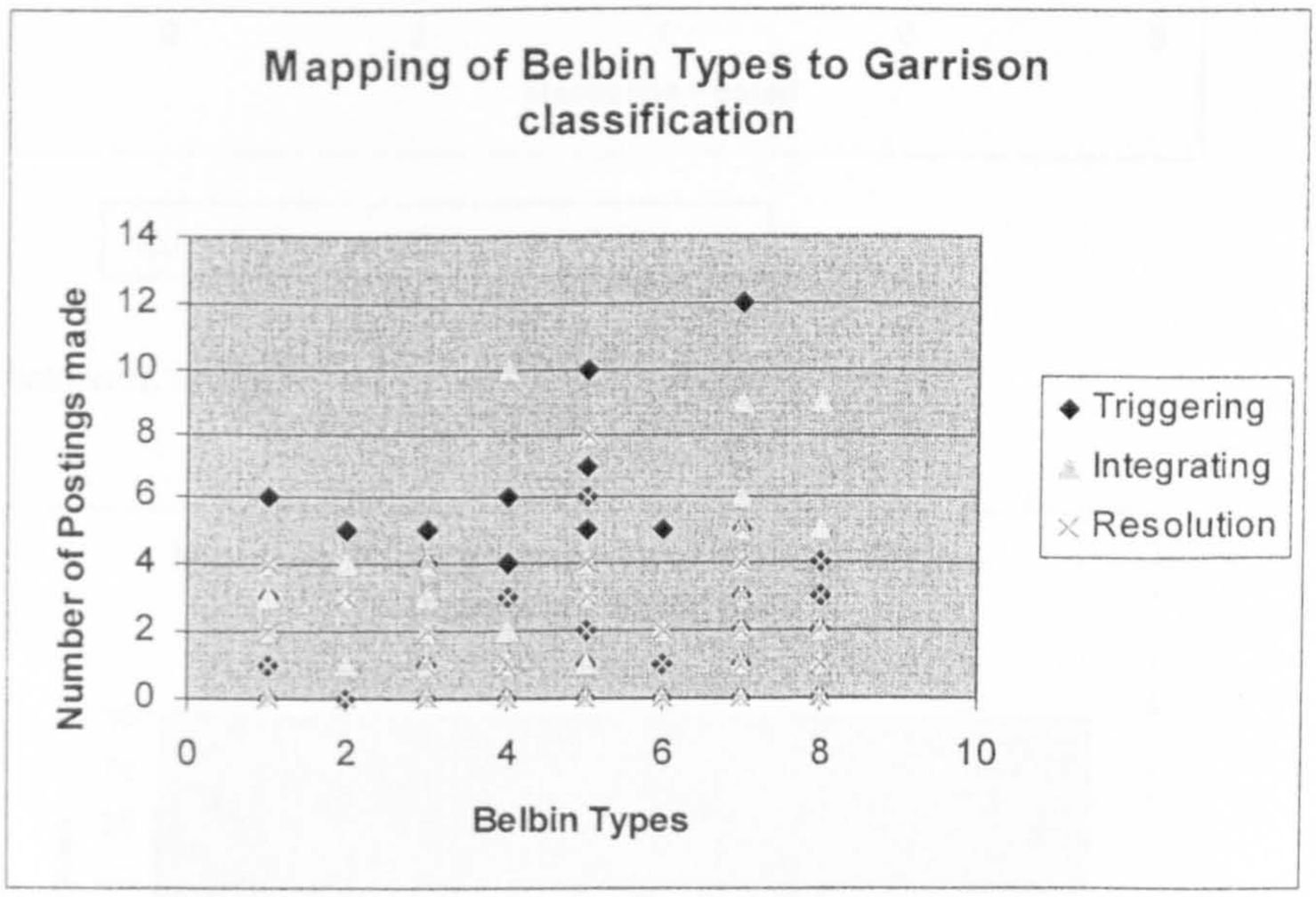

Triggering type messages
Number of postings made
14
12
10
8
6
4
2
0
0 2 4 6 8 10
Belbin Types


Exploration type messages
Number of postings made
60
50
40
30
20
10
0
0
2
4
6
8
10
Belbin Types


Integration type messages
Number of Postings made
12
10
8
6
4
2
0
0
2
4
6
8
10
Belbin Types

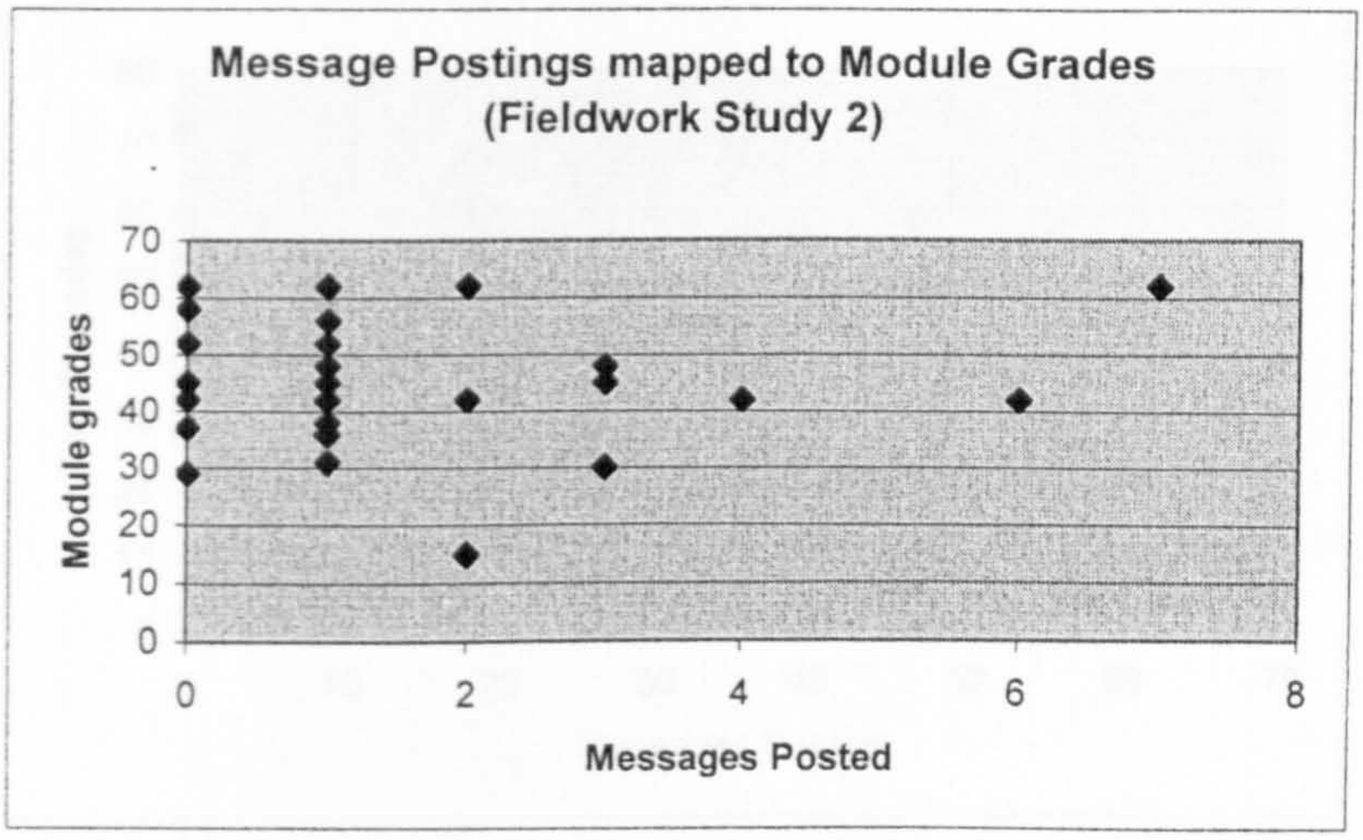

Resolution types messages
Number of postings made
9
8
7
6
5
4
3
2
1
0
0
2
4
6
8
10
Belbin Types


Mapping of Belbin Types to Garrison classification
# of Postings made
60
50
40
30
20
10
0
0
2
4
6
8
10
Belbin Types
Triggering
Exploration
Integration
Resolutuion


Mapping of Belbin Types to Garrison classification
Number of Postings made
14
12
10
8
6
4
2
0
0
2
4
6
8
10
Belbin Types
Triggering
Integrating
Resolution

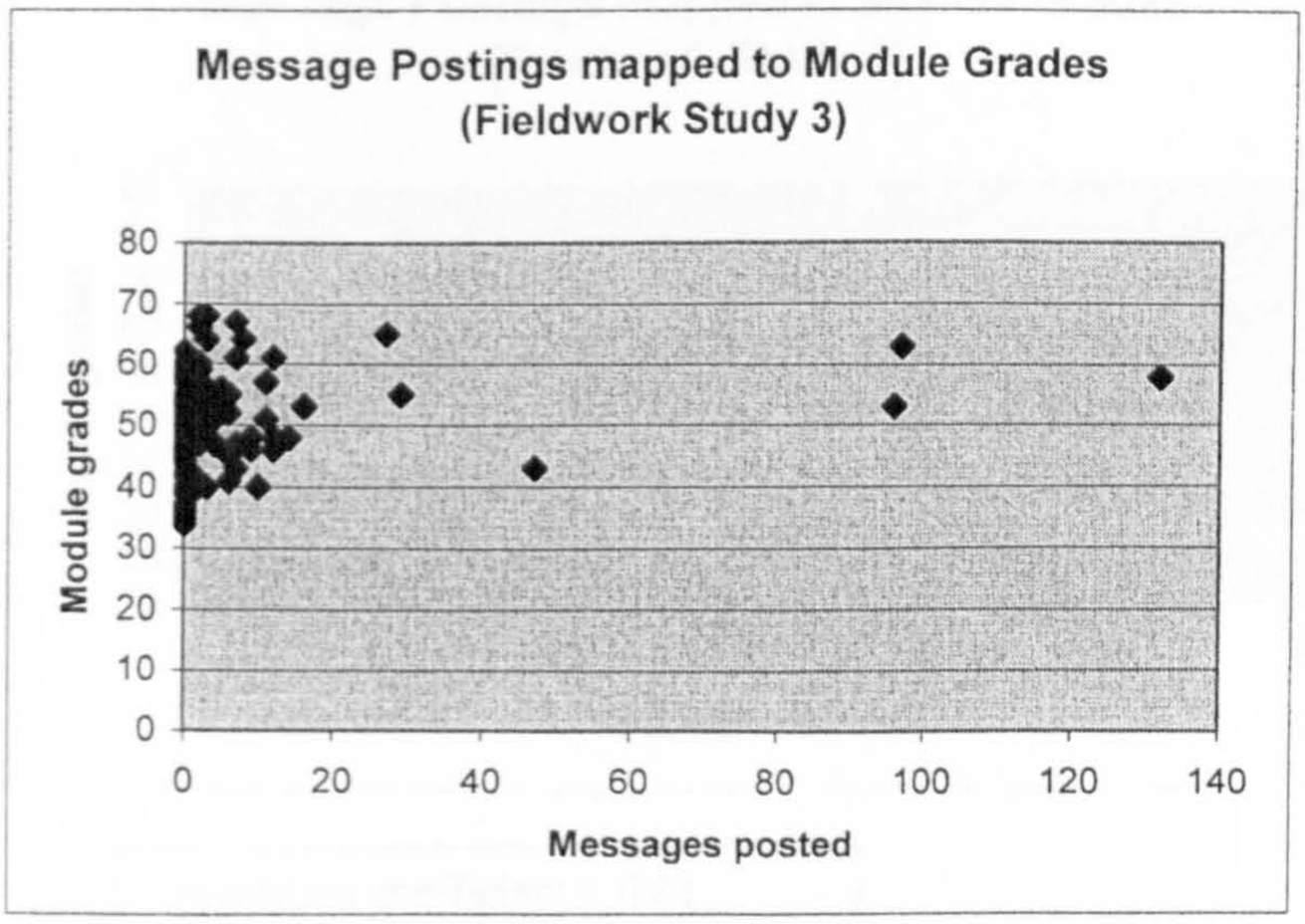
Message Postings mapped to Module Grades – Whole Cohort

Fieldwork Study 2



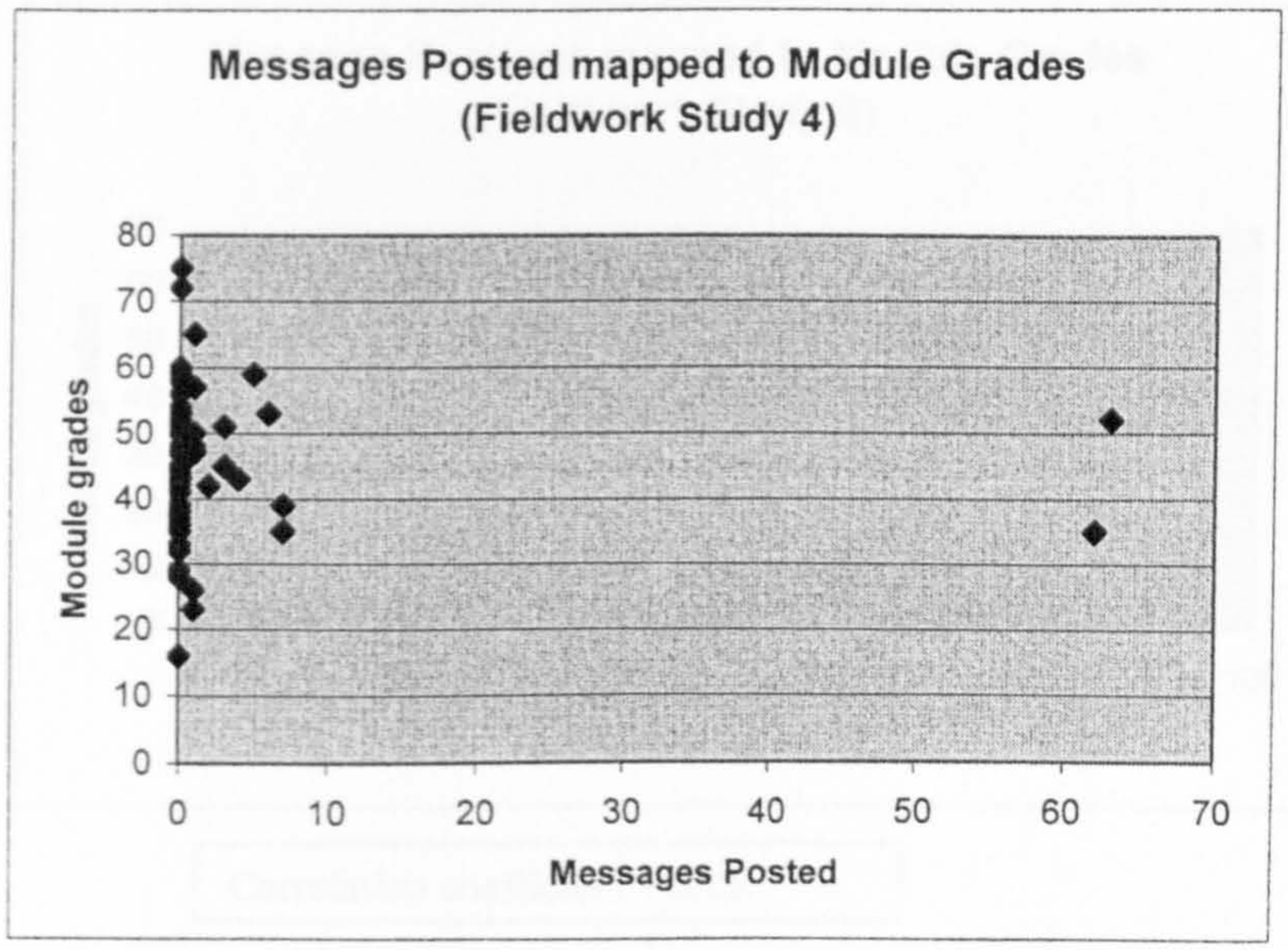
Correlation coefficient = 0.075

Fieldwork Study 3



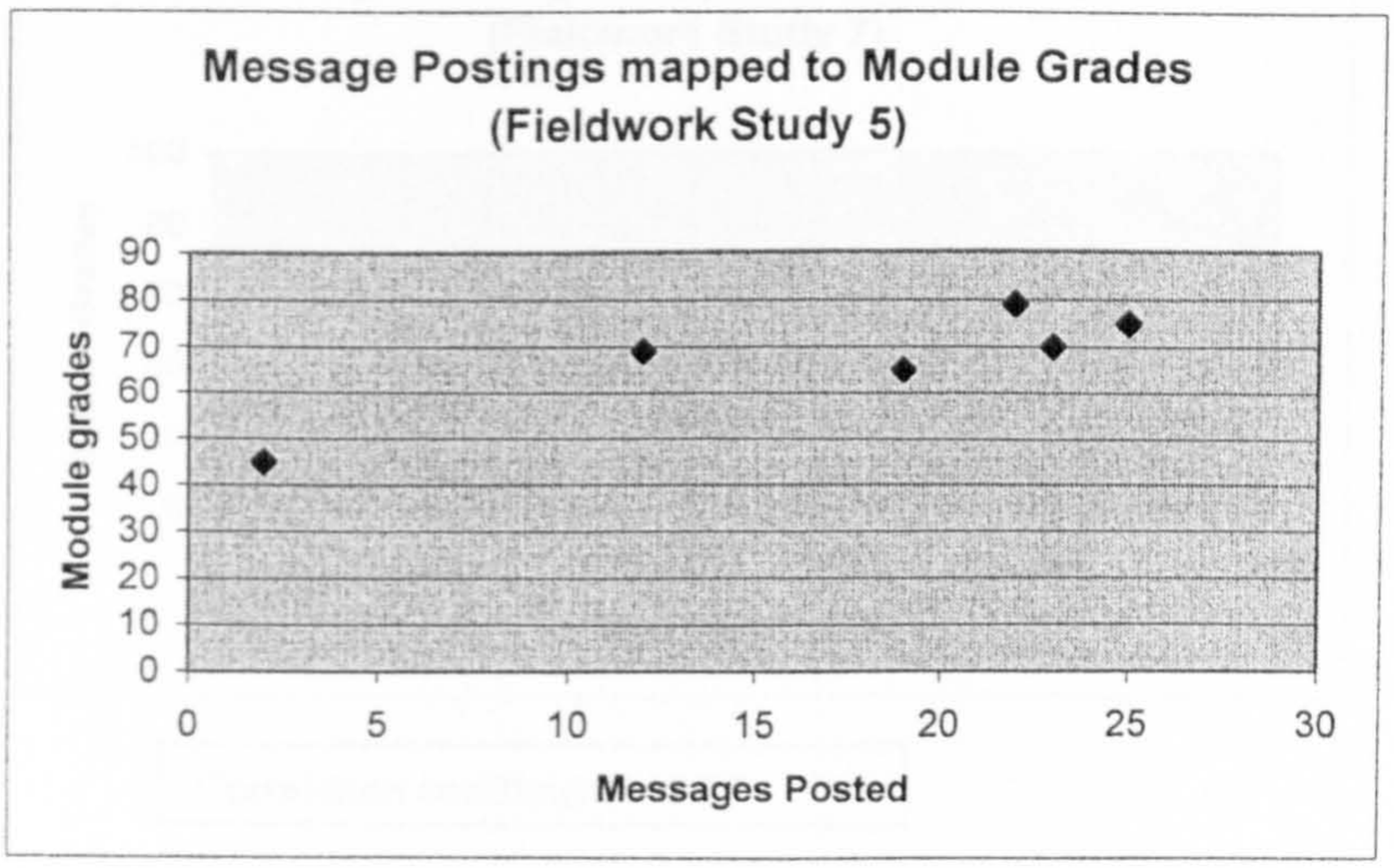
Correlation coefficient = 0.16

Fieldwork Study 4



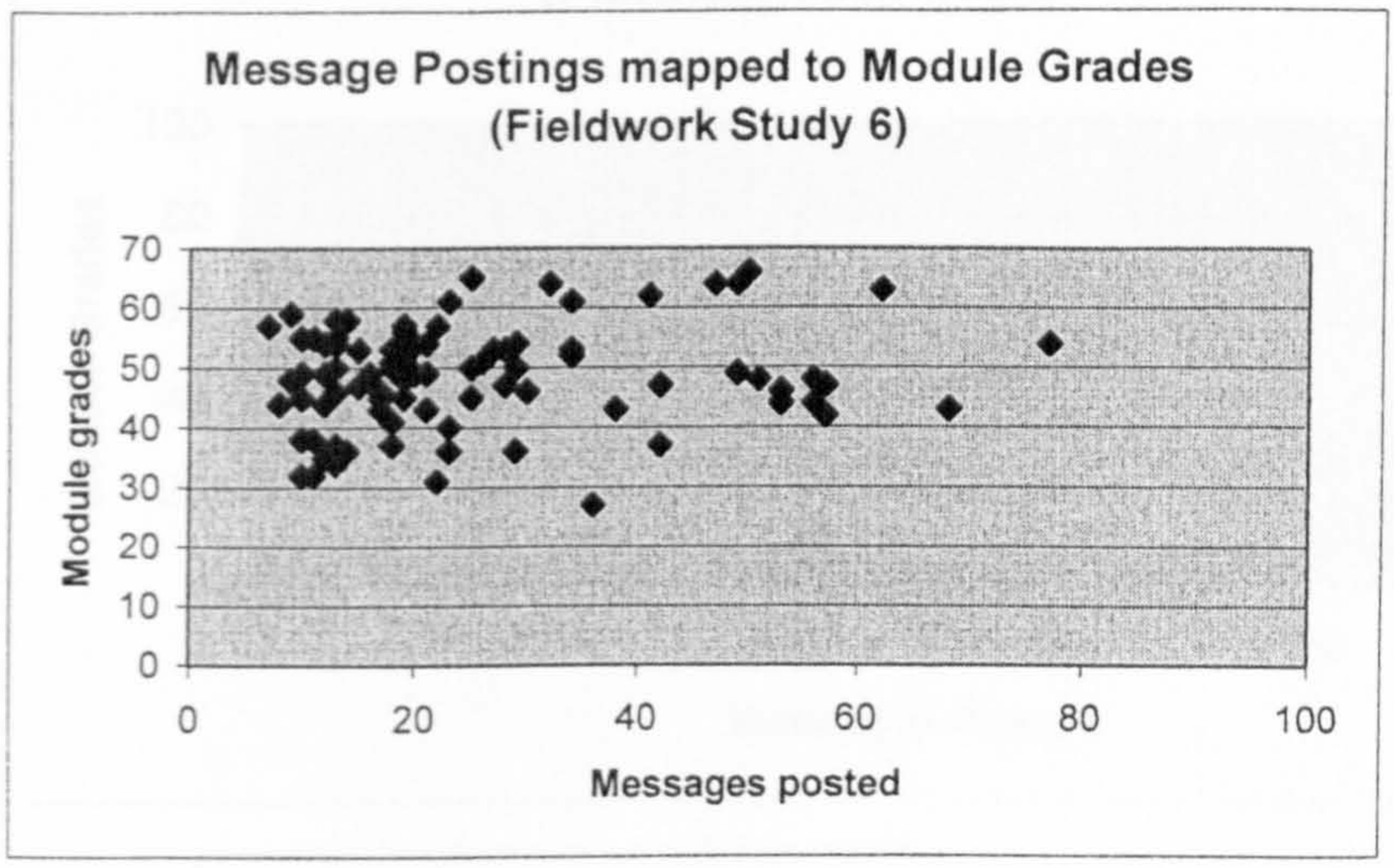
Correlation coefficient = 0.02

Fieldwork Study 5



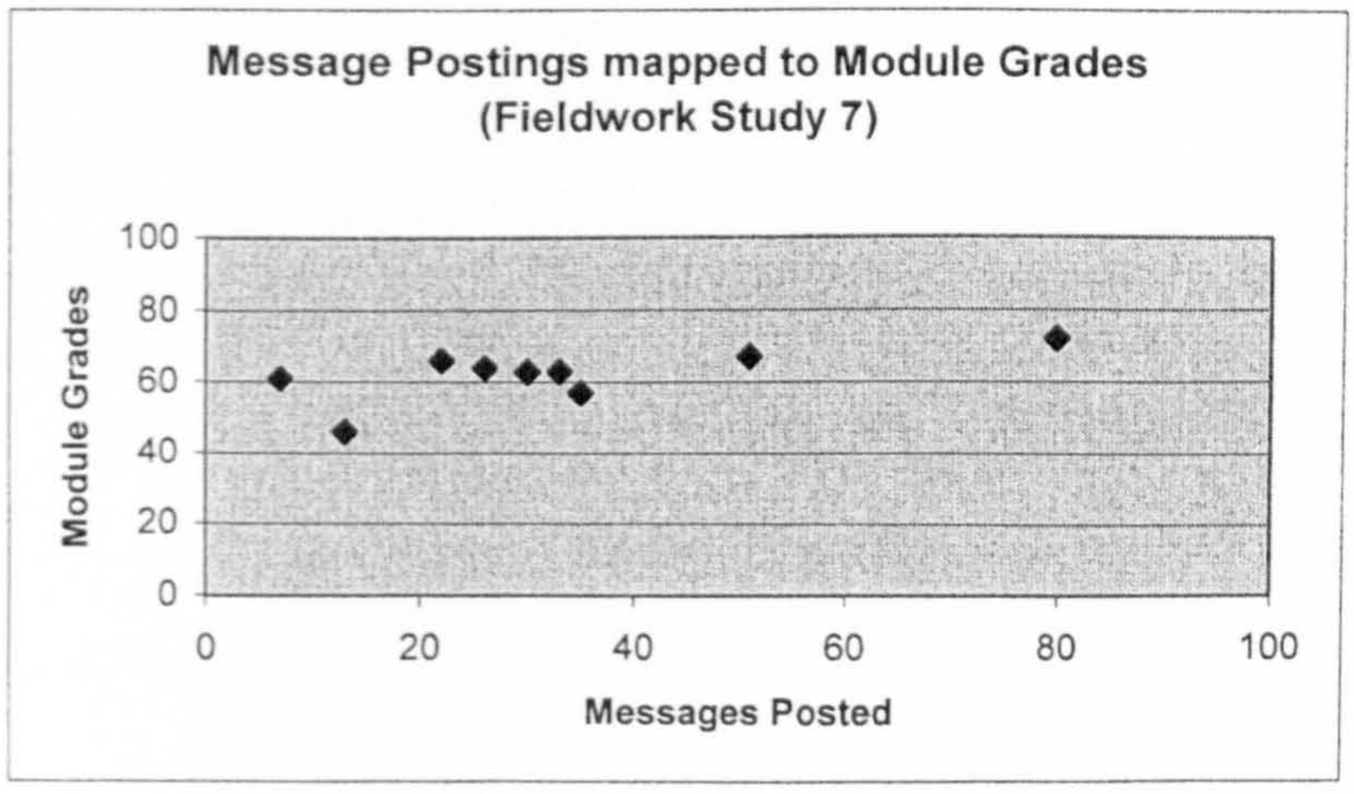
Correlation coefficient = 0.88

Fieldwork Study 6

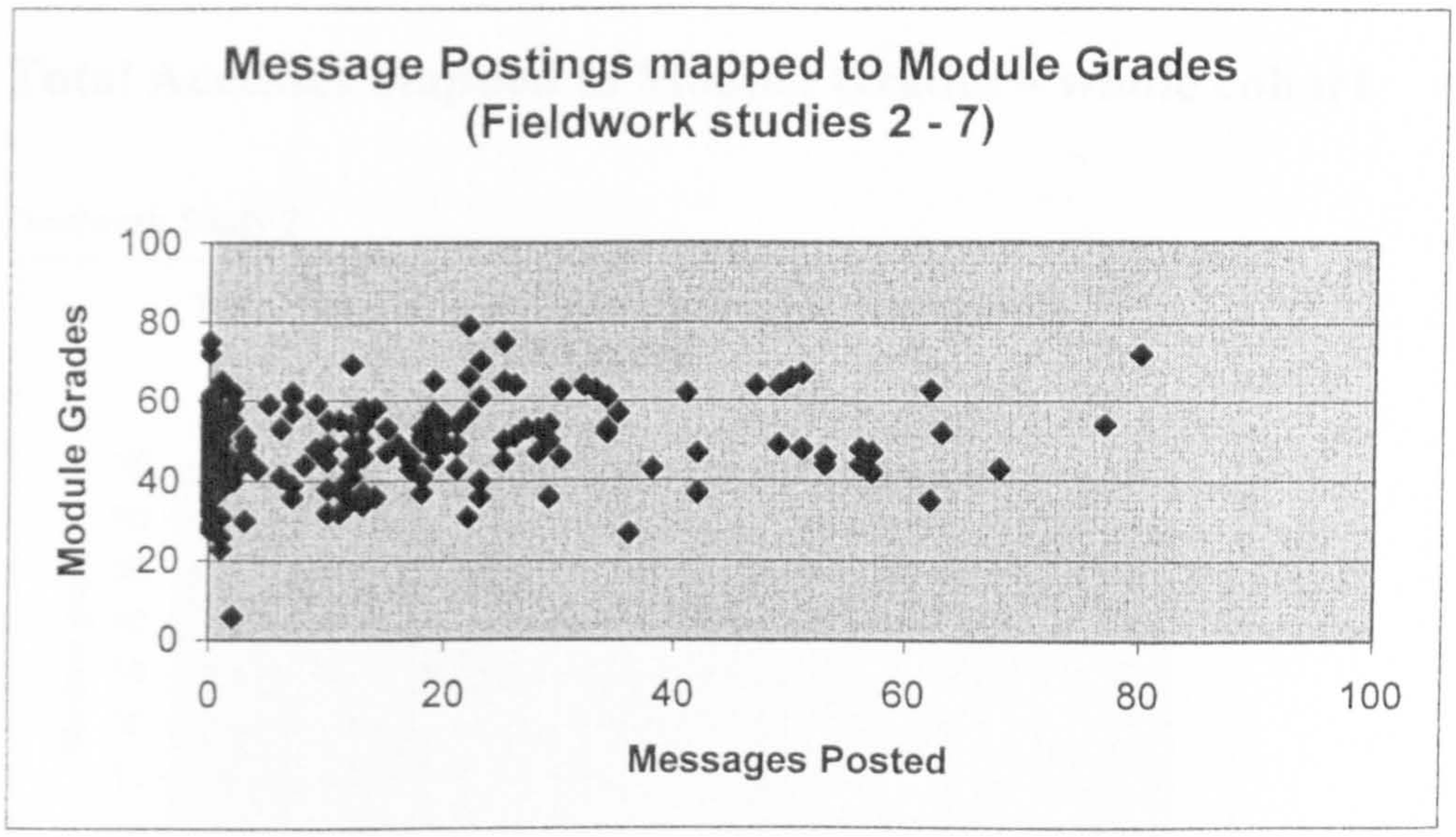


Correlation coefficient = 0.15

Fieldwork Study 7



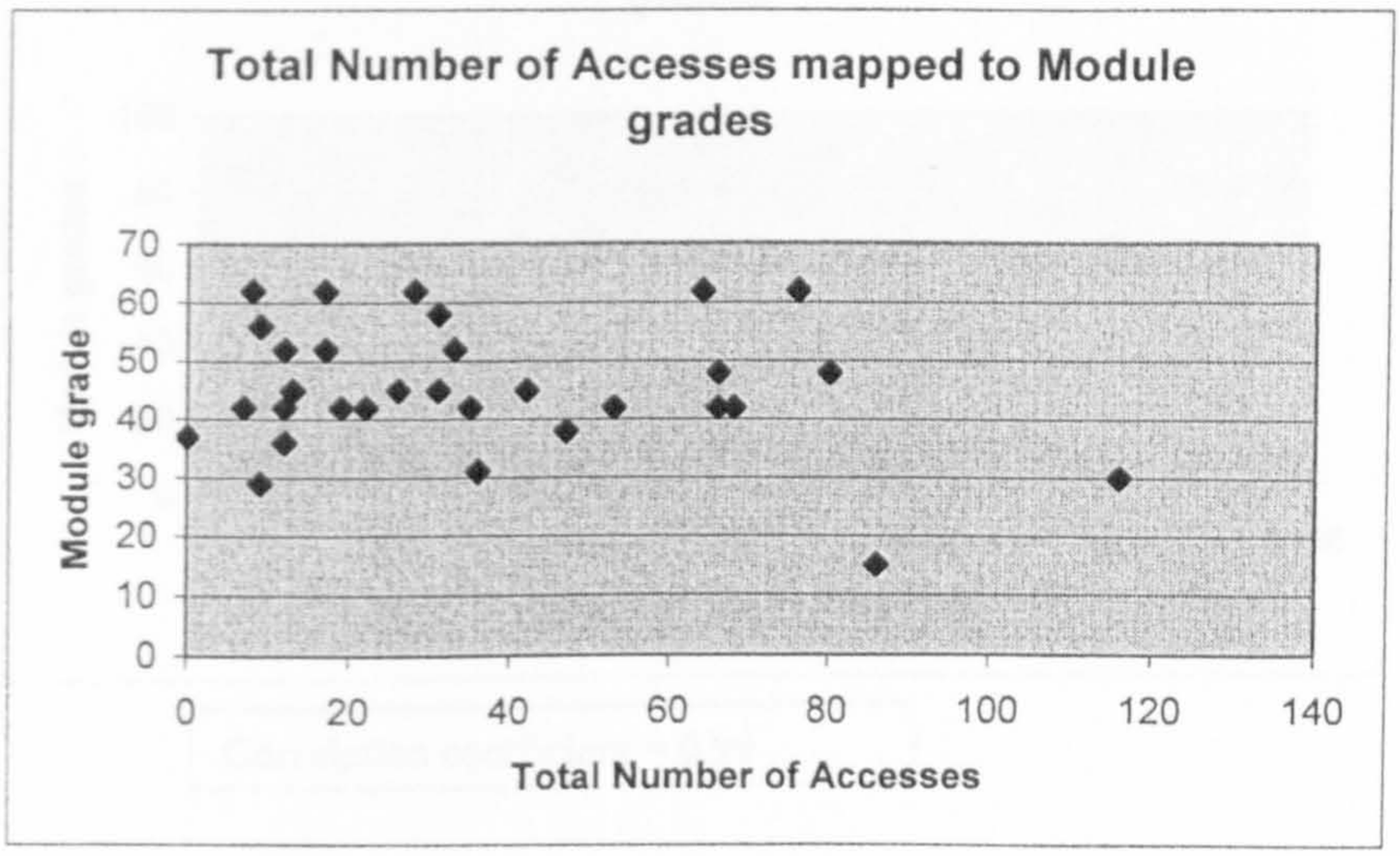
Correlation coefficient = 0.65



Correlation coefficient = 0.1

Total Accesses mapped to Module Grades – whole cohort

Fieldwork Study 2

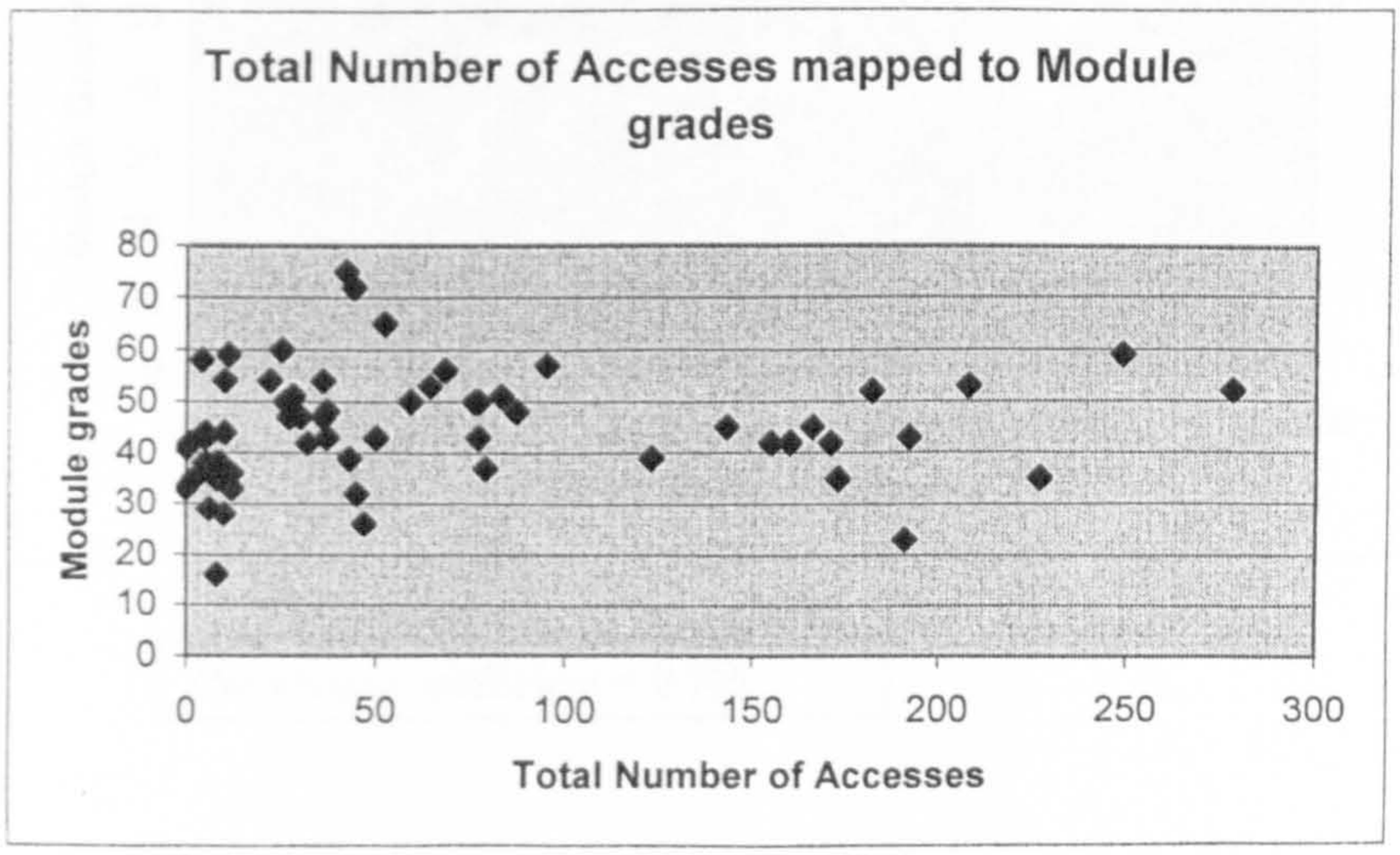


Correlation coefficient = 0.22

Fieldwork Study 3

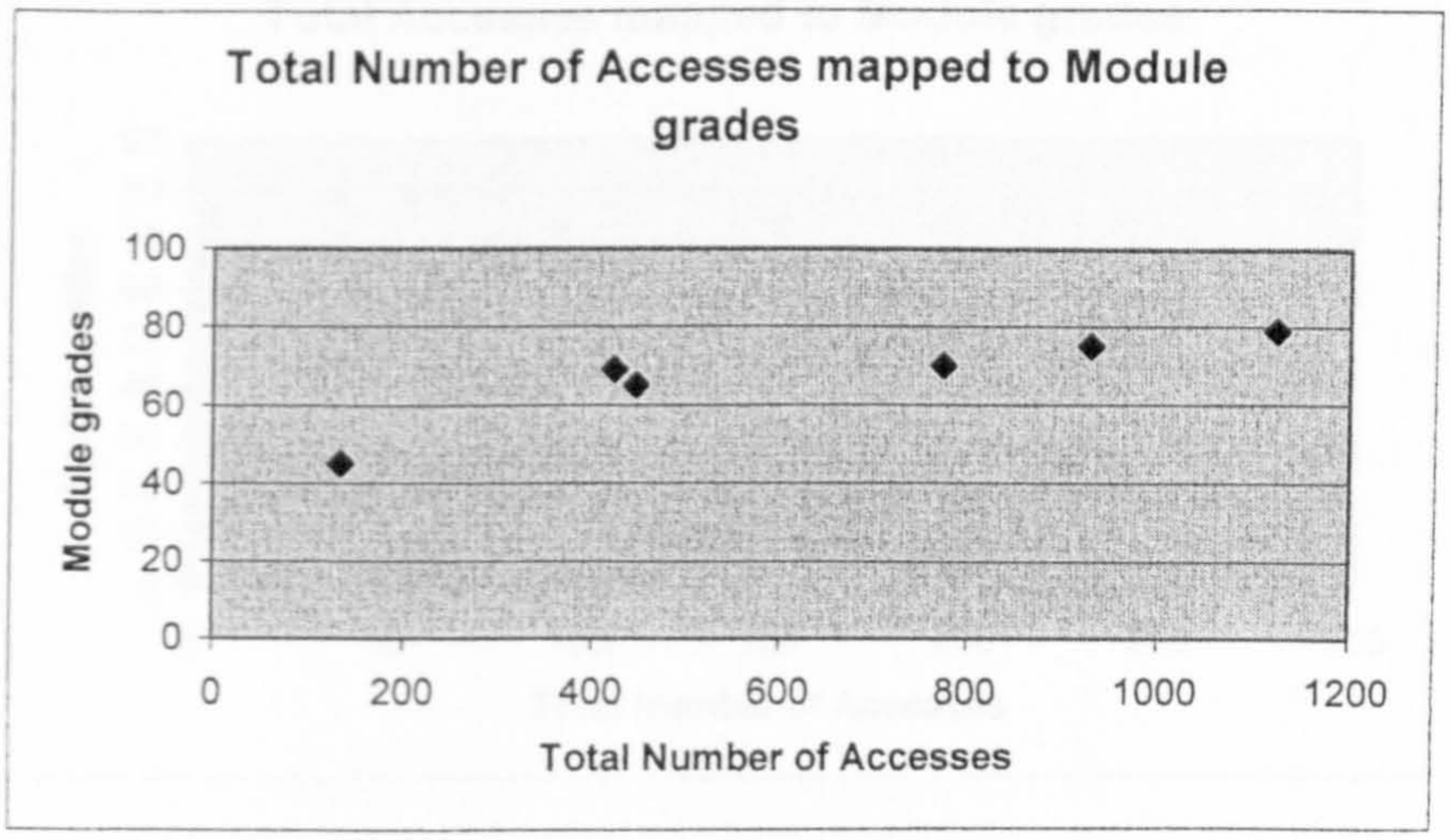
Access data not available.

Fieldwork Study 4



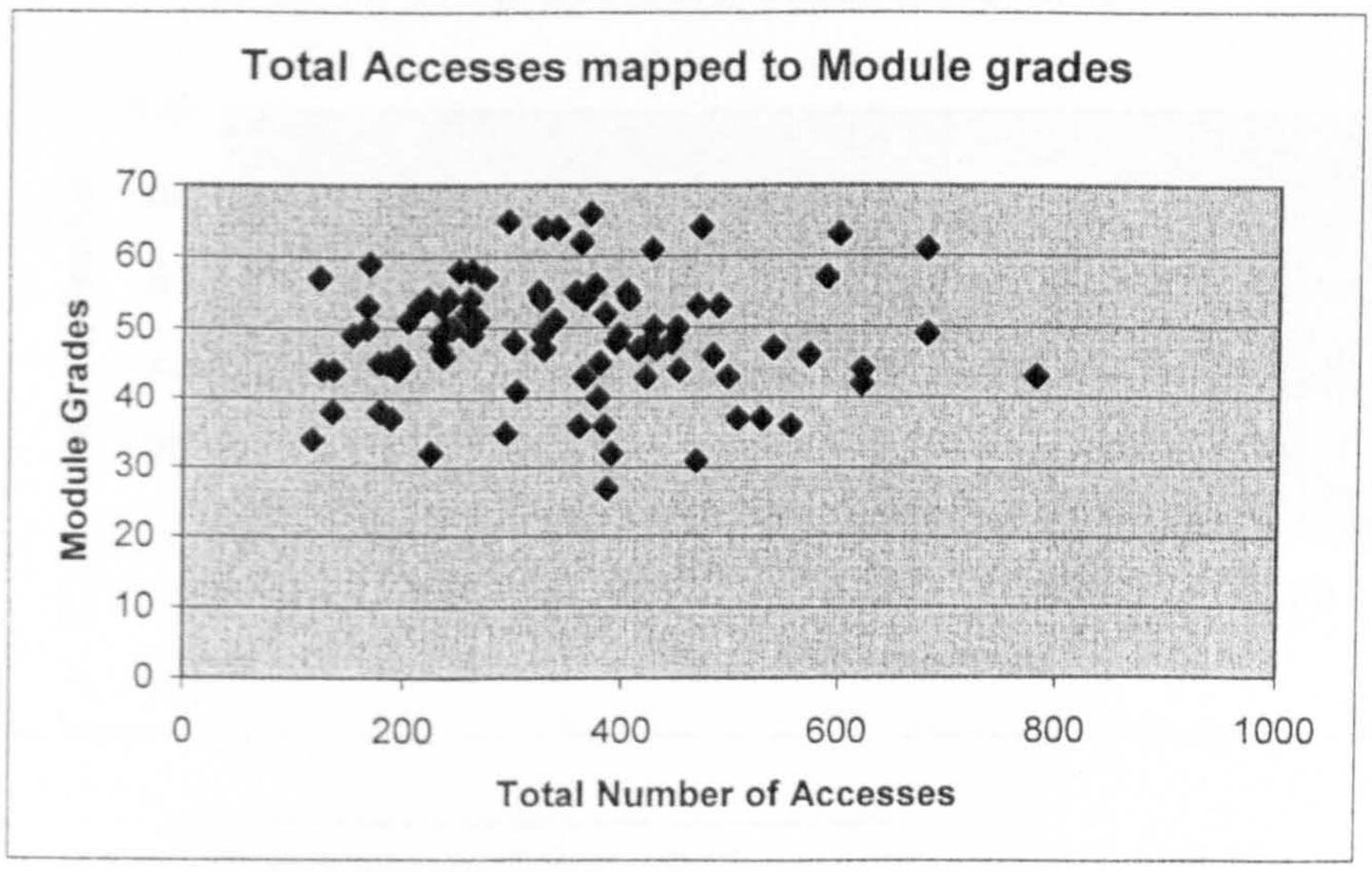
Correlation coefficient = 0.07

Fieldwork Study 5



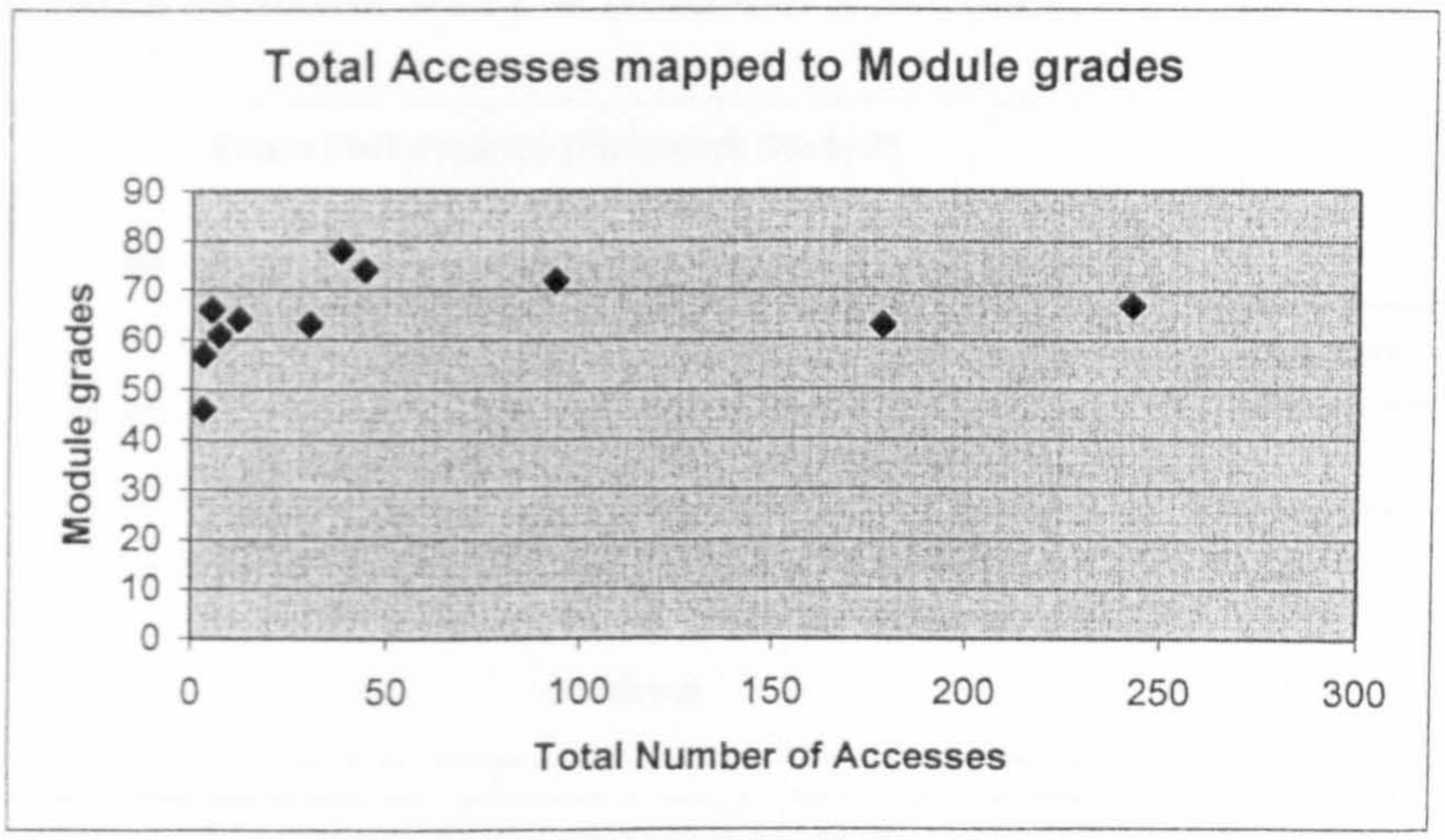
Correlation coefficient = 0.99

Fieldwork Study 6

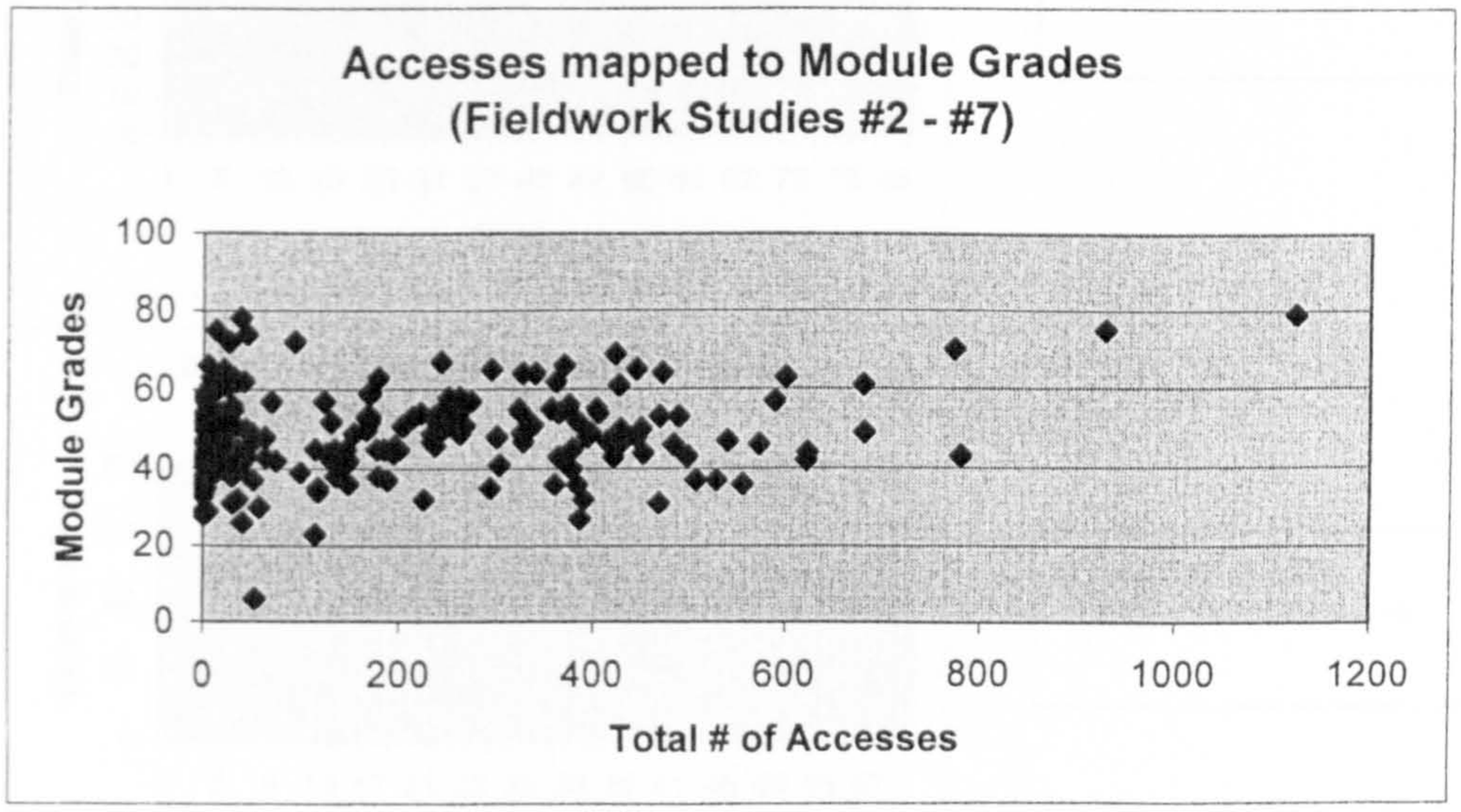


Correlation coefficient = 0.005

Fieldwork Study 7

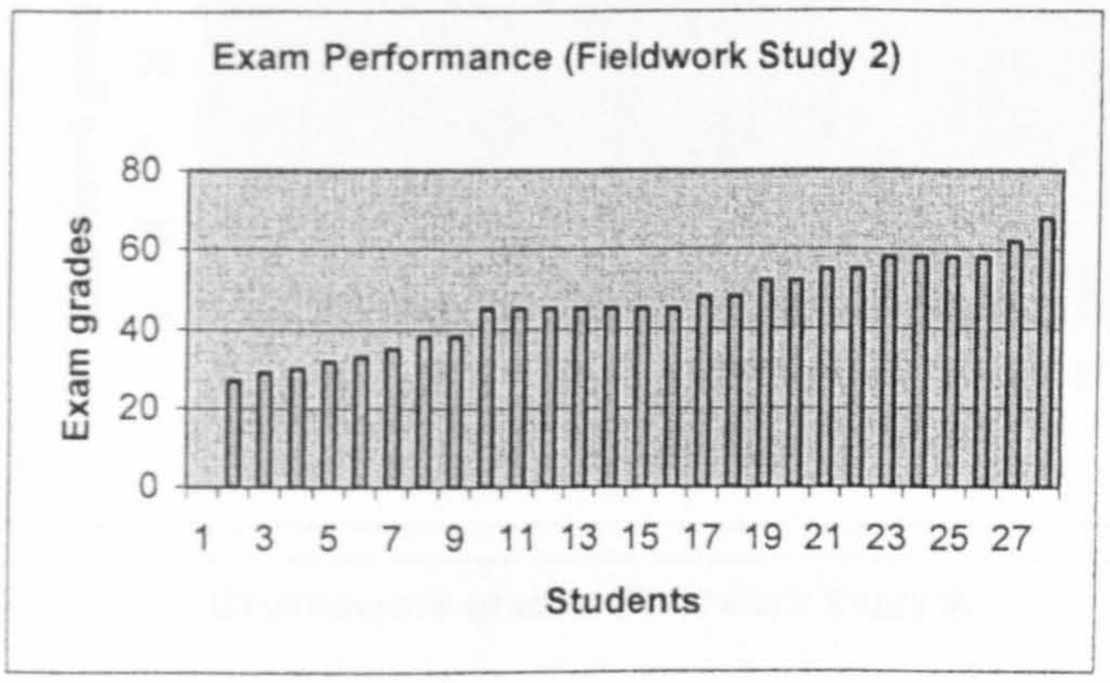


Correlation coefficient = 0.98

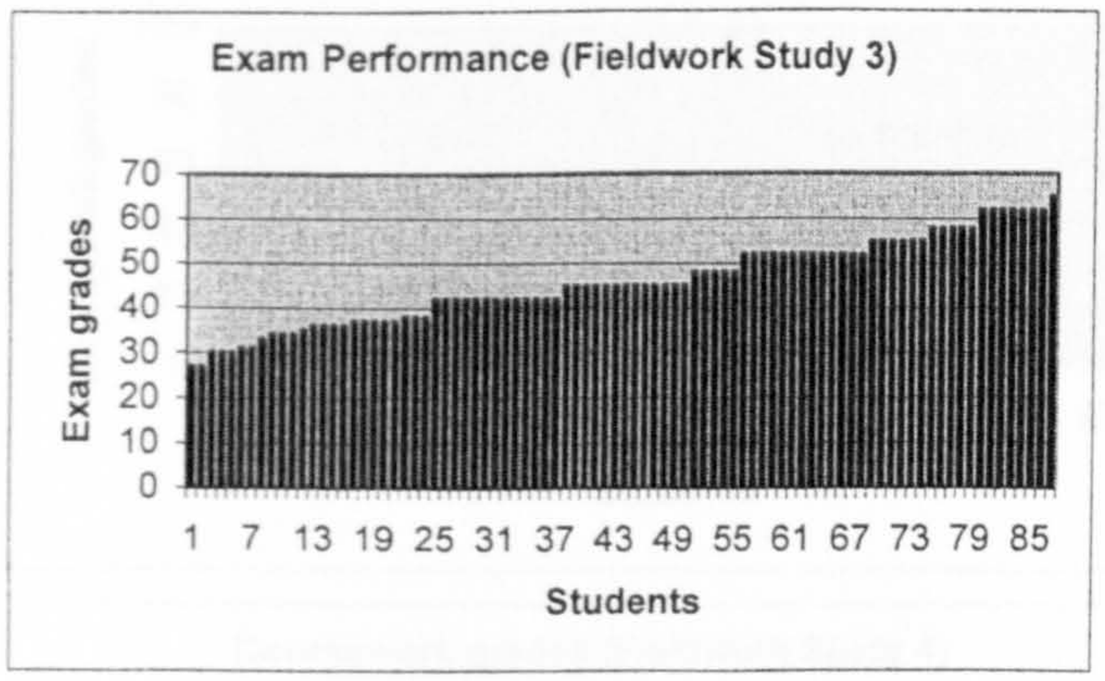


Correlation coefficient = 0.47

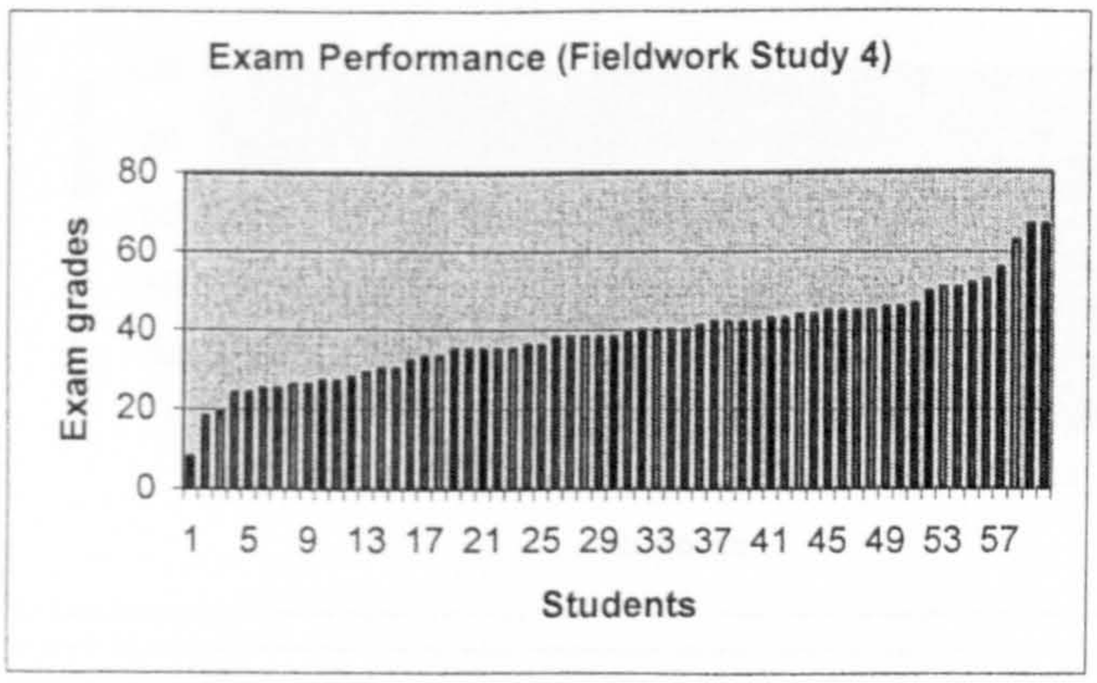
A Comparison of Assessment Performance on the Computing and Ethics module over 4 fieldwork studies:



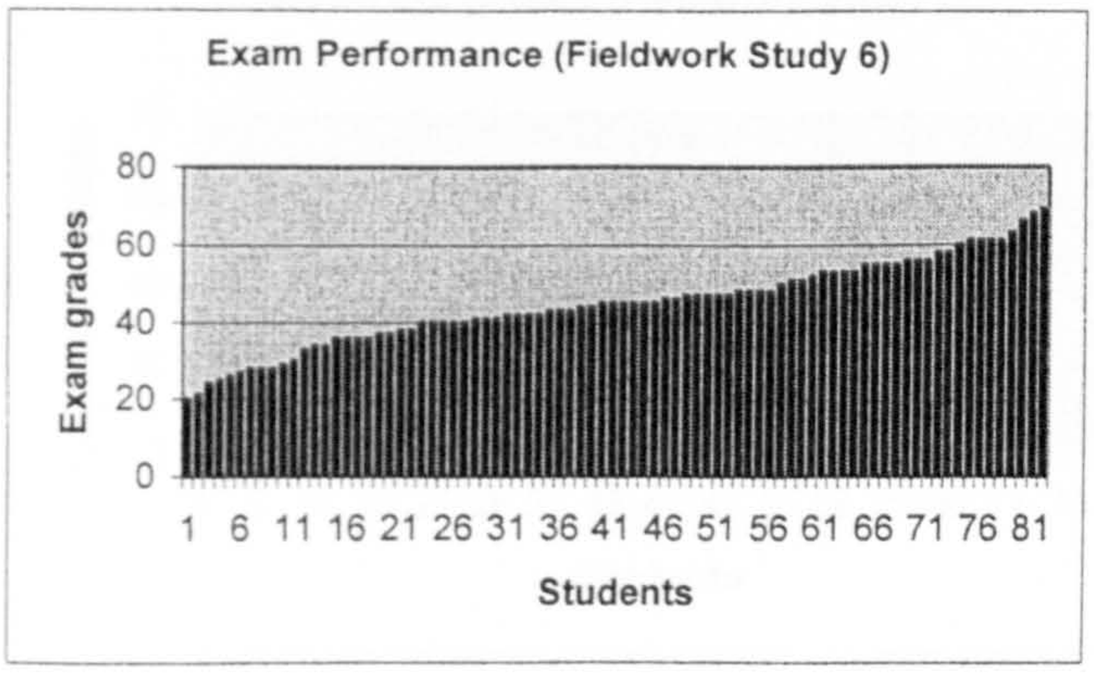
Pass Rate = 68%
Grades >= 60% = 7%



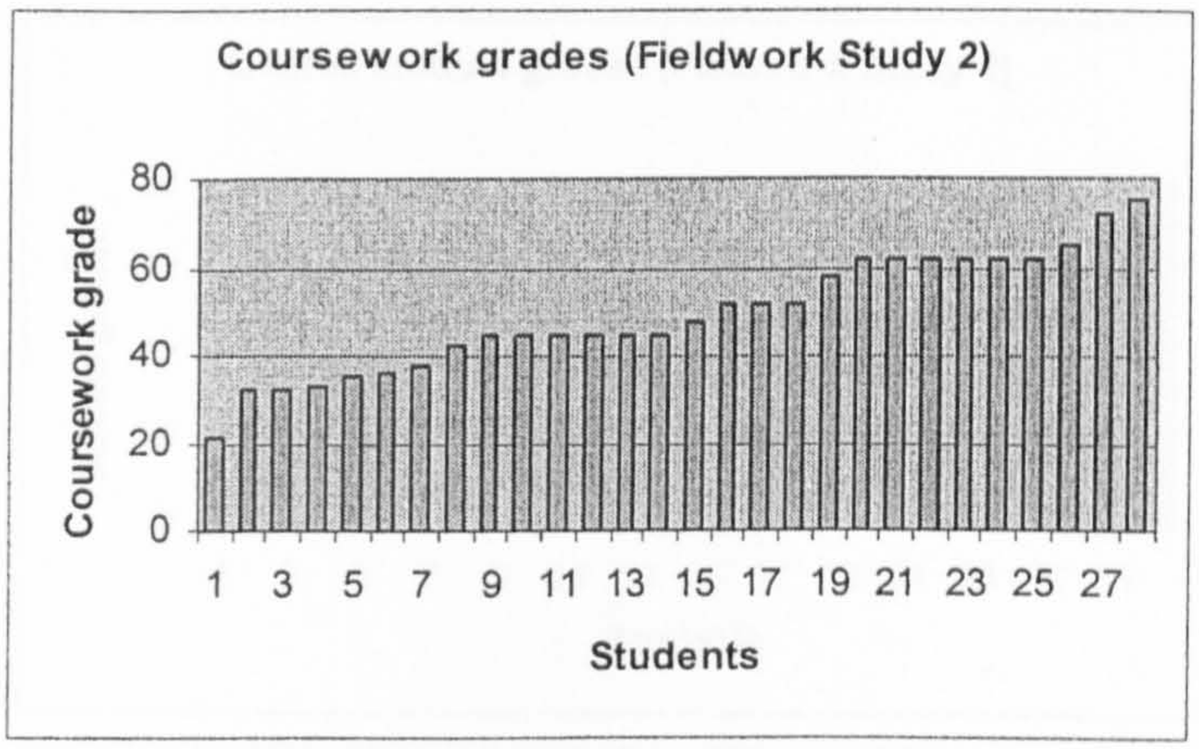
Pass Rate = 72%
Grades >= 60% = 9%



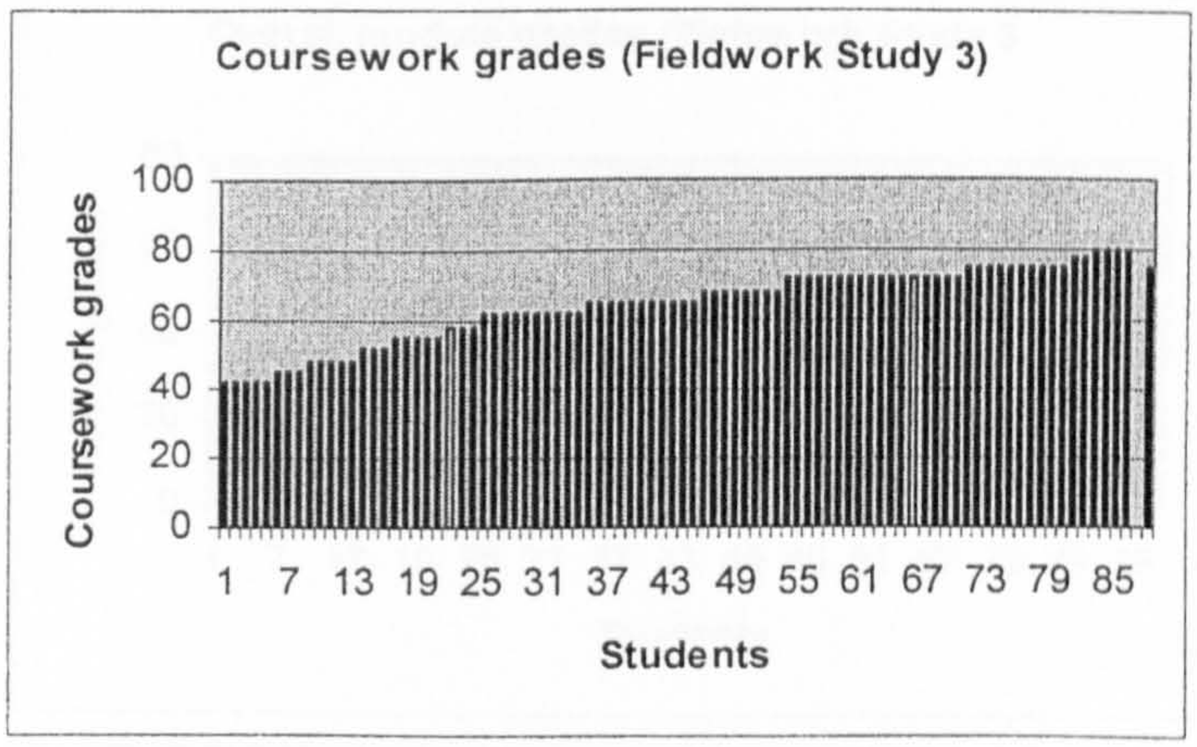
Pass Rate = 41%
Grades >= 60% = 4%



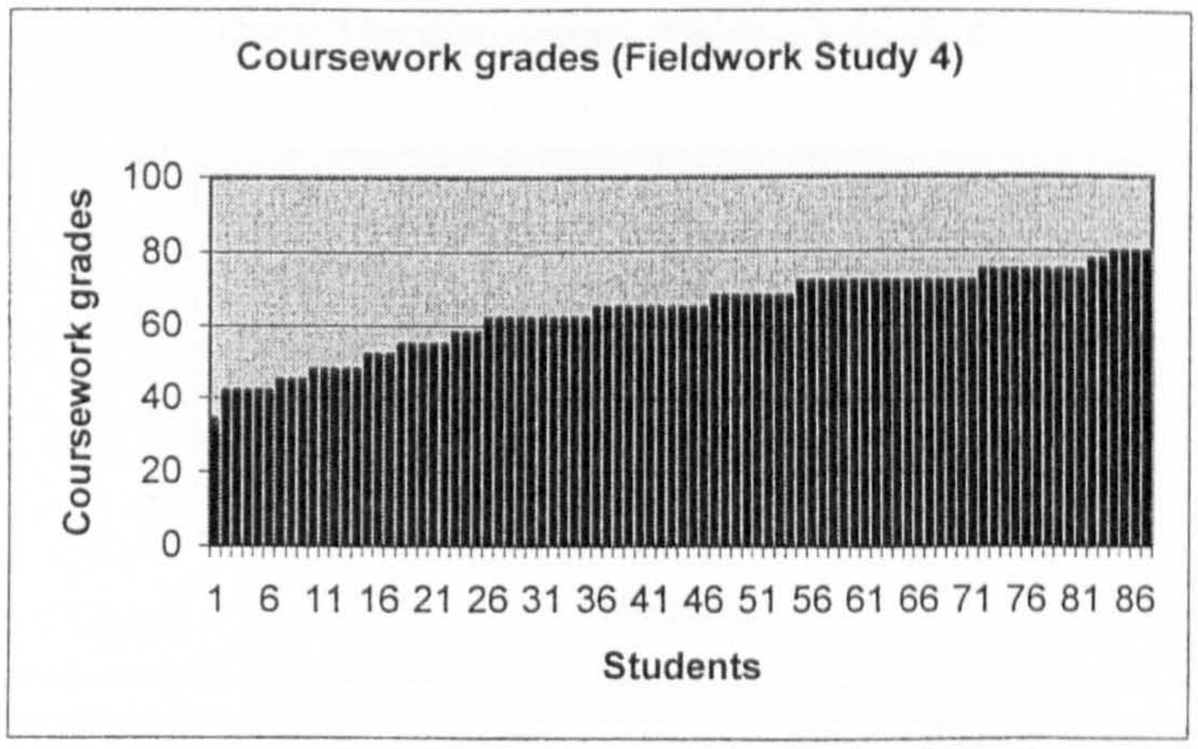
Pass Rate = 73%
Grades >= 60% = 11%



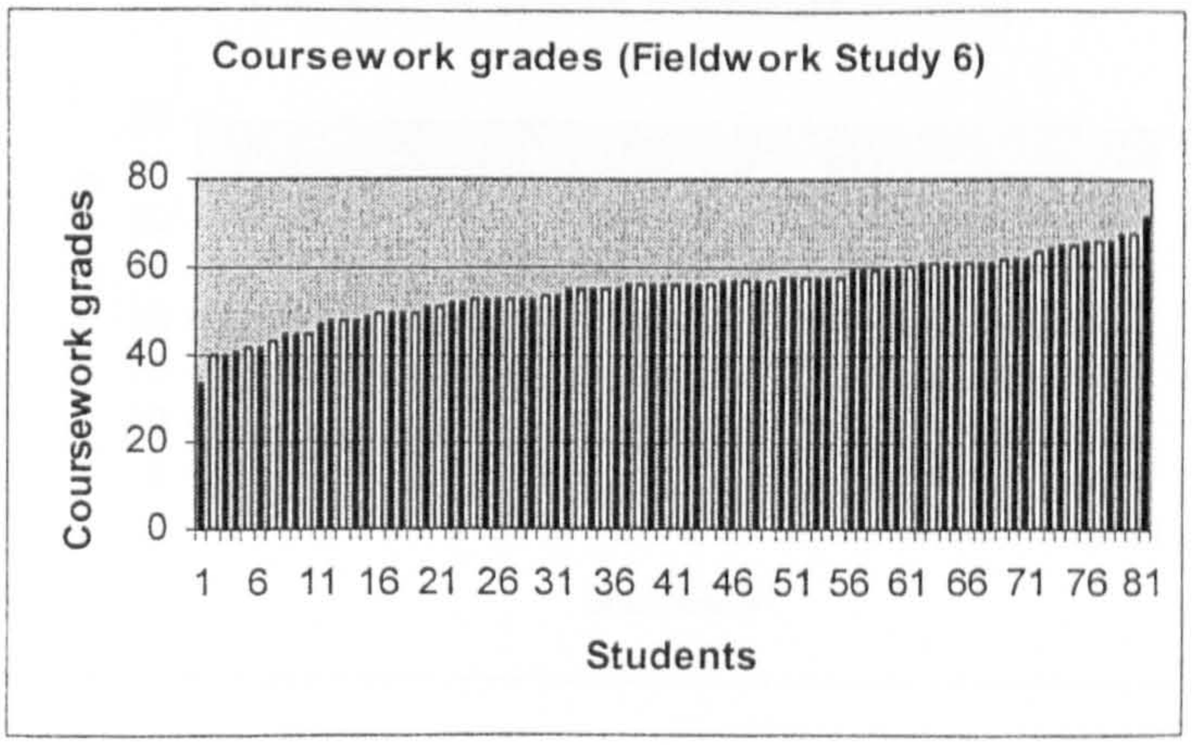
Pass Rate = 75%
Grades >= 60% = 32%



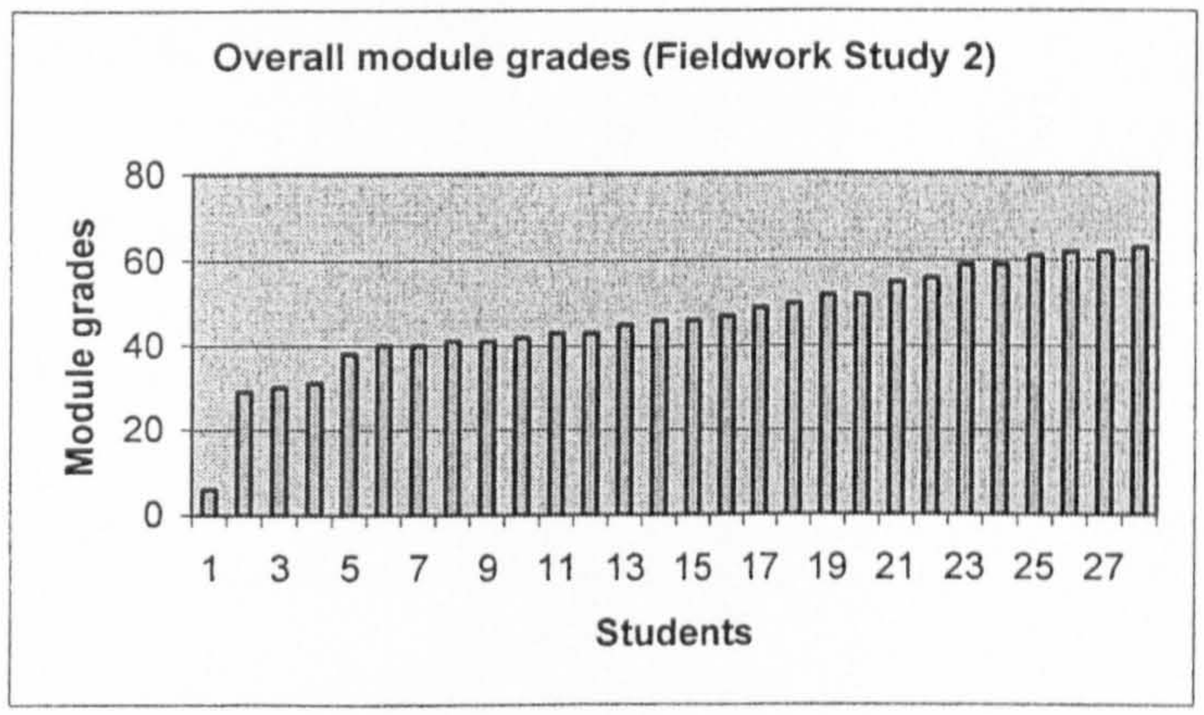
Pass Rate = 99%
Grades >= 60% = 71%



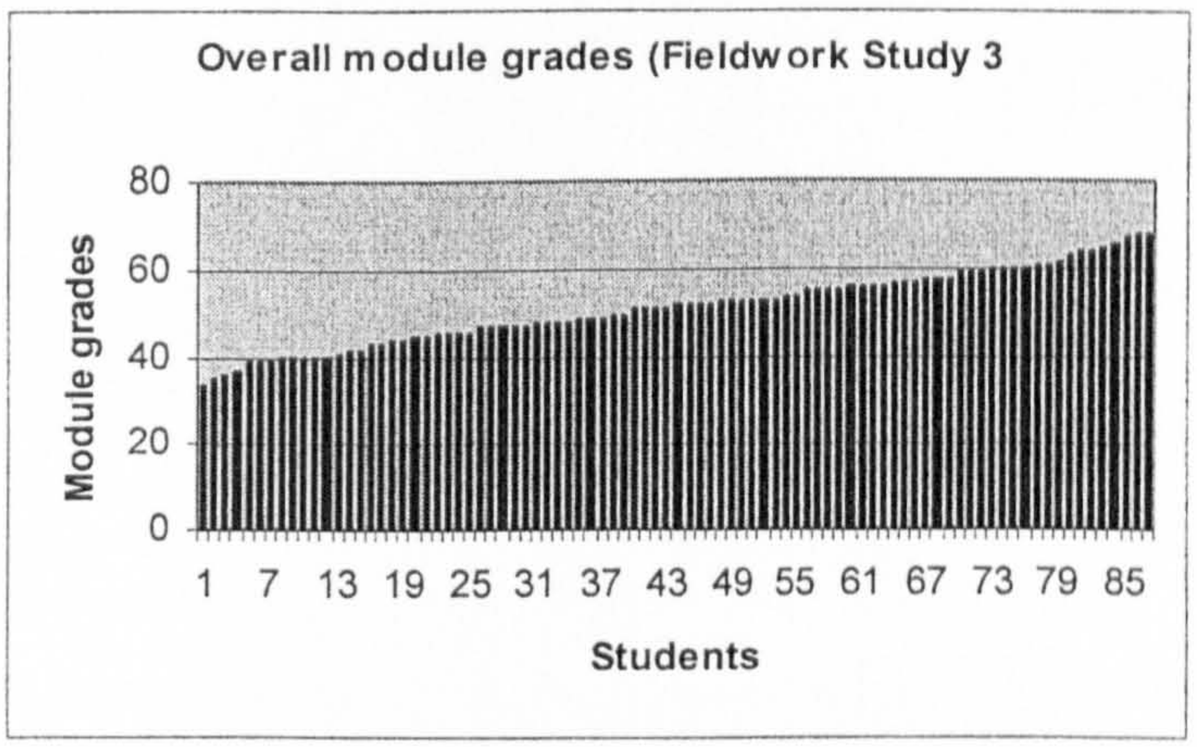
Pass Rate = 100%
Grades >= 60% = 50%



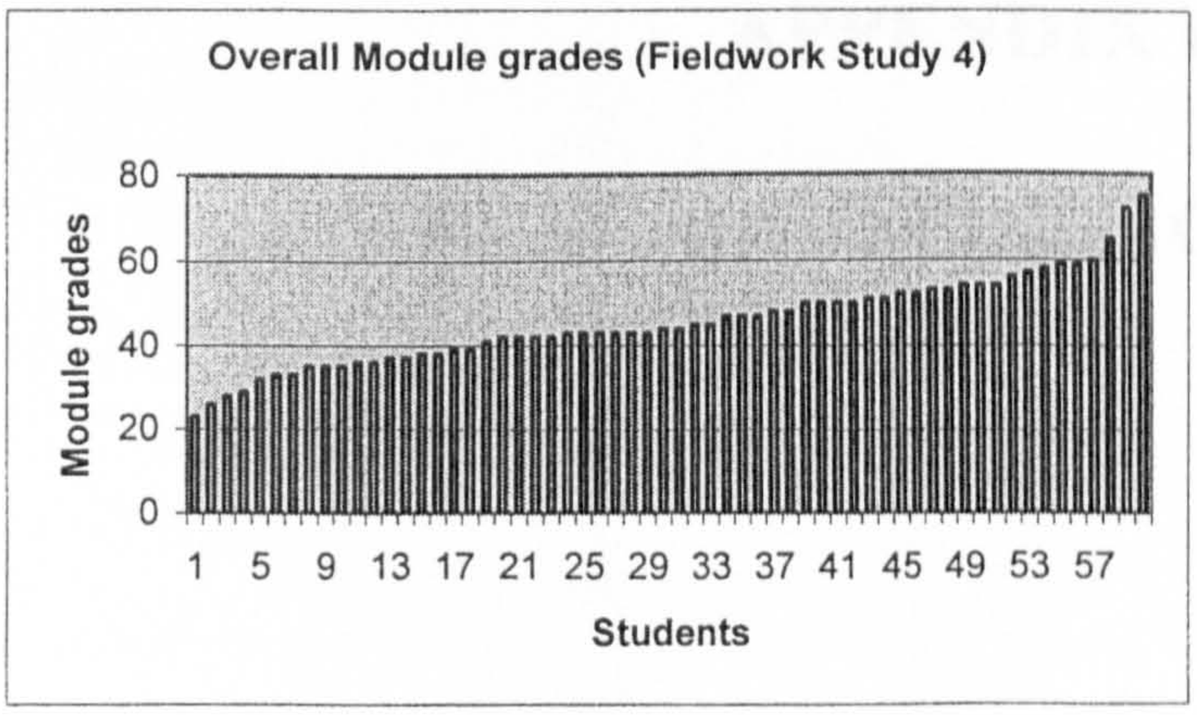
Pass Rate = 99%
Grades >= 60% = 27%



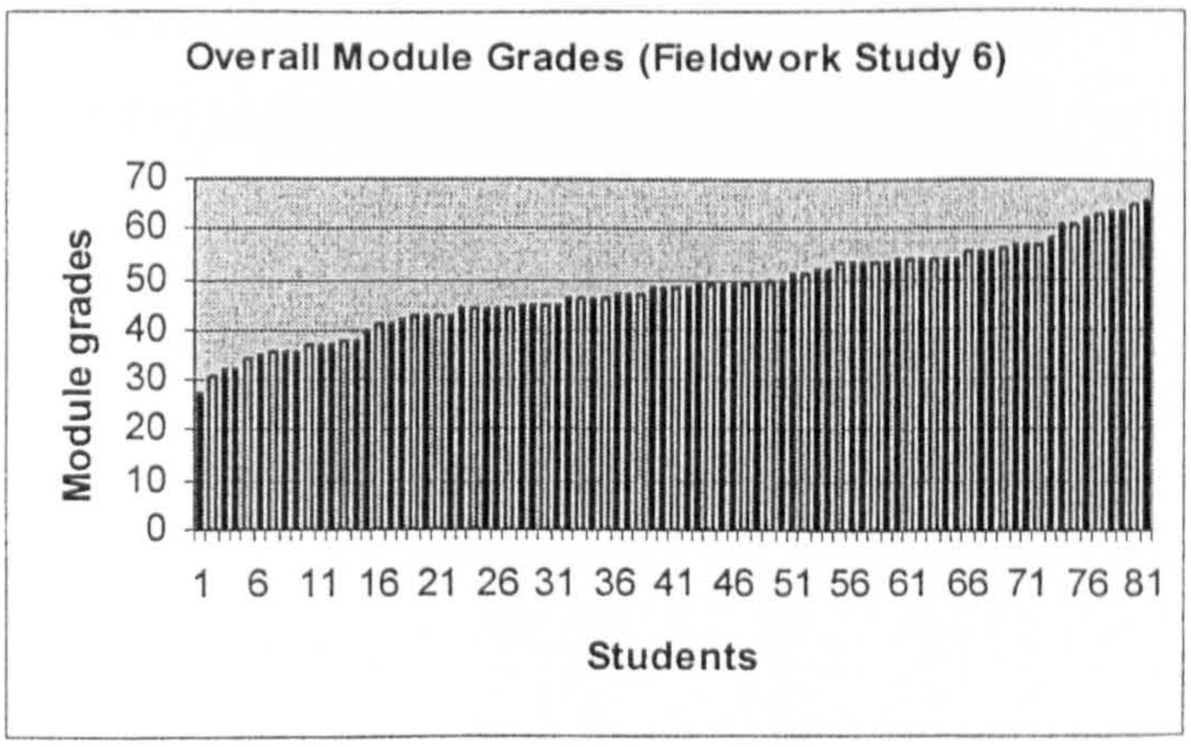
Pass Rate = 82%
Grades >= 60% = 14%



Pass Rate = 92%
Grades >= 60% = 17%



Pass Rate = 73%
Grades >= 60% = 4%



Pass Rate = 83%
Grades >= 60% = 10%

APPENDIX G

RESEARCH PUBLICATIONS

APPENDIX G

Research Publications

Refereed Book Chapter

JEFFERIES, P., "Ethical Issues in the building of Virtual/Managed Learning Environments in Higher Education: A Case Study", published in Techno-Legal Aspects of Information Society and New Economy: an Overview, Information Society Series No. 1, FORMATEX, March, 2003

Refereed Journal Papers

JEFFERIES, P. & WATERHOUSE, P., (2004) "Campus-based Managed Learning Environments: beyond technology" published in the International Journal of Web Engineering and Technology (IJWET), Vol. 1 No. 2, Inderscience Enterprises Ltd, 2004

GRIFFIN, J., JEFFERIES, P. & GRODZINSKY, F., (2004) "Multi-Institutional Collaboration in Teaching Professional Issues in Software Engineering" submitted for possible publication in the Journal of Moral Education.

JEFFERIES, P., GRODZINSKY, F. & GRIFFIN, J., (2003), "Advantages and Problems in using ICT to support the Teaching of a Multi-Institutional Computer Ethics Course" published in the Journal of Educational Media, special edition on "Blended Learning", Vol 28, #2 and #3, Taylor & Francis, 2003

JEFFERIES, P., (2003), "ICT in supporting Collaborative Learning: Pedagogy & Practice" published in the Journal of Educational Media, Volume 28, #1, Taylor & Francis, 2003

JEFFERIES, P. & ROGERSON, S., (2003) "Using Asynchronous Computer Conferencing to support the teaching of Computing and Ethics: a Case Study" published in the fifth volume of Annals of Cases on Information Technology (ACIT), Idea Group Publishing, USA, 2003

JEFFERIES, P. & CONSTABLE, I., "Using BSCW in Learning & Teaching" published in the July issue (Vol. 3, Issue 3) of Educational Technology & Society, (ISSN 1436-4522) journal, special issue "On-line Collaborative Learning Environments", July 2000.

JEFFERIES, P. & HUSSAIN, F., "Using the Internet as a Teaching Resource" published in the journal Education & Training, special edition "Using the Internet for Learning & Teaching in Higher Education", Volume 40, Issue 8, November 1998, MCB University Press.

Invited Guest Speaker Presentations

JEFFERIES, P., (2003) "ICT in Learning: The Education Business" presented at the Royal Holloway School of Management, University of London, 19th February, 2003

JEFFERIES, P., (2002) "Managed Learning Environments/Virtual Learning Environments; Building technological straightjackets or supporting new educational paradigms?" presented at the International Centre for Learner Managed Learning Seminar, Middlesex University, 11th December, 2002.

Refereed Conference Papers

JEFFERIES, P., GRODZINSKY, F. & GRIFFIN, J. (2004) "Building successful on-line learning communities across international boundaries: a Case Study" published in the Proceedings: ETHICOMP, 2004, Syros, Greece, April, 2004

JEFFERIES, P. & ROGERSON, S., (2002) "Experiments in using Asynchronous Computer Conferencing to support the learning and teaching of computer ethics" published in the Proceedings: ETHICOMP, 2002, Lisbon, Portugal, November 2002.

GRIFFIN, J., GRODZINSKY, F. & JEFFERIES, P., (2002) "The impact of using Computer Supported Collaborative Learning Tools on Moral Reasoning in A Multi-Institutional Computer Ethics Module" published in the Proceedings: ETHICOMP, 2002, Lisbon, Portugal, November 2002.

GRODZINSKY, F., GRIFFIN, J. & JEFFERIES, P., (2002) "Reinventing Collaborative Learning using Blackboard: A Web-Based Resource, In the Teaching of a Multi-Institutional Computer Ethics Module" published in the Proceedings: ETHICOMP, 2002, Lisbon, Portugal, November 2002.

WATERHOUSE, P. & JEFFERIES, P., (2002) "Developing collaborative web environments to support Deep Learning – In search of the Holy Grail or just Utopian dreams?" published in the Proceedings: Bristol Business School Teaching & Learning Conference, September, 2002

JEFFERIES, P. & WATERHOUSE, P., (2002) "Managed Learning Environments/Virtual Learning Environments: New educational paradigms or technological straightjackets?" published in the Proceedings: 13th EAEEIE Annual Conference on Innovations in Education for Electrical and Information Engineering (EIE), York, April 2002.

JEFFERIES, P. & WATERHOUSE, P., (2001) "Towards an effective integration of technology into a campus based managed learning environment?" published in the Proceedings: ALT-C 2001: Changing Learning Environments, 8th Annual Conference of the Association for Learning Technology, University of Edinburgh, September 2001.

JEFFERIES, P., CONSTABLE, I., KIELY, B., RICHARDSON, D., ABRAHAM, A., (2000) "Computer Aided Assessment using WebCT" published in the Proceedings: 4th International Computer Assisted Assessment (CAA) Conference, Loughborough University, June 2000.

JEFFERIES, P., (2000) "Multimedia, Cyberspace & Ethics" published in the Proceedings: IEEE International Visualisation 2000 Conference, London, IEEE Computer Press, July 2000.

JEFFERIES, P. & HUSSAIN, F., (1999) "Square-eyed & Virtual – A Vision of the Information Age?" published in the Proceedings: 4th ETHICOMP International Conference on the Social and Ethical Impacts of Information and Communication Technologies, LUISS Guido Carli University, Rome, Italy, October 1999. ISBN 88-900396-0-4

JEFFERIES, P. & HUSSAIN, F., (1999) "Multimedia Information Systems in Education" published in the Proceedings: International Visualisation '99 Conference, London, IEEE Computer Press, July 1999.

HUSSAIN, F. & JEFFERIES, P., (1998) "The Use of Multimedia in Higher Education" published in the Proceedings: Workshop in Computer & Information Systems, Dhahran, Saudi Arabia, March 1998.

Seminar Papers

JEFFERIES, P., (2002) "ICT in Learning; Pedagogy & Practice" presented at the second meeting of the Institute for Learning & Teaching (ILTHE) Web User's Group, De Montfort University, Milton Keynes, November, 2002.

JEFFERIES, P. (2002) "Supporting the effective implementation of asynchronous computer conferencing in a campus-based HE environment" presented at the 6th Postgraduate HCT Workshop 2002 held at the University of Sussex, 26-27th September, 2002.

JEFFERIES, P. & WATERHOUSE, P., (2002) "Effective integration of technology into a campus based learning environment: utopia or achievable reality?" presented at the LTSN "Distance Learning: Where are We Now?" event held at the University of York, 3rd July 2002.

JEFFERIES, P., (2001) "Managed Learning Environments – Meeting Stakeholders' Needs" presented at the inaugural meeting of the Institute for Learning & Teaching (ILT) MLE User's Group, De Montfort University, Milton Keynes, November, 2001.

JEFFERIES, P., (2000) "Computer Mediated Education - Some of the Issues" presented at the "Technology in Learning & Teaching" Workshop, De Montfort University, Milton Keynes, June 2000.

JEFFERIES, P., (2000) "Issues around Computer based Conferencing" presented at the "Using Learning Technologies" workshop, De Montfort University, Leicester, May 2000.

JEFFERIES, P., (2000) Personal Data: Issues of Ethics and Regulation Seminar Statement, presented at the "Personal Data: Issues of Ethics and Regulation" Seminar hosted by CCSR at De Montfort University, 27th January 2000.

Refereed Poster Presentations

JEFFERIES, P. & ROGERSON, S. (2003) "Building horizons: Using Asynchronous Computer Conferencing to support the teaching of Computing & Ethics" presented at the LTSN "Professionalism and Ethics in the Computing Curriculum" workshop held at Wolverhampton University on 24th January, 2003.

RICHARDSON, D. & JEFFERIES, P. (2002) "Formative Assessment Innovation: Improving Motivation and Pass Rates" presented at the joint SEDA/AISHE Conference "Supporting and Evaluating Change", Dublin, April, 2002

APPENDIX H

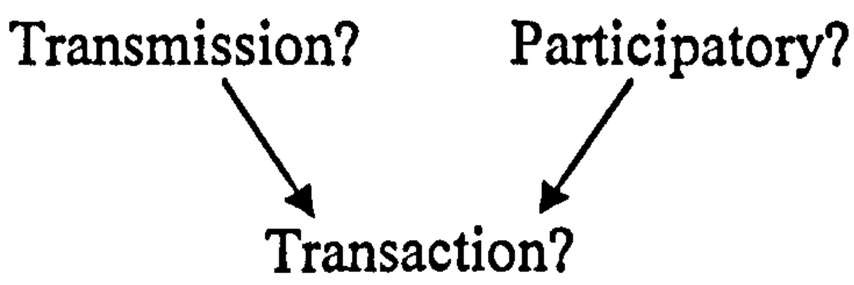
PROPOSED STRATEGY

APPENDIX H

Proposed Strategy

As research has shown, any learning technology needs to be properly integrated into module delivery. An iterative prototyping approach of analysis, requirements specification, design, implementation and evaluation is therefore proposed. The first stage of this should, it is felt, take into consideration Pedagogical, Ethical and Technological issues (**PET**) for the module as a whole as outlined below:

Stage 1 - Analysis of the Module/Unit of Study in terms of Pedagogy, Ethics and Technology (PET)

Pedagogy	Examine personal orientation towards learning and teaching (Land, 2001) Determine Learning Outcomes in terms of Skills Knowledge Define activities and learning strategies to meet defined outcomes: One-alone One-to-one One-to-many Many-to-Many Determine the learning process being supported for each activity  Determine Modes and Requirements of Assessment linked to learning outcomes. Formative/Summative Individual/Group Test (MCQ) Examination Coursework Context

	Mode of Study (distance, campus-based)
Ethics	Consider the Ethical Issues in terms of Privacy – "informed consent", anonymity Access – do all students have equal access? Property – who "owns" the data, copyright issues Accuracy – will non-moderation lead to a proliferation of "mis-information"
Technology	Suitability for proposed activity? **One-alone** Web pages, databases, libraries, journals, CAL packages, intelligent tutoring systems, CAA, simulations **One-to-one: the email paradigm** Negotiating learning contracts, tutorials, annotation of formative assessment, **One-to-many: the bulletin board paradigm** Lecture notes, noticeboards, FAQs, TV, Video **Many-to-many: the conferencing paradigm** CSCW - seminars, discussion groups, brainstorming, Chat rooms, audio/video/text conferencing Skills (tutor/learner) Availability of technologies Estimated production/setting up costs in terms of time

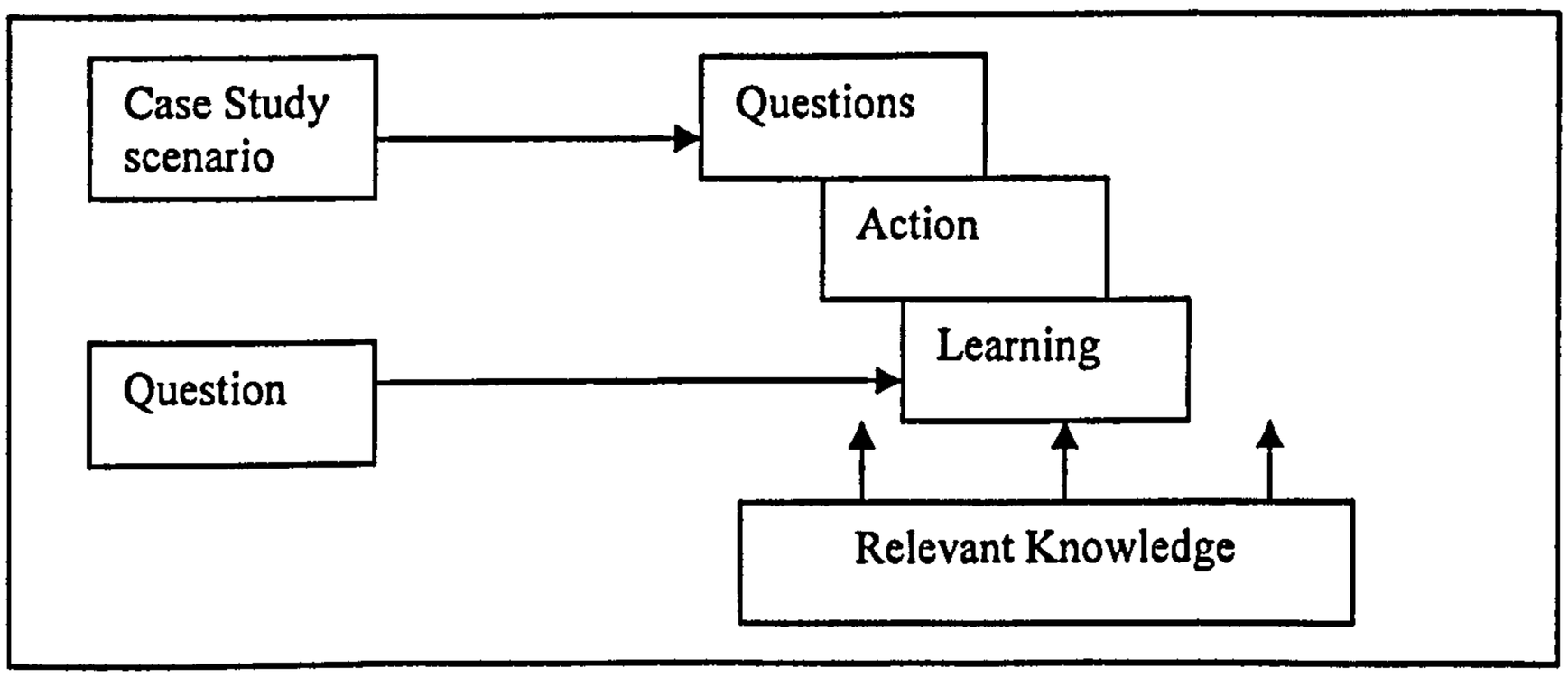
Having applied the PET analysis and determined that ACC can be pedagogically justified in supporting module delivery then Stage 2 needs to be addressed. Stage 2 concerns developing a requirements specification in terms of how to integrate use of ACC with the f2f contact sessions.

Stage 2 – Development of a Requirements specification aimed at integrating ACC into Module delivery

Integration	Specify the techniques to be used to integrate ACC with f2f – e.g. Individual contribution to the conference to form part of the overall assessment for the module. (Measurement criteria would then need to be developed in terms of quantity and/or quality.) Setting of collaborative on-line activities (Voluntary/Assessed) Making reference to particular ACC activity within f2f sessions
Preparation	Determine facilitating f2f techniques for the development of: critical analysis, social presence, project management skills, collaborative learning
Management	Determine degree and nature of moderation or monitoring. On-line/Offline
Pre-Implementation	Determine Target audience Local/National/International – time differences, collaboration Possible skills/access issues (tutors/learners) Technology to be used Availability of technical assistance (for setting up student Accounts and general maintenance/trouble-shooting). Timing/Method of Introduction
Evaluation Techniques	Determine techniques for evaluation – e.g. Student/Staff feedback – questionnaires, interviews, observation Usage statistics/computer generated reports Comparative Assessments of Usage and Performance, (e.g. Learning outcomes, MJT - learning as product) Process measurements (e.g. Community of Inquiry Model)

Stage 3 – Design

Based upon the findings from Stages 1 and 2 the module can now be designed to incorporate both f2f and virtual mediums for interaction as well as developing appropriate content for meeting the defined learning outcomes. Use should be made of the following adaptation of the "Action Learning Forum" (Hale, 2000) approach to learning within the ACC environment:



Within this approach the group defines the questions to be addressed that are related to their chosen Case study (e.g. Ethical dilemma) scenario. Then each member of the group individually defines the questions they wish to tackle therefore the body of knowledge is accessed on an individual basis. As such this knowledge will be integrated with the individual's understanding and further experience. Knowledge may then be accessed and acquired from a range of sources and as such will not be provided in a "programmed" way but will be gained on a just-in-time basis at the place and in the format that the individual prefers. Forum members then pool their knowledge of knowledge by sharing those sources that they have found helpful for their own learning. Assessment will take the form of a group assignment that will require students to work collaboratively and co-operatively in producing a piece of assessed coursework.

Stage 4 – Implementation

At the implementation stage care has to be taken to ensure that sufficient preparation has been undertaken to ensure that the following have been addressed

Skills

- Students are equipped with the necessary skills they require for operating efficiently within the virtual environment.
- Students' critical analysis has been developed

Motivation

- Students appreciate the "value" of using ACC and perceive the need for them to engage with it.

Reward

- Contribution to overall module assessment is clearly understood

Stage 5 – Evaluation

Following implementation it is vital to evaluate the impact that use of ACC has had upon the students' learning experience in order to inform future development.

APPENDIX I

BELBIN'S SELF PERCEPTION INVENTORY

APPENDIX I

BELBIN'S SELF PERCEPTION INVENTORY

A SELF-PERCEPTION INVENTORY

DIRECTIONS

From each section distribute a total of ten points among the sentences which you think best describe your behaviour. These points may be distributed among several sentences: in extreme cases they might be spread among all the sentences or ten points may be given to a single sentence. Enter the points in the table provided.

		Allocation of Points
1	WHAT I BELIEVE I CAN CONTRIBUTE TO A TEAM	10 Points Total
a)	I think I can quickly see and take advantage of new opportunities.	
b)	I can work well with a very wide range of people	
c)	Producing ideas is one of my natural assets.	
d)	My ability rests in being able to draw people out whenever I detect they have something of value to contribute to group objectives.	
e)	My capacity to follow through has much to do with my personal effectiveness.	
f)	I am ready to face temporary unpopularity if it leads to worthwhile results in the end.	
g)	I am quick to sense what is likely to work in a situation with which I am familiar.	
h)	I can offer a reasoned case for alternative courses of action without introducing bias or prejudice.	

2 <u>IF I HAVE A POSSIBLE SHORTCOMING IN TEAM WORK IT COULD BE THAT</u>: 10 Points Total

a) I am not at ease unless meetings are well structured and controlled and generally well conducted

b) I am inclined to be too generous towards others who have a valid viewpoint that has not been given a proper airing.

c) I have a tendency to talk a lot once the group gets on to new ideas.

d) My objective outlook makes it difficult to join in readily and enthusiastically with colleagues.

e) I am sometimes seen as forceful and authoritarian if there is a need to get something done.

f) I find it difficult to lead from the front, perhaps because I am over-responsive to group atmosphere.

g) I am apt to get too caught up in ideas that occur to me and so lose track of what is happening.

h) My colleagues tend to see me as worrying unnecessarily over detail and the possibility that things may go wrong.

3 WHEN INVOLVED IN A PROJECT WITH OTHER PEOPLE. 10 Points Total

a) I have an aptitude for influencing people without pressurising them

b) My general vigilance prevents careless mistakes and omissions being made.

c) I am ready to press for action to make sure that the meeting does not waste time or lose sight of the main objectives.

d) I can be counted on to contribute something original.

e) I am always ready to back a good suggestion in the common interest.

f) I am keen to look for the latest in new ideas and developments.

g) I believe my capacity for cool judgement is appreciated by others.

h) I can be relied upon to see that all essential work is organised.

4 MY CHARACTERISTIC APPROACH TO GROUP WORK IS THAT: 10 Points

Total

a) I have a quiet interest in getting to know colleagues better.

b) I am not reluctant to challenge the views of others or to hold a minority view myself.

c) I can usually find a line of argument to refute unsound propositions.

d) I think I have a talent for making things work once a plan has to be put into operation.

e) I have a tendency to avoid the obvious and to come out with the unexpected.

f) I bring a touch of perfectionism to any team.

g) I am ready to make use of contacts outside the group itself.

h) While I am interested in all views I have no hesitation in making up my mind once a decision has to be made

5 <u>I GAIN SATISFACTION IN A JOB BECAUSE:</u>

10 Points
Total

a) I enjoy analysing situations and weighing up all the possible choices.

b) I am interested in finding practical solutions to problems.

c) I like to feel I am fostering good working relationships.

d) I can exert a strong influence on decisions.

e) I can meet people who may have something to offer.

f) I can get people to agree on a necessary course of action.

g) I feel in my element where I can give my task my full attention.

h) I like to find a field that stretches my imagination.

6 <u>IF I AM SUDDENLY GIVEN A DIFFICULT TASK WITH LIMITED TIME AND UNFAMILIAR PEOPLE:</u> 10 Points Total

a) I would feel like retiring to a corner to devise a way out of the impasse before developing a line.

b) I would be ready to work with the person who showed the most positive approach however difficult he/she might be.

c) I would find some way of reducing the size of the task by establishing what different individuals might best contribute.

d) My natural sense of urgency would help to ensure that we did not fall behind schedule.

e) I believe I would keep cool and maintain my capacity to think straight.

f) I would retain a steadiness of purposes in spite of the pressures.

g) I would be prepared to take a positive lead if I felt the group was making no progress.

h) I would open discussions with a view to stimulating new thoughts and getting something moving.

7 <u>WITH REFERENCE TO THE PROBLEMS TO WHICH I AM SUBJECT IN WORKING GROUPS:</u>

10 Points Total

a) I am apt to show my impatience with those who are obstructing progress.

b) Others may criticise me for being too analytical and insufficiently intuitive.

c) My desire to ensure that work is properly done can hold up proceedings.

d) I tend to get bored rather easily and rely on one or two stimulating members to spark me off.

e) I find it difficult to get started unless the goals are clear.

f) I am sometimes poor at explaining and clarifying complex points that occur to me.

g) I am conscious of demanding from others the things I cannot do myself.

h) I hesitate to get my points across when I run up against real opposition.

Transfer the points scored from the points table on each page, entering them by the appropriate letter. Add the points vertically to give a total team role score.

SECTION		CW		CH		SH		PL		RI		ME		TW		C
1	g		d		f		c		a		h		b		e	
2	a		b		e		g		c		d		f		h	
3	h		a		c		d		f		g		e		b	
4	d		h		b		e		g		c		a		f	
5	b		f		d		h		e		a		c		g	
6	f		c		g		a		h		e		b		d	
7	e		g		a		f		d		b		h		c	
TOTAL																

KEY TO TEAM ROLES

CW	=	Company Worker
CH	=	Chairman
SH	=	Shaper
PL	=	Plant
RI	=	Resource Investigator
ME	=	Monitor Evaluator
TW	=	Team Worker
C	=	Completer

USEFUL PEOPLE TO HAVE IN TEAMS

Type	*Symbol*	*Typical Features*	*Positive Qualities*	*Allowable Weakness*
Company Worker	CW	Conservative, dutiful, predictable.	Organising ability, practical common sense, hard-working, self-discipline.	Lack of flexibility, unresponsiveness to unproven ideas.
Chairman	CH	Calm, self-confident, controlled	A capacity for treating and welcoming all potential contributors on their merits and without prejudice. A strong sense of objectives.	No more than ordinary in terms of intellect or creative ability.
Shaper	SH	Highly strung, outgoing, dynamic	Drive and a readiness to challenge inertia, ineffectiveness, complacency or self-deception.	Proneness to provocation, irritation and impatience.
Plant	PL	Individual, serious-minded, unorthodox	Genius, imagination, intellect, knowledge	Up in the clouds, inclined to disregard practical details or protocol.
Resource Investigator	RI	Extroverted, enthusiastic, curious, communicative.	A capacity for contacting people and exploring anything new. An ability to respond to challenge.	Liable to lose interest once the initial fascination has passed.
Monitor-Evaluator	ME	Sober, unemotional, prudent.	Judgement, discretion, hard-headedness.	Lacks inspiration or ability to motivate others.
Team Worker	TW	Socially oriented, rather mild, sensitive	An ability to respond to people and situations, and to promote team spirit.	Indecisiveness at moments of crisis.
Completer (Finisher)	C	Painstaking, orderly, conscientious, anxious	A capacity for follow-through. Perfectionism	A tendency to worry about small things. A reluctance to "let go".

Please complete the following slip to indicate what team role your answers have lead to:

Name .....

Which team role did you get the highest score for?

.....

Which team role was 2nd highest?

.....

Please return this slip to your Module Tutor.

(All data collected regarding your identified team role will be anonymised and will be used for research purposes only)

APPENDIX J

LEARNING STYLES QUESTIONNAIRE

APPENDIX J

LEARNING STYLES QUESTIONNAIRE

This Questionnaire is designed to find out your preferred learning style(s). Over the years you have probably developed learning 'habits' that help you benefit more from some experiences than from others. Since you are probably unaware of this, this questionnaire will help you pinpoint your learning preferences so that you are in a better position to select learning experiences that suit your style.

There is no time limit to this questionnaire. It will probably take you 10-15 minutes. The accuracy of the results depends on how honest you can be. There are no right or wrong answers. If you agree more than you disagree with a statement put a tick by it (√). If you disagree more than you agree put a cross by it (x). Be sure to mark each item with either a tick or a cross.

☐ 1. I have strong beliefs about what is right and wrong, good and bad

☐ 2. I often act without considering the possible consequences.

☐ 3. I tend to solve problems using a step-by-step approach.

☐ 4. I believe that formal procedures and policies restrict people.

☐ 5. I have a reputation for saying what I think, simply and directly.

☐ 6. I often find that actions based on feelings are as sound as those based on careful thought and analysis

☐ 7. I like the sort of work where I have time for thorough preparation and implementation.

☐ 8. I regularly question people about their basic assumptions.

☐ 9. What matters most is whether something works in practice.

☐ 10. I actively seek out new experiences.

☐ 11. When I hear about a new idea or approach I immediately start working out how to apply it in practice.

☐ 12. I am keen on self discipline such as watching my diet, taking regular exercise, sticking to a fixed routine, etc.

☐ 13. I take pride in doing a thorough job.

☐ 14. I get on best with logical, analytical people and less well with spontaneous, 'irrational' people.

15. I take care over the interpretation of data available to me and avoid jumping to to conclusions.

16. I like to reach a decision carefully after weighing up many alternatives.

17. I am attracted more to novel, unusual ideas than to practical ones.

18. I don't like disorganised things and prefer to fit things into a coherent pattern.

19. I accept and stick to laid down procedures and policies so long as I regard them as an efficient way of getting the job done.

20. I like to relate my actions to a general principle.

21. In discussions I like to get straight to the point.

22. I tend to have distant, rather formal relationships with people at work.

23. I thrive on the challenge of tackling something new and different.

24. I enjoy fun-loving, spontaneous people.

25. I pay meticulous attention to detail before coming to a conclusion.

26. I find it difficult to produce ideas on impulse.

27. I believe in coming to the point immediately.

28. I am careful not to jump to conclusions too quickly.

29. I prefer to have as many sources of information as possible – the more data to think over the better.

30. Flippant people who don't take things seriously enough usually irritate me.

31. I listen to other people's points of view before putting my own forward.

32. I tend to be open about how I'm feeling.

33. In discussions I enjoy watching the manoeuvrings of the other participants.

34. I prefer to respond to events on a spontaneous, flexible basis rather than plan things out in advance.

35. I tend to be attracted to techniques such as network analysis, flow charts, branching programmes, contingency planning, etc.

36. It worries me if I have to rush out a piece of work to meet a tight deadline.

37. I tend to judge people's ideas on their practical merits.

38. Quiet, thoughtful people tend to make me feel uneasy.

39. I often get irritated by people who want to rush things.

40. It is more important to enjoy the present moment than to think about the past or future.

41. I think that decisions based on a thorough analysis of all the information are sounder than those based on intuition.

42. I tend to be a perfectionist.

43. In discussions I usually produce lots of spontaneous ideas.

44. In meetings I put forward practical, realistic ideas.

45. More often than not, rules are there to be broken.

46. I prefer to stand back from a situation and consider all the perspectives.

47. I can often see inconsistencies and weaknesses in other people's arguments.

48. On balance I talk more than I listen.

49. I can often see better, more practical ways to get things done.

50. I think written reports should be short and to the point.

51. I believe that rational, logical thinking should win the day.

52. I tend to discuss specific things with people rather than engaging in social discussion.

53. I like people who approach things realistically rather than theoretically.

54. In discussions I get impatient with irrelevancies and digressions.

55. If I have a report to write I tend to produce lots of drafts before setting on the final version.

56. I am keen to try things out to see if they work in practice.

57. I am keen to reach answers via a logical approach.

58. I enjoy being the one that talks a lot.

59. In discussions I often find I am the realist, keeping people to the point and avoiding wild speculations.

60. I like to ponder many alternatives before making up my mind.

61. In discussions with people I often find I am the most dispassionate and objective.

62. In discussions I'm more likely to adopt a 'low profile' than to take the lead and do most of the talking.

63. I like to be able to relate current actions to a longer term bigger picture.

64. When things go wrong I am happy to shrug it off and 'put it down to experience'.

65. I tend to reject wild, spontaneous ideas as being impractical.

66. It's best to think carefully before taking action.

67. On balance I do the listening rather than the talking.

68. I tend to be tough on people who find it difficult to adopt a logical approach.

69. Most times I believe the end justifies the means.

70. I don't mind hurting people's feelings so long as the job gets done.

71. I find the formality of having specific objectives and plans stifling.

72. I'm usually one of the people who puts life into a party.

73. I do whatever is expedient to get the job done.

74. I quickly get bored with methodical, detailed work.

75. I am keen on exploring the basic assumptions, principles and theories underpinning things and events.

76. I'm always interested to find out what people think.

77. I like meetings to be run on methodical lines, sticking to laid down agenda, etc.

78. I steer clear of subjective or ambiguous topics.

79. I enjoy the drama and excitement of a crisis situation.

80. People often find me insensitive to their feelings.

LEARNING STYLES QUESTIONNAIRE – SCORING

You score **ONE** point for each item you ticked (√). There are no points for items you crossed (X).

Simply indicate on the lists below which items were ticked.

2	7	1	5
4	13	3	9
6	15	8	11
10	16	12	19
17	25	14	21
23	28	18	27
24	29	20	35
32	31	22	37
34	33	26	44
38	36	30	49
40	39	42	50
43	41	47	53
45	46	51	54
48	52	57	56
58	55	61	59
64	60	63	65
71	62	68	69
72	66	75	70
74	67	77	73
79	76	78	80
Total Points			
Activist	***Reflector***	***Theorist***	***Pragmatist***

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20	20	20	20	
19				
18		19	19	
17	19	18		
16				Very strong preference
15		17	18	
14				
13	18	16	17	
12	17	15	16	
	16			Strong preference
11	15	14	15	
10	14	13	14	
9	13	12	13	Moderate preference
8				
7	12	11	12	
6	11	10	11	
5	10	9	10	Low preference
4	9	8	9	
3	8	7	8	
	7	6	7	
	6	5	6	
2	5	4	5	
	4	3	4	Very low
1	3	2	3	preference
	2	1	2	
	1		1	
0	0	0	0	

Name (please print) .....

Thank you for your help in completing this survey.

Please return this slip to your Module Tutor.

(All data collected regarding your identified Learning Style preference will be anonymised and will be used for research purposes only)

LEARNING STYLES – GENERAL DESCRIPTIONS

Activists

Activists involve themselves fully and without bias in new experiences. They enjoy the here and now and are happy to be dominated by immediate experiences. They are open-minded, not sceptical, and this tends to make them enthusiastic about anything new. Their philosophy is: 'I'll try anything once'. They tend to act first and consider the consequences afterwards. Their days are filled with activity. They tackle problems by brainstorming. As soon as the excitement from one activity has died down they are busy looking for the next. They tend to thrive on the challenge of new experiences but are bored with implementation and longer term consolidation. They are gregarious people constantly involving themselves with others but, in doing so, they seek to centre all activities around themselves.

Reflectors

Reflectors like to stand back to ponder experiences and observe them from many different perspectives. They collect data, both first hand and from others, and prefer to think about it thoroughly before coming to any conclusions. The thorough collection and analysis of data about experiences and events is what counts so they tend to postpone reaching definitive conclusions for as long as possible. Their philosophy is to be cautious. They are thoughtful people who like to consider all possible angles and implications before making a move. They prefer to take a back seat in meetings and discussions. They enjoy observing other people in action. They listen to others and get the drift of the discussion before making their own points. They tend to adopt a low profile and have a slightly distant, tolerant, unruffled air about them. When they act it is part of a wide picture which includes the past as well as the present and others' observations as well as their own.

Theorists

Theorists adapt and integrate observations into complex but logically sound theories. They think problems through in a vertical, step-by-step logical way. They assimilate disparate facts into coherent theories. They tend to be perfectionists who won't rest easy until things are tidy and fit into a rational scheme. They like to analyze and synthesize. They are keen on basic assumptions, principles, theories, models and systems thinking. Their philosophy prizes rationality and logic. 'If it's logical it's good'. Questions they frequently ask are: 'Does it make sense?' 'How does this fit with that?' 'What are the basic assumptions?' They tend to be detached, analytical and dedicated to rational objectivity rather than anything subjective or ambiguous. Their approach to problems is consistently logical. This is their 'mental set' and they rigidly reject anything that doesn't fit with it. They prefer to maximize certainty and feel uncomfortable with subjective judgements, lateral thinking and anything flippant.

Pragmatists

Pragmatists are keen on trying out ideas, theories and techniques to see if they work in practice. They positively search out new ideas, theories and techniques to see if they work in practice. They positively search out new ideas and take the first opportunity to experiment with applications. They are the sort of people who return from management courses brimming with new ideas that they want to try out in practice. They like to get on with things and act quickly and confidently on ideas that attract them. They tend to be impatient with ruminating and open-ended discussions. They are essentially practical, down to earth people who like making practical decisions and solving problems. They respond to problems and opportunities 'as a challenge'. Their philosophy is; 'There is always a better way' and 'If it *works* it's good'.

Example Student Learning Style Profiles

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

Ring your scores on this chart and then join them up.

Activist	Reflector	Theorist	Pragmatist	
20 19 18 17 16 15 14 13	20 19 18	20 19 18 17 16	20 19 18 17	Very strong preference
12 11	17 16 15	15 14	16 15	Strong preference
10 9 8 7	14 13 12	13 12 11	14 13 12	Moderate preference
6 5 4	11 10 9	10 9 8	11 10 9	Low preference
3 2 1 0	8 7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	8 7 6 5 4 3 2 1 0	Very low preference

APPENDIX K

LIND'S MORAL JUDGEMENT TEST

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The *Moral Judgment Test* (MJT)

The *Moral Judgment Test* (*MJT*) has been constructed to assess subjects' moral judgment competence. This competence has been aptly defined by Lawrence Kohlberg, „as the capacity to make decisions and judgments which are moral (i.e., based on internal principles) and to *act* in accordance with such judgments" (Kohlberg, 1964, p. 425; emphasis added). According to modern theories of communicative ethics (e.g., Habermas, 1985; 1990), one of the core moral abilities is to solve a behavior problem or dilemma by entering an ethical discourse rather than use force or violence. For this, someone must be able to *appreciate* not only arguments of people who agree with one's own opinion but also of those who *oppose* it. Such a competence, it seems, is most crucial for participating in a democratic, pluralistic society (Lind, 1987). Fortunately, we have now much research evidence available that clearly shows that education can foster this competence (Lind, 2000; 1996; Lind & Wakenhut, 1985; Oser, 1986; Rest, 1986).

Besides this, the MJT produces measures for their moral ideals or *attitudes*, I.e., their attitudes toward each stage of moral reasoning as defined by Kohlberg (1958; 1984). Moreover, the *MJT* can be scored for other aspects of a subjects' moral judgment behavior like situational adequacy of moral judgment, extremity of judgment (Heidbrink, 1985), moral closed-mindedness, most preferred stages of reasoning and more (Lind, 1978; Lind & Wakenhut, 1985).
(For references please see the text „Introduction to the MJT", 1998, cited below).

Recent publications about the MJT and findings of MJT research are to be found on the web-site „Moral and Democratic Development and Education" (http://www.uni-konstanz.de/ag-moral/).
Guidelines for adapting the MJT to other languages can be found in „Introduction to the Moral Judgment Test (MJT)" (Lind, 1998; http://www.uni-konstanz.de/ag-moral/ ; see list of publications). These guidelines establish rigorous standards for cross-cultural validity, so that the findings with different version can actually be compared. The MJT is designed for use in research and ev aluation projects. It is **not** designed as an instrument for individual diagnostics or selection purposes. Test weariness may be a problem in test-retest-studies. This problem can result in an unusual lowering of the C-score on the retest. Special attention should be given to motivating subjects by explaining the need of retesting, and the importance of the study.

This is a slightly revised version (Dec. 2001), replacing "acceptability" judgments by "acceptance" and "rejection" judgments. I like to thank Mr. Michael Hauan for pointing out to me the less than optimal adequacy of the former formulati on. No substantial changes of response pattern are expected due to this change. Yet, studies into this question would be quite welcome.

December 11, 2001

Only for the project administrator:
1. Date:
2. Name of the project administrator:
3. Name of the project :
4. Number of the Questionnaire:

Questionnaire on Ethical Problems

This questionnaire consists of several parts. To be able to match parts from the same person, we need an identification. Please do not enter your name anywhere on the questionnaire.

For *identification*, please fill in the following questions instead:

The first two letters of your mother's first name: ___ | ___ (e.g., Jessica: -> "J | A")

The first two letters of your father's first name: ___ | ___

The last two digits of your house number: ___ | ___ (if it has only one digit, please write a leading "O", e.g. "0 | 2")

The day of your birth (e.g., "0|5" for fifth of...): ___ | ___

5. Please transcribe the above numbers here: ___ | ___ ___ | ___ ___ | ___ ___ | ___
(Personal identification number)

I. Workers' Dilemma

Due to some seemingly unfounded dismissals, some factory workers suspect the managers of eavesdropping on their employees through an intercom and using this information against them. The managers officially and emphatically deny this accusation. The union declares that it will only take steps against the company when proof has been found that confirms these suspicions. Two workers then break into the administrative offices and take tape transcripts that prove the allegation of eavesdropping.

	I strongly *dis*agree						**I strongly agree**
6. Would you disagree or agree with the workers' behavior?	-3	-2	-1	0	+1	+2	+3

How acceptable do you find the following arguments *in favor* of the two workers' behavior? Suppose someone argued they were *right* . . .

This argument . . .

	I strongly reject								**I strongly accept**
7. because they didn't cause much damage to the company.	-4	-3	-2	-1	0	+1	+2	+3	+4
8. because due to the company's disregard for the law, the means used by the two workers were permissible to restore law and order.	-4	-3	-2	-1	0	+1	+2	+3	+4
9. because most of the workers would approve of their deed and many of them would be happy about it.	-4	-3	-2	-1	0	+1	+2	+3	+4
10. because trust between people and individual dignity count more than the firm's internal regulations	-4	-3	-2	-1	0	+1	+2	+3	+4
11. because since the company had committed an injustice first, the two workers were justified in breaking into the offices	-4	-3	-2	-1	0	+1	+2	+3	+4
12. because the two workers saw no legal means of revealing the company's misuse of confidence, and therefore chose what they considered the lesser evil.	-4	-3	-2	-1	0	+1	+2	+3	+4

How acceptable do you find the following arguments *against* the two workers' behavior? Suppose someone argued they were *wrong* . . .

This argument . . .

	I strongly reject								**I strongly accept**
13. because we would endanger law and order in society if everyone acted as the two workers did.	-4	-3	-2	-1	0	+1	+2	+3	+4
14. because one must not violate such a basic right as the right of property ownership and take the law into one's own hands, unless some universal moral principle justifies doing so.	-4	-3	-2	-1	0	+1	+2	+3	+4
15. because risking dismissal from the company on behalf of other people is unwise.	-4	-3	-2	-1	0	+1	+2	+3	+4
16. because the two should have run through the legal channels at their disposal and not committed a serious violation of the law.	-4	-3	-2	-1	0	+1	+2	+3	+4
17. because one doesn't steal and commit burglary if one wants to be considered a decent and honest person.	-4	-3	-2	-1	0	+1	+2	+3	+4
18. because the dismissals of the other employees did not affect them and thus they had no reason to steal the transcripts.	-4	-3	-2	-1	0	+1	+2	+3	+4

II. Doctor's Dilemma

A woman had cancer and she had no hope being saved. She was in terrible pain and so weakened that a large dose of a painkiller such as morphine would have caused her death . During a temporary period of improvement, she begged the doctor to give her enough morphine to kill her. She said she could no longer endure the pain and would be dead in a few weeks anyway. The doctor complied with her wish.

	I strongly *dis*agree						I strongly agree
19. Do you disagree or agree with the doctor's behavior?	-3	-2	-1	0	+1	+2	+3

How acceptable do you find the following arguments *in favor* of the doctor?
Suppose someone said he acted *rightly* . . .

This argument . . .

	I strongly reject								I strongly accept
20. because the doctor had to act according to his conscience. The woman's condition justified an exception to the moral obligation to preserve life.	-4	-3	-2	-1	0	+1	+2	+3	+4
21. because the doctor was the only one who could fulfill the woman's wish; respect for her wish made him act as he did.	-4	-3	-2	-1	0	+1	+2	+3	+4
22. because the doctor only did what the woman talked him into doing. He need not worry about unpleasant consequences.	-4	-3	-2	-1	0	+1	+2	+3	+4
23. because the woman would have died anyway and it didn't take much effort for him to give her an overdose of a painkiller.	-4	-3	-2	-1	0	+1	+2	+3	+4
24. because the doctor didn't really break a law. Nobody could have saved the woman and he only wanted to shorten her suffering.	-4	-3	-2	-1	0	+1	+2	+3	+4
25. because most of his fellow doctors would presumably have done the same in a similar situation.	-4	-3	-2	-1	0	+1	+2	+3	+4

How acceptable do you find the following arguments *against* the doctor?
Suppose someone said that he acted *wrongly* . . .

This argument . . .

	I strongly reject								I strongly accept
26. because he acted contrary to his colleagues' convictions. If they are against mercy-killing the doctor shouldn't do it.	-4	-3	-2	-1	0	+1	+2	+3	+4
27. because one should be able to have complete faith in a doctor's devotion to preserving life even if someone with great pain would rather die.	-4	-3	-2	-1	0	+1	+2	+3	+4
28. because the protection of life is everyone's highest moral obligation. We have no clear moral criteria for distinguishing between mercy-killing and murder.	-4	-3	-2	-1	0	+1	+2	+3	+4
29. because the doctor could get himself into much trouble. They have already punished others for doing the same thing.	-4	-3	-2	-1	0	+1	+2	+3	+4
30. because he could have had it much easier if he had waited and not interfered with the woman's dying.	-4	-3	-2	-1	0	+1	+2	+3	+4
31. because the doctor broke the law. If one thinks that mercy-killing is illegal, then one should refuse such requests.	-4	-3	-2	-1	0	+1	+2	+3	+4

Thank you!

APPENDIX L

GENERALISED LEARNING MODEL FOR IMPLEMENTATION

APPENDIX L

GENERALISED LEARNING MODEL FOR IMPLEMENTATION

1. Choose an appropriate, focussed module that has a discursive nature requiring development of critical analysis. (See fieldwork study 1)

2. Design module delivery according to the PET framework outlined in Appendix H. This will include determining strategies for integrating use of the ACC environment into the f2f sessions as well as defining how such use is going to be assessed. (See fieldwork study 3)

3. Brief students as to the monitoring that will be undertaken and how they are expected to use the environment (See fieldwork study 4).

4. Propose introductory exercises for students to undertake using the technology. An example exercise could be to encourage the students to get to know each other by providing mini biographies of themselves (See fieldwork studies 5 and 7).

5. Encourage students within the f2f contact sessions to organise themselves and use the conferencing environment effectively. (See fieldwork study 1)

6. Facilitate consideration of group roles in strategy development and implementation. (See fieldwork study 7)

7. Encourage development of critical evaluation and responsibility for learning through adopting a non-moderating role within the conferencing environment. (See fieldwork studies 3. 4, 5, 6, and 7)

8. Monitor the environment on a regular basis to pick up any issues that can then be addressed in the f2f sessions. (See fieldwork study 3)

9. Facilitate both intrinsic and extrinsic reward for using the conferencing environment. (See fieldwork studies 5, 6 and 7)

APPENDIX M

DETAILED GUIDANCE ON THE IMPACT OF USING ASYNCHRONOUS COMPUTER CONFERENCING

APPENDIX M

Detailed Guidance on the impact of using ACC within a predominantly campus based context of learning.

Based on findings related to the impact of using ACC within a predominantly campus-based context of learning the recommendations formulated are:

- The approach to module design needs to be holistic and incorporate usage of the ACC environment (i.e. there needs to be a strong link between module objectives/learning outcomes and the use of the technology). If such usage is not designed into module delivery then campus-based students are unlikely to use it.
- The module chosen needs to be focussed and have key elements that require discussion.
- Use of the technology should enhance the learning experience rather than necessarily replacing face-to-face contact.
- That, in order to address the ethical issues involved, students be "briefed" as to expectations of them in using the system.
- That students be given an explanation of how the tutor will be monitoring their activity.
- That staff and students be made aware of both the intrinsic and extrinsic benefits than can be gained from using the technology.
- That tutors be aware that patterns of communication will be affected by their intervention should they adopt this role.

- That strategies be developed to raise students' awareness of group roles and team working to overcome their lack of organisational skills.
- That time be given for students to socialise to build their confidence in using the medium.
- That time be given to setting up and monitoring the environment
- That issues raised within the conferencing environment be followed up in the F2F contact sessions.
- That negotiation be undertaken when operating over multiple campuses with multiple tutors in order to reach consensus over approach and assessment.
- That tutors be aware that students on the same campus are likely to set up F"F meetings or synchronous chat to supplement conference discussions. Tutors will then need to decide whether or not this is desirable in relation to the particular learning outcomes they are seeking to achieve through use of the ACC environment.

APPENDIX N

FEEDBACK QUESTIONNAIRE

Blackboard Survey 2002

	Please indicate your choice, as appropriate, by colouring/shading the boxes or by adding your comments					
How often have you used Blackboard?	Daily	Weekly	Fortnightly	Monthly	Do not use	Other
On an average week, how many hours did you spend using Blackboard?	Less than 1	1-5	5-10	10-15	Greater than 15	Other
What did you use it for?	Resource for personal research (following suggested links)	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)	To transfer files to group members	Storage of personal research results	Other
Usefulness of the Blackboard for this purpose (Rated from 1 to 5, with 5 being most useful - please put a number in each cell in the row)						
Advantages of using Blackboard for international group collaboration?	On-line, asynchronous nature of communication/ collaborative learning	Accessible at time/place to suit	Ease of access	Ability to reflect and research before contributing	Providing tangible evidence of activity/ contribution	Other
How important was this to you? (Rated from 1 to 5, with 5 being most important - please put a number in each cell in the row)						
Please indicate during which phase of the collaboration each of these factors proved to be an advantage? Please choose ***ONE*** of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report??	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of advantage to the phase identified:	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all
Disadvantages:	Slow speed	Data overload	Security	Medium restricted to asynchronous text based communication	User interface/ease of access	Other

How serious are these? (Rated from 1 to 5, with 5 being most serious - put a number in each cell in the row)						
Please indicate during which phase of the collaboration each of these factors proved to be a disadvantage? Please choose *ONE* of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of disadvantage to the phase identified.	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Comments
In your opinion, how useful is Blackboard for supporting collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful	Comments
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	International dimension – getting to know students in other institutions	Other
What factors discouraged you from contributing?	Not knowing people and their skills as in face to face collaboration	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element	Other
How likely is it that you will be making use of Blackboard or other collaborative working tools in your career (eg Lotus Notes)?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Would you choose on line collaborative groups over face to face groups? If you chose Seldom or Not at all, please elaborate below.	Very likely	Quite Likely	Sometimes	Seldom	Not at all	Comments

Was your commitment to the group less because it was on line rather than face to face?	Very likely (It was less)	Quite likely	Sometimes	Seldom	Not at all (same commitment)	Comments

Please feel free to add comments about the value of using Blackboard for collaborative learning and how this compares with face to face collaboration:

Examples of Completed Student Questionnaires

WebCT Survey 2001 Course BSc. Computer Science ..... Full-time/Part-time *(Please delete as appropriate)

	Please highlight options, as appropriate				
Use of asynchronous computer-conferencing adds value to the learning experience	Strongly agree ✓	Agree	Neither agree nor disagree - use of CMC is OK	Disagree	Strongly disagree
Please give brief reasons for the response given above	Allows remote	discussion with peers. Allows		large discussions	on differing opinions
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15
What did you use it for?	Resource for personal research (following suggested links)	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)		
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful)	5	5	5		
Advantages of using WebCT as an additional resource?	On-line and accessible in own time/place	Ability to read other people's contributions	Opportunities for recording a personal contribution	Range of resources available	Other ALL of -11
How important was this to you? (Rated from 1 to 5, with 5 being most important)	5	5	5	5	
Disadvantages:	Slow speed	Data overload	Security	Quality control	Lack of anonymity in discussions
How serious are these? (Rated from 1 to 5, with 5 being most serious)	2	4	4	2	5
In your opinion, how useful is WebCT for supporting or encouraging collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful ✓
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	Other ALL
What factors discouraged you from contributing?	Not applicable	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element N
How likely is it that you will be making use of WebCT or other collaborative working tools in your career?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all
Do you feel that the discussion area should be moderated by the module tutor in order to keep discussions more focussed?	Strongly agree	Agree	Neither agree nor disagree - tutor intervention would be OK	Disagree	Strongly disagree ✓
Please give reasons for your response above	The area should be self-governing, At university level no-one will over abuse the system like in the real world				

Please feel free to add comments about the value of using WebCT for Teaching and Learning:

Change the forum to VBullitin ! its much easier to read threads and supports the election of admins !!!

	Please highlight options, as appropriate				
Use of asynchronous computer-conferencing adds value to the learning experience	Strongly agree	Agree	Neither agree nor disagree - use of CMC is OK	Disagree	Strongly disagree
Please give brief reasons for the response given above	It allows students to interact with each other about things happening on the module, as apposed to knowing a few select people on the course.				
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15
What did you use it for?	Resource for personal research (following suggested links)	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)		
Usefulness of WebCT for this purpose Rated from 1 to 5, with 5 being most useful)	4	5	2		
Advantages of using WebCT as an additional resource?	On-line and accessible in own time/place	Ability to read other people's contributions	Opportunities for recording a personal contribution	Range of resources available	Other
How important was this to you? Rated from 1 to 5, with 5 being most important)	5	5	4	5	
Disadvantages:	Slow speed	Data overload	Security Shows the student number	Quality control	Lack of anonymity in discussions
How serious are these? (Rated from 1 to 5, with 5 being most serious)	1	2	4	4	2
In your opinion, how useful is WebCT for supporting or encouraging collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	Other
What factors discouraged you from contributing?	Not applicable	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element
How likely is it that you will be making use of WebCT or other collaborative working tools in your career?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all
Do you feel that the discussion area should be moderated by the module tutor in order to keep discussions more focussed?	Strongly agree	Agree	Neither agree nor disagree - tutor intervention would be OK	Disagree	Strongly disagree

Please give reasons for your response above	It should be however how much of an intervention will be taken, there are some issues which will be better moderated, however we don't have a lecture in a pub moderating our module chat.

Please feel free to add comments about the value of using WebCT for Teaching and Learning:

think it would be useful if it was set up for all modules that a student takes, however it does add some extra time out of the timetable which can be quite lengthy when having to read all the discussions.

WebCT Survey 2001 **Course BSc Computer Science Full-time**

	Please highlight options, as appropriate				
Use of asynchronous computer-conferencing adds value to the learning experience	Strongly agree	Agree	Neither agree nor disagree - use of CMC is OK	Disagree	Strongly disagree
Please give brief reasons for the response given above					
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15
What did you use it for?	Resource for personal research (following suggested links)	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)		
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful)	4	4			
Advantages of using WebCT as an additional resource?	On-line and accessible in own time/place	Ability to read other people's contributions	Opportunities for recording a personal contribution	Range of resources available	Other
How important was this to you? (Rated from 1 to 5, with 5 being most important)	3	3			
Disadvantages:	Slow speed	Data overload	Security	Quality control	Lack of anonymity in discussions
How serious are these? (Rated from 1 to 5, with 5 being most serious)	4	4			
In your opinion, how useful is WebCT for supporting or encouraging collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	Other
What factors discouraged you from contributing?	Not applicable	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element
How likely is it that you will be making use of WebCT or other collaborative working tools in your career?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all
Do you feel that the discussion area should be moderated by the module tutor in order to keep discussions more focussed?	Strongly agree	Agree	Neither agree nor disagree - tutor intervention would be OK	Disagree	Strongly disagree
Please give reasons for your response above	Lots of irrelevant / rude comments made				

Please feel free to add comments about the value of using WebCT for Teaching and Learning:

WebCT should have been monitored, it's one thing for people to say that they have the right to free speech, but that doesn't mean that they need to swear in every message they add. People deliberately swearing should be removed from the discussion group.

WebCT Survey 2001 Course ...Bsc(Hons) Computing..... Full-time

	Please highlight options, as appropriate				
Use of asynchronous computer-conferencing adds value to the learning experience	Strongly agree	Agree	Neither agree nor disagree - use of CMC is OK	Disagree	Strongly disagree
Please give brief reasons for the response given above.		It allows interaction between students (and lecturers) that wouldn't normally be possible.			
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15
What did you use it for?	Resource for personal research (following suggested links)	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)		
Usefulness of WebCT for this purpose Rated from 1 to 5, with 5 being most useful)	2	3	4		
Advantages of using WebCT as an additional resource?	On-line and accessible in own time/place	Ability to read other people's contributions	Opportunities for recording a personal contribution	Range of resources available	Other
How important was this to you? Rated from 1 to 5, with 5 being most important)	4	3	2		
Disadvantages:	Slow speed	Data overload	Security	Quality control (i.e the lack of it)	Lack of anonymity in discussions
How serious are these? (Rated from 1 to 5, with 5 being most serious)	2	3 (Often too many messages to read in one sitting)		5	
In your opinion, how useful is WebCT for supporting or encouraging collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation (Being told you'd be penalised if you didn't use it)	Peer group involvement	Personal satisfaction	Other
What factors discouraged you from contributing?	Not applicable	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element
How likely is it that you will be making	Very	Quite	Sometimes	Seldom	Not at all

use of WebCT or other collaborative working tools in your career?	Likely	Likely			
Do you feel that the discussion area should be moderated by the module tutor in order to keep discussions more focussed?	Strongly agree	Agree	Neither agree nor disagree - tutor intervention would be OK	Disagree	Strongly disagree
Please give reasons for your responses above		(See Below)			

Please feel free to add comments about the value of using WebCT for Teaching and Learning:

I think webCT is a good idea and it was good fun. I read the messages usually once a week until things started to tail off at the end.
Along with a few others I was one of the first (I think I was the second person) to use the service, and in the beginning it looked like it was going to be a useful source of information and discussion.
However, I soon started to see that (as a tool for the subject) it was going to be heavily hindered by the lack of moderation... and indeed, after a while, it definitely got "out of hand".
After which, I continued to read the messages but did not feel that contributing would hold any purpose. :-(

Oh well... at least it was used!
:-)

I hope my comments are of some help,
Thanks,
Rich"

From: [redacted]

To: [redacted]

WebCT Survey 2001 **Course Bsc (Hons) Computer Science *Full-time/Part-time *(Please delete as appropriate)**

	Please highlight options, as appropriate				
Use of asynchronous computer-conferencing adds value to the learning experience	Strongly agree	Agree	Neither agree nor disagree - use of CMC is OK	Disagree	Strongly disagree
Please give brief reasons for the response given above		Knowledge can be enhanced when it is shared with others. Many heads are better than one.			
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15
What did you use it for?	Resource for personal research (following suggested links)	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)		
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful)	4				
Advantages of using WebCT as an additional resource?	On-line and accessible in own time/place	Ability to read other people's contributions	Opportunities for recording a personal contribution	Range of resources available	Other
How important was this to you? (Rated from 1 to 5, with 5 being most important)	4	3		2	
Disadvantages:	Slow speed	Data overload	Security	Quality control	Lack of anonymity in discussions
How serious are these? (Rated from 1 to 5, with 5 being most serious)		4	2		3
In your opinion, how useful is WebCT for supporting or encouraging collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	Other
What factors discouraged you from contributing?	Not applicable	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element
How likely is it that you will be making use of WebCT or other collaborative working tools in your career?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all
Do you feel that the discussion area should be moderated by the module tutor in order to keep discussions more focussed?	Strongly agree	Agree	Neither agree nor disagree - tutor intervention would be OK	Disagree	Strongly disagree
Please give reasons for your response above		Tutor intervention would be useful if there is a general feeling that people are abusing the system. Otherwise, they should leave discussions to run their course.			

Please feel free to add comments about the value of using WebCT for Teaching and Learning:

To: Pat Jefferies <pjefferies@qmu.ac.uk>
Sent: 21 May 2001 23:01
Subject: WebCT - A clearer picture :-)

Hi Pat, thanks for replying to me, I'm glad I was of help.. :-)

Thinking about it... if you're taking note of my comments, perhaps I should elaborate on what I was thinking... it may give you a clearer picture of what I was trying to say.. :-)

The idea of self-moderation is a good one and I think I was one of the people who was saying that "everyone is sensible" so I didn't see a need for a "discussion moderator" or any sort of hard rules. Well, it looks like I was too trusting (as usual, lol), for I soon noticed that one or two "out of hand" people, managed to ruin (perhaps "ruin" is a little harsh, but still...) it for the rest of us.
I still think that tough moderation isn't necessary, although we really ought to have had some rules given to us. Rules that are set by the lecturers tend to get adhered to, where as "rules" given by the students are more likely to get broken and/or heavily argued about.

I think, for example, we should have had a "no swearing" rule. Ok, there was (and is) a huge argument around whether we should have been allowed to swear or not, but I think (when it comes down to it) a simple "no swearing" rule would have stopped (or at least, reduced) most of the problems/silliness and abuse that occurred.

Also, I remember that, in the beginning, I was talking with my friends about the fact that "lecturers were going to read our posts", so we were going to make sure that we didn't put anything that was "unsuitable".
After a short while the odd post that perhaps could be called "unsuitable" appeared, and the lecturers didn't seem to respond in any-way. When this happened, I know a lot of people started to ignore the fact that tutor's were watching and just got-on with writing whatever they felt like.
To be fair, I know we were supposed to be self-moderating, but because we didn't have one single "leader" no one was really able to say anything against a "bad" post. If anyone did, all that happened was personal insults!

I don't think what had happened (by the end) was anyone's fault, I suspect it was just an unfortunate

(yet interesting) occurrence that certainly couldn't have been predicted. I for one learnt some interesting facts, and "in this day and age" it was eye opening to read some people's opinions! It just goes to show we're not going to have a society were most people "agree on things" any time soon! lol.

On the flip side of the coin, personally, I still think that with "the right group of people" complete rule-less self-moderation is possible. Although, perhaps "the right group of people" wasn't a large number of students (that, from personal experience, really didn't know what to do when they found out the board was going to be "self-moderated"!) lol!

..ooh... I think this e-mail had ended up a little like a post off WebCT! Oops.. ;-)
Although, I hope it has explained my thoughts and why I selected the items I did on the survey. :-)

Annnyway... I'd best get back to my Computing Ethics revision...

Good luck with the PHD!
I hope to be doing one of them someday... ;-)

Bye, Byee..
Rich'

--- Pat Jefferies <pjefferies@dmu.ac.uk> wrote:
> Richard
>
> Many thanks for taking the time and trouble to
> complete the questionnaire
> for me - this has provided me with some very useful
> feedback that will
> definitely help my research. I am also very
> interested in your comments
> regarding the requirement for moderation by the
> tutor as I rather felt that
> this may hinder the discussion rather than help it -
> I was really wanting
> the students to self-organise and regulate the area
> but I do take your point
> about what actually happened. Anyway - many thanks
> again for helping me out
> by completing the questionnaire - I am very
> grateful.
>
> All the best
>
> Pat
> Pat Jefferies
> Programme Leader -
> HND/BSc Computing Science

WebCT Survey 2002

	Please indicate your choice, as appropriate, by colouring/shading the boxes or by adding your comments					
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use	Other
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15	Other
What did you use it for?	Resource for personal research	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)	To transfer documents to group members	Storage of personal research results	Other
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful - please put a number in each cell in the row)	5	5	5	5	5	
Advantages of using WebCT for group collaboration?	On-line, asynchronous nature of communication/ collaberative learning	Accessible at time/place to suit	Ease of access	Ability to reflect and research before contributing	Providing tangible evidence of activity/contribution	Other
How important was this to you? (Rated from 1 to 5, with 5 being most important - please put a number in each cell in the row)	5	5	5	5	5	
Please indicate during which phase of the collaboration each of these factors proved to be an advantage? Please choose *ONE* of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of advantage to the phase identified:	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all
Disadvantages:	Slow speed	Data overload	Security	Medium restricted to asynchronous text based communication	User interface/ease of access	Other
How serious are these? (Rated from 1 to 5, with 5 being most serious - put a number in each cell in the row)	5	5	5	5	5	

↑ all these aspects are serious but i don't feel they applied to webct.

Please indicate during which phase of the collaboration each of these factors proved to be a disadvantage? Please choose ONE of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of disadvantage to the phase identified.	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Comments
In your opinion, how useful is WebCT for supporting collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful	Comments
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	International dimension – getting to know students in other institutions	Other
What factors discouraged you from contributing?	Not knowing people and their skills as in face to face collaboration	Lack of confidence in making your opinions known to others	Peer group pressure	Lack of experience of using this working medium	Anti-social element	Other
How likely is it that you will be making use of WebCT or other collaborative working tools in your career (eg Lotus Notes)?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Would you choose on line collaborative groups over face to face groups? If you chose Seldom or Not at all, please elaborate below.	Very likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Was your commitment to the group less because it was on line rather than face to face?	Very likely (it was less)	Quite likely	Sometimes	Seldom	Not at all (as my commitment)	Comments

Please feel free to add comments about the value of using WebCT for collaborative learning and how this compares with face to face collaboration:

I thought the was a excellent communication system which allowed dedicated group members the ability to complete tasks effectively and effectively. It takes the "awkward talk" element away from group meetings, working with group focus. I would recommend this method and would definitely work in this manner again.

WebCT Survey 2002

	Please indicate your choice, as appropriate, by colouring/shading the boxes or by adding your comments					
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use	Other
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15	Other
What did you use it for?	Resources for personal research	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)	To transfer documents to group members	Storage of personal research results	Other
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful - please put a number in each cell in the row)	5	5	5	5	5	
Advantages of using WebCT for group collaboration?	On-line, asynchronous nature of communication/ collaborative learning	Accessible at time/place to suit	Ease of access	Ability to reflect and research before contributing	Providing tangible evidence of activity/contribution	Other
How important was this to you? (Rated from 1 to 5, with 5 being most important - please put a number in each cell in the row)	5	5	5	5	5	
Please indicate during which phase of the collaboration each of these factors proved to be an advantage? Please choose *ONE* of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of advantage to the phase identified:	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all
Disadvantages:	Slow speed	Data overload	Security	Medium restricted to asynchronous text based communication	User interface/ease of access	Other
How serious are these? (Rated from 1 to 5, with 5 being most serious - put a number in each cell in the row)	5	5	5	5	5	

↑ all These aspects are serious but I don't feel they applied to WebCT.

Please indicate during which phase of the collaboration each of these factors proved to be a disadvantage? Please choose ONE of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of disadvantage to the phase identified.	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Comments
In your opinion, how useful is WebCT for supporting collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful	Comments
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	International dimension – getting to know students in other institutions	Other
What factors discouraged you from contributing?	Not knowing people and their skills as in face to face collaboration	Lack of confidence in putting your opinions known to others	Peer group pressure	Lack of experience of using this working medium	Anti-social element	Other
How likely is it that you will be making use of WebCT or other collaborative working tools in your career (eg Lotus Notes)?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Would you choose an ON collaborative groups over face to face groups? If you chose Seldom or Not at all, please elaborate below.	Very likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Was your commitment to the group less because it was on line rather than face to face?	Very likely (it was less)	Quite likely	Sometimes	Seldom	Not at all (same commitment)	Comments

Please feel free to add comments about the value of using WebCT for collaborative learning and how this compares with face to face collaboration:

I thought the was an excellent communication medium which allowed dedicated group members to chat to one another to effectively and effectively. It creates "quiet talk" element away from group meetings with group focus. I would recommend this method and would definitely use in the near future.

WebCT Survey 2002

	Please indicate your choice, as appropriate, by colouring/shading the boxes or by adding your comments					
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use	Other
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15	Other
What did you use it for?	Resource for personal research	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)	To transfer documents to group members	Storage of personal research results	Other
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful - please put a number in each cell in the row)	3	5	4	5	3	
Advantages of using WebCT for group collaboration?	On-line, asynchronous nature of communication/ collaborative learning	Accessible at time/place to suit	Ease of access	Ability to reflect and research before contributing	Providing tangible evidence of activity/contribution	Other
How important was this to you? (Rated from 1 to 5, with 5 being most important - please put a number in each cell in the row)	4	5	5	4	4	
Please indicate during which phase of the collaboration each of these factors proved to be an advantage? Please choose *ONE* of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of advantage to the phase identified:	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all
Disadvantages:	Slow speed	Data overload	Security	Medium restricted to asynchronous text based communication	User interface/ease of access	Other
How serious are these? (Rated from 1 to 5, with 5 being most serious - put a number in each cell in the row)	4	4	2	2	2	

Please indicate during which phase of the collaboration each of these factors proved to be a disadvantage? Please choose *ONE* of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of disadvantage to the phase identified.	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Comments
In your opinion, how useful is WebCT for supporting collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful	Comments
What factors encouraged you to contribute?	Closed discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	International dimension – getting to know students in other institutions	Other
What factors discouraged you from contributing?	Not knowing people and their skills as in face to face collaboration	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element	Other
How likely is it that you will be making use of WebCT or other collaborative working tools in your career (eg Lotus Notes)?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Would you choose on line collaborative groups over face to face groups? If you chose Seldom or Not at all, please elaborate below.	Very likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Was your commitment to the group less because it was on line rather than face to face?	Very likely (it was less)	Quite likely	Sometimes	Seldom	Not at all (same commitment)	Comments

Please feel free to add comments about the value of using WebCT for collaborative learning and how this compares with face to face collaboration:

I feel you can express yourself much better then actually meeting face-to-face as sometimes you feel nervous and probably afraid of being incorrect.

WebCT Survey 2002

	Please indicate your choice, as appropriate, by acknowledging the boxes or by adding your comments					
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use	Other
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15	Other
What did you use it for?	Resource for personal research	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)	Transfer documents to/up members	Storage of personal research results	Other to print off lecture notes
Usefulness of WebCT for this purpose (Rated from 1 to 5, with 5 being most useful - please put a number in each cell in the row)	4	5 3	1	3 2	0	5
Advantages of using WebCT for group collaboration?	Ability, asynchronous nature of communication/ collaborative learning	Accessible at time/place to suit	Ease of access	Ability to reflect and research before contributing	Providing tangible evidence of activity/contribution	Other As we know each other personally it was fair
How important was this to you? (Rated from 1 to 5, with 5 being most important - please put a number in each cell in the row)	4	3	2	1	0	5
Please indicate during which phase of the collaboration each of these factors proved to be an advantage? Please choose ONE of the phases that each factor made a serious impact	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?
Please indicate how likely each of these factors will be of advantage to the phase identified:	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all
Disadvantages	Slow speed	Data overload	Security	Medium restricted to asynchronous text based communication	User interface/ease of access	didn't see any disadvantages
How serious are these? (Rated from 1 to 5, with 5 being most serious - put a number in each cell in the row)						

Please indicate during which phase of the collaboration each of these factors proved to be a disadvantage? Please choose ONE of the phases that each factor made a serious impact	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?	Initial setting up / Division of work / Production of final report?
Please indicate how likely each of these factors will be of disadvantage to the phase identified.	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Very likely / Likely / Not very likely / Not at all	Comments didn't have a problem
In your opinion, how useful is WebCT for supporting collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful	Comments
What factors encouraged you to contribute?	Friendly discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	International dimension – getting to know students in other institutions	Other Knowing would fail if didn't
What factors discouraged you from contributing?	Not knowing people and their skills as in face to face collaboration	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element	Other
How likely is it that you will be making use of WebCT or other collaborative working tools in your career (eg Lotus Notes)?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Would you choose on line collaborative groups over face to face groups? If you chose Seldom or Not at all, please elaborate below.	Very likely	Quite likely	Sometimes	Seldom	Not at all	Comments
Was your commitment to the group less because it was on line rather than face to face?	Very likely (it was less)	Quite likely	Sometimes	Seldom	Not at all (maybe committed)	Comments

Please feel free to add comments about the value of using WebCT for collaborative learning and how this compares with face to face collaboration:

Webct excellent - no bias done on appearance, not problems in arranging times to meet up - much safer webct compared to working face to face - also meant fellow friends in same group didn't pressurise others or talk about their lives, kept you focused.

WebCT Survey 2003

	Please indicate your choice, as appropriate, by acknowledging the boxes or by adding your comments					
How often have you used WebCT?	Daily	Weekly	Fortnightly	Monthly	Do not use	Other
On an average week, how many hours did you spend using WebCT?	Less than 1	1-5	5-10	10-15	Greater than 15	Other
What did you use it for?	Resource for personal research	To contribute to on-going discussions	To follow on-going discussions without contributing (lurking)	To transfer documents to group members	Storage of personal research results	Other (to check off feedback here)
Usefulness of WebCT for this purpose (Ranked from 1 to 5, with 5 being most useful - please put a number in each cell in the row)	4	3	1	2	0	5
Advantages of using WebCT for group collaboration?	On-line, asynchronous nature of communication/ collaborative learning	Accessibility of documents in unit	Ease of access	Ability to reflect and research before contributing	Providing tangible evidence of activity/contribution	Other (no one, Enjoy technical personality or was fair)
How important was this to you? (Ranked from 1 to 5, with 5 being most important - please put a number in each cell in the row)	4	3	2	1	0	5
Please indicate during which phase of the collaboration each of these factors proved to be an advantage? Please choose ONE of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of advantage to the phase identified:	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all
Disadvantages:	Slow speed	Data overload	Security	Medium restricted to asynchronous text based communication	User interface/ease of access	Other didn't see any disadvantages
How serious are these? (Rated from 1 to 5, with 5 being most serious - put a number in each cell in the row)						

Please indicate during which phase of the collaboration each of these factors proved to be a disadvantage? Please choose ONE of the phases that each factor made a serious impact	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?	Initial setting up Division of work Production of final report?
Please indicate how likely each of these factors will be of disadvantage to the phase identified.	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Very likely Likely Not very likely Not at all	Comments didn't have a problem
In your opinion, how useful is WebCT for supporting collaborative working?	No use at all	Little use	Some use	Quite useful	Very useful	Comments
What factors encouraged you to contribute?	Friendly discussion environment	Tutor motivation	Peer group involvement	Personal satisfaction	International dimension -- getting to know students in other institutions	Other (amazing tutor! Paid if didn't)
What factors discouraged you from contributing?	Not knowing people and their skills as in face to face collaboration	Lack of confidence in making your opinions known to peers	Peer group pressure	Lack of experience of using this working medium	Anti-social element	Other
How likely is it that you will be making use of WebCT or other collaborative working tools in your career (eg Lotus Notes)?	Very Likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Would you choose on line collaborative groups over face to face groups? If you chose Seldom or Not at all, please elaborate below.	Very likely	Quite Likely	Sometimes	Seldom	Not at all	Comments
Was your commitment to the group less because it was on line rather than face to face?	Very likely (it was less)	Quite likely	Sometimes	Seldom	Not at all (maybe commitment)	Comments

Please feel free to add comments about the value of using WebCT for collaborative learning and how this compares with face to face collaboration:

Webct excellent - no bias done on appearance, not problems in arranging times to meet up - much prefer webct compared to working face to face - also meant friends in same group didn't pressurize others or talk about their lives. kept you focused.

FIELDWORK STUDY 7 – Student Feedback

The following results were obtained from 23 of the 47 students invited to participate.

1. Choose the response that comes closest to the way you feel about the international group project. Collaborating with students from abroad was...	Number of Responses	Response Ratio
not worthwhile	1	4%
somewhat worthwhile	15	65%
very worthwhile	7	30%
Total	23	100%

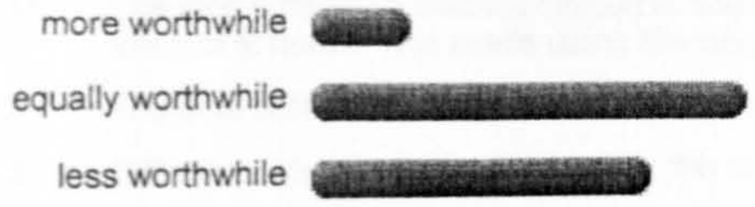
2. The strategy your group chose to organize the project was...	Number of Responses	Response Ratio
ineffective	5	22%
somewhat effective	10	43%
very effective	8	35%
Total	23	100%

3. As a medium for collaborative work, Blackboard was...	Number of Responses	Response Ratio
not worthwhile	2	9%
somewhat worthwhile	13	57%
very worthwhile	8	35%
Total	23	100%

4. Group work was evenly shared.	Number of Responses	Response Ratio
strongly agree	5	22%
somewhat agree	6	26%
disagree	11	48%
strongly disagree	1	4%

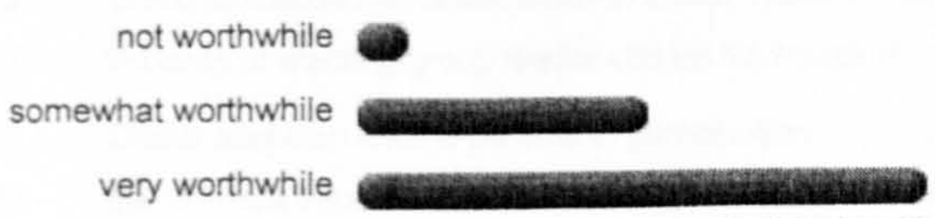
	Total	23	100%

5. As compared to other assignments in the course, the international group project was...



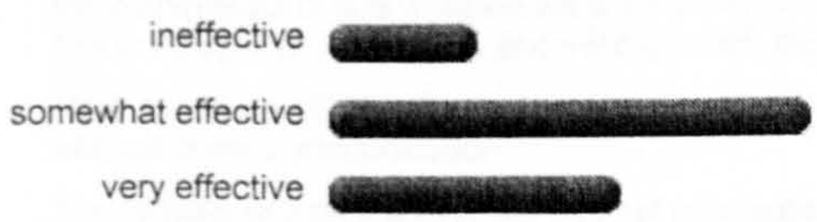
	Number of Responses	Response Ratio
more worthwhile	3	13%
equally worthwhile	11	48%
less worthwhile	9	39%
Total	23	100%

6. Instructions/suggestions from professors were...



	Number of Responses	Response Ratio
not worthwhile	2	9%
somewhat worthwhile	7	30%
very worthwhile	14	61%
Total	23	100%

7. In terms of increasing one's understanding of ethical theories/analysis, the international group project was...



	Number of Responses	Response Ratio
ineffective	4	17%
somewhat effective	12	52%
very effective	7	30%
Total	23	100%

8. The project requirement to address a real-life scenario was...

	Number of Responses	Response Ratio
not worthwhile	0	0%
somewhat worthwhile	11	48%
very worthwhile	12	52%
Total	23	100%

9	What do you see as shortcomings of the international groups project?
#	Response
1	The time difference made it difficult to collaborate. In addition, I am a commuter and do not have access to high speed internet at home. This made using Blackboard both slow and cumbersome.
2	The time difference, and the inability to meet in real-time.
3	Difficult to communicate and stay on the same page with different time zones, and different things happening.
4	It was very difficult to collaborate over blackboard because of the time difference.
5	time difference, varied levels of ethical analysis ability between courses.
6	Difficult to receive instant feedback.
7	different grade weighting for different people, so it made it hard for everyone to participate equally. For some, this was their whole course, while others, it was an out of class asignment on top of work.
8	different colleges had the project worth different percentages. american students did not put in as much work as irish students.
9	Communication can break down at times. There are some periods when people are difficult to contact.
10	Process of electing group leader can be haphazzard Closer attention should be paid to participation
11	the different importances of the projects to students, it some Universities it was only worth 20% and in UL it is 40% also, UL it was with final years, other Univ it was 2nd/3rd years so wasnt as important for them.
12	misinterpretation and inconsitency is more likely when using the blackboard. It's not as reliable as real time conversations
13	I think the difference of marks for the irish and us students was a big problem. US were getting 20% and we were getting 45% this is ovbiously going to reflect the effort a person is willing to give the project.
14	I found that from my personal interaction the American students seemed less focused on trying to complete a good project. Also as the course is ran in the final semester here at UL having two major projects in one module is totally unrealistic, but this is more of a module issue.
15	i found that the international project did not allow for the even distribution of work or the proper assignment of roles. we did the belbin tests to see what we were suited at but we (the other ul student and i) made the suggestion that we should use this in assigning group roles and were ignored. then no fixed roles were actually agreed on
16	Hard to communicate effectively. Ideas were not being fully incorporated by all involved as its diffcult to make decision without direct communication.
17	The diifculty of working over the internet on a bulletin board. Perhaps different lecturing styles at different institutions and the differing importance of the project at the different colleges.
18	very hard to get things done as you'll never get people together at the same time for discussions and as a result things take a lot longer. Yet your deadlines are a lot earlier than others not doing international

10	What do you see as strengths of the international groups project?
#	Response
1	exposure to other cultures.
2	Ability to gain new insights from people around the world.
3	Good to see other opinions in other cultures, and sifferent parts of the world.
4	Viewpoints from different cultures

5	strenghtens communication skills
6	Was able to see how different students go about their work.
7	Working with other people that have differences is a very essential skill that should be learned early.
8	chance to work with different college and country
9	BB system. All work is located at same place. All ideas are conveyed in the same format.
10	international perspective
11	being restricted to using blackboard made us use it properly. learn to work with more respect and allowed full organisation for work. learned how to communicate effectively with typed words rather than spoken
12	The project allows the members to learn a lot about other cultures and different methods. If a group is very organised to start off with, the project will be a great success.
13	I think it is a great idea in theory, getting a global view on ehtical issues.
14	We got the opportunity to learn about the various ethical theories and their application through direct interaction with students from another country. This interaction was invaluable as it allowed us to gain experience ion the use of an online collaboration tool while at the same time proactively pursuing a goal.
15	the strenght of the project was that it was my first experience with both a bb system and international collaboration over such a project
16	Working in a virtual group, it highlights cons and pros for future projects
17	Being a part time student I have been exposed to many different methods of working on projects - this approach is not unusual. This project has given all students involved the opportunity to share ideas with others outside their normal group and also from different cultures.
18	Develops a realistaion of the difficulty of working with people of whom you have no knowledge and do not meet and the difficulty of working over the net.
19	you get to see a wider range of opinions and points of view, from a more diverse group of people.

11	Please provide recommendations for the improvement of the international groups project.
#	Response
1	I would suggest not picking roles in the begining. Allow for the groups to figure that out for themselves. In all facets of life group work is important
2	Working in collaboration with students over seas via Blackboard was difficult and ineffective.
3	Need more time, and maybe an outline to help guide groups.
4	More time in class to talk about the project with group members.
5	increased structure/guidance given by professors.
6	Give less time so that the focus is more intense.
7	Have the project weigh the same for all students across the international student spectrum.
8	initial guidance from lecturers to help choose a leader. Encourage participants to contribute more equally
9	make it worth the same for all students as % of module.
10	A more structured spec would be better. Alot of people were very unsure as to how to procede with the project. All grades should be the same across the board.
11	I feel that the groups should be spread more evenly over the colleges as having a majority from one college effectively means that the incentive to proactively use the blackboard is not there
12	i think further guidelines over issues such as team roles and strategies should be enforced and also that there should be a more strict deadline system in place to make sure that all parties put in the appropriate amount of work all along
13	mandatory meetings on an instant messenger might help.
14	A different deadline than just before demo day. Perhaps a number of set interim dealines/hand-ups/progress reports to ensure that the group is working and everyone is contributing.
15	less pressure by extending the deadlines. (this might be impossible due to other colleges semester lengths)

APPENDIX O

ETHICAL FRAMEWORK

APPENDIX O

Ethical Framework

All of the fieldwork studies were conducted within an ethical framework. As such, consideration was given to ethical issues related to Privacy, Accessibility, Property Rights and Accuracy:

Privacy

This entailed all of the students being made aware of

- How the research was going to be conducted.
- What data would be collected – i.e. through questionnaires (LSI, Belbin, Student Feedback, MJT), semi-structured interviews, tracking of message posting and access.
- How the data collected by the various instruments would be analysed and used.
- That their use of the VLE would be tracked by the system and monitored by the tutors
- That they were expected to use the system in a professional way

Students were informed of these in both the face-to-face contact sessions as well as through a Privacy Statement that was posted onto the VLE itself:

Privacy Statement

Tracking of Page Accesses

All students should note that page access within the WebCT area is monitored. Such monitoring gives module tutors the ability to see the number of accesses made to the area by each student, the pages that they have visited and the number and type of postings (original or follow-up) they have made. All data gathered regarding such access will be kept confidential but may be used as appropriate in consideration of progress and for research purposes in order to try to improve the WebCT resource that is available to students.

Discussion areas

PLEASE NOTE:

All discussion areas should be treated as public forums and should therefore be used in a responsible manner - any abuse will lead to action that may involve disciplinary procedures being implemented. Such procedures may also necessitate divulging certain information to relevant authorities.

Two discussion areas are provided - "Local" and "Global".

Local - This area will be available on a "local" (campus and semester based) basis and will be labelled as such. It is assumed that all postings to this discussion area will be related to the "local" group of students studying the Computing & Ethics module.

Global - This area (labelled **All**) will be available to any students on any campus at any time who are studying the Computing & Ethics module. The intention with this area is to build a common resource that may be accessed and added to by different cohorts of students regardless of time or place. A student may wish to post to either of these discussion areas as they feel appropriate.

- Student feedback was gained via anonymous questionnaires, voluntary emails and voluntary interviews.

- All feedback via emails and interview notes were published anonymously within the thesis.

- Individual student's postings were all made anonymous after all of the different tools had been used to analyse findings (e,g. Transaction Analyses, mapping to Belbin, Garrison, MJT, LSI)

Accessibility

- Students needed to have sufficient IT skills to be able to access the system.

- Students needed to have access to computers either at university or at home (preferably both)

As the students in the fieldwork studies undertaken for this research were all final year computing students these two factors did not pose any real issues.

Property Rights

- All data entered onto the VLE by either staff or students is, by default, the property of the university therefore there were no real issues over this.

- Students were encouraged to respect the property rights of others and to acknowledge sources correctly.

Accuracy

- All of the data placed within the VLE environment by the tutors had to be checked for accuracy and regularly updated.

- Discussions by the students had to be regularly monitored by the tutor and issues picked up in the face-to-face context. For example, if there was any evidence of mis-information being posted or "flaming" was taking place then tutors had to address these in the contact sessions.