Collective Mediation:

A neo-Vygotskian perspective of undergraduate interdisciplinary group projects.

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Abstract

With an underlying concern for grounding pedagogical practice, this study uses controversial methods to research a controversial issue: the dynamic between the social nature of learning and the isolating nature of computer technology. The context chosen for researching this concern comprises a case study of four groups that participated in an undergraduate interdisciplinary group project as part of their second year studies in business at the Auckland University of Technology, a programme marketed on the basis of the development of authentic skills and capabilities using this particular pedagogy. What is of interest is how the use of computer technology allowed the participants to co-construct meaning in this context.

This interest in the socially and culturally constructed aspects of human functioning rests upon a Vygotskian perspective, which I review along with various appropriations of this theory and other viewpoints in the literature review. Based upon this analysis, I then present a model for Collective Mediation, which views the computer as a mediational tool encompassed within the collaborative activity of the groups involved in this study. At this point I also suggest a protocol, or framework, for understanding this joint activity, which then guides the research methodology.

The primary source of data in the study consists of transcriptions of focus group meetings with the participants over a four-month period of time, a method that is justified by the requirements of the research to understand the multitude of relationships among the group members and with computer technology. To support triangulation, a questionnaire, log sheets, and member checks were also employed. The results reveal not only a rich fabric of activities and meanings, but a complex social dynamic guiding the events leading up to the construction of a joint project: one that was constrained, as well as supported, by the use of computers. In key areas, the pedagogy studied was shown to lack support.

This thesis adds material to the debate concerning the interface between the computer, as an increasingly complex medium for educational activities, and the social fabric created within an authentic group project at tertiary level. There are clear practical implications. On a theoretical level, the study adds to an understanding of how neo-Vygotskian theory can, or cannot, be interpreted to understand such settings and, in terms of methodology, the study introduces a new protocol for analysing the rich data set that is needed to capture the dynamics involved.

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Chapter One: Introduction

1.1   Impetus

Using computers for educational purposes can be a problematic exercise. Gregory, an art educator, for example, once observed the following about a computer classroom when visiting a local school:

> What was amazing to me about that classroom was that every single student was completely silent. The only sound to be heard was the occasional clicking of computer keyboards as they sat staring almost mindlessly at computer screens. Everyone had an individual computer and was working alone. No one shared anything. No one got up to ask a question. The teacher wasn't talking. No one said a word (1996, p. 50).

Like Gregory, I have struggled with tensions between, what I perceive to be, the social nature of teaching and learning and the antisocial, and seemingly unnatural, aspects of using computers in education. When I first started teaching with computers in New Zealand (NZ) high schools in the late 1980s, using these new machines to aid in the process was seen as a 'cruisy number' by teachers of other subjects, with teachers queuing up to take advantage of the few computer resources we had at the time, even though they had little knowledge of what to do with them. Computers were on the fringe then in education in NZ, a novelty, and so the prospect of placing a group of students in front of an Apple II, or a BBC microcomputer each, or in pairs due to limited resources, to complete some guided tutorial seemed like an easy lesson. Oppenheimer (1997) and McMahon (1989) have critically commented upon this 'filmstrip' strategy of using computer technology to entertain students, with the usual noisy social environment of a traditional classroom centred around a teacher, being replaced by a room full of quiet students staring at the screens. Cuban adds further that:

> The introduction of film and radio into schools in the 1920's and 1930's and instructional television in the 1950's and 1960's saw a similar pattern of blue-sky promises of the new technology revolutionizing instruction and learning (1993, p. 187).

I was aware then, as a beginning computer teacher, that many saw the computers as a panacea for many educational problems, that many teachers saw the technology as a solution, a treatment for educational problems (see also Dede, 1998). Like Gregory, I was unsettled with this phenomenon. As well as the total lack of socialization, it was the 'mindlessness' of these computer activities that struck me. The students did not seem to be learning; they were simply memorizing things in reward for some visual entertainment. Seymour Papert's similar criticisms of the misuse of technology in this sense were popular at the time and, influenced by these, I then started teaching the computing language Logo as well as others in order to address this issue (Papert, 1980). Logo was effective because it had an easy graphical interface, that is, it still entertained while requiring the students to design and construct objects. Other text based languages such as GW BASIC and Turbo Pascal, I discovered, became equally, if not more, rewarding for learning purposes in a problem solving sense. However, while the students were more individually active and constructive in their learning activities which were based on Papert's ideas, the antisocial aspects remained, and I became aware of the so called computer 'nerd' phenomenon amongst my students (Heim, 1995; Turkle, 1984). The students who were often good at programming appeared to me to be the most socially inept.

Finally, after three years of teaching with a well resourced, but constrained curriculum at a Turkish high school, using largely individual based tasks, I had had enough of watching silent laboratories of students 'glued' to computer screens. I wanted a change and moved to an American curriculum school in Thailand that gave me complete freedom to experiment with different teaching methods. So I tried various different group work projects with some success and even conducted informal research on these using video recordings of the students working together. One project in particular that received acclaim was the "Oldways Bus Company" group project, my adaptation of an individual systems development exercise from a computer textbook (Heathcote, 1994, p. 168). Typically groups of four senior students were asked to use computer technology configured with a variety of applications to create a proposal for computerizing a fictitious bus company's systems which, at that time, were said to be completely manual. The groups were asked to present a prototype for the new system including specifications for hardware, software, staff training, systems implementation and maintenance. As part of the assessment, they

were also asked to present a report plus any other props such as physical models, and then gave a presentation of all of this to the bus company's 'Board', which included myself as a 'Board Member', the School Principal as the 'CEO', and another teacher as the 'Accountant'.

The success of projects like these served as the impetus for this research. I wanted to know more about collaborative learning projects using computers like the above, and so started my reading, which included my discovery of Vygotsky, a man whose work was not mentioned when I was studying towards my Masters degree in psychology in the early 1980s. This interest led to my enrolment at the University of Bath and then to a transfer to the University of Auckland and the writing of this thesis.

On returning to NZ in mid 1999, I had the opportunity to teach Information Technology subjects in an integrated business studies program at the Auckland University of Technology (AUT) then named the Auckland Institute of Technology (AIT). This provided an ideal venue for a study of group projects with computers because the Bachelor of Business Degree program for years had been promoting the use of such projects as part of its integrated module program. The use of authentic, contextualized learning in small groups was widely believed at the time to be an effective method for building real world skills and capabilities (see Vile, 2000). With ongoing modifications these group projects continue to make up a significant portion of the assessment in the integrated modules and yet no formal study had apparently ever been done of them when I worked at AUT. The opportunity was ripe. So, in late 1999, I conducted a preliminary study of two groups that were completing one of these projects called the "Business Development Plan" (Raven, 2001). This study can be seen as a pilot study as it was used primarily to try out data collection methods and to gain experience in qualitative research techniques with group contexts. The main study, which provides the data for this thesis, was carried out in early 2001 and spanned four months. In this study I followed four groups of students, the practical maximum that was possible, in this context, for a variety of reasons for one researcher.

1.2   Purpose

Like many (see, for example, Hogan & Tudge, 1999, p. 44; Rogoff, 1990, p. 4; Wertsch, 1999, p. 145; Wertsch & Tulviste, 1999, p. 9), on first reading Vygotsky, I was interested in his focus on the social nature of human development and learning, a great change in perspective from the individualistic theories of the developmental, behavioural, and cognitive psychologists that I had studied previously. Emphasizing the social, while not eliminating the internal, was of great appeal to a study of groups in action. Vygotsky's reliance on mediators of various descriptions as the vehicle for this dynamic process between the internal and the external social world seemed very appropriate to explaining how groups of individuals functioned together.

In this study I examine undergraduate group projects from a neo-Vygotskian perspective. Applying the work of Lev Semovich Vygotsky (1896-1934) to a modern pedagogical practice at tertiary level, and developing a model that reflects this application are the primary objectives. Of particular interest is how Vygotsky's notion of mediation, and various appropriations of this idea, can explain collaborative activity with computers in a group learning environment. I suggest the concept of collective mediation, which combines Vygotsky's conception of mediation at an individual level with the shared meaning negotiated within a group.

Underlying this specific concern with establishing a theoretical model for group projects is an interest in grounding practice in theory. This interest stems from an awareness of opposing views in the literature concerning the complex activities of teaching and learning particularly at university level (see Barnett, 2000). The first view is of the situatedness of learning (Brown, Collins, & Duguid, 1989) and of postmodern scepticism towards meta-narratives (Lyotard, 1984). These perspectives set a challenge for theorizing and generalizing educational practices by questioning the value of such educational research (see also Erickson & Gutierrrez, 2002). This contrasts with the second viewpoint represented by calls for grounding practice. Hannafin, Hannafin, Land, and Oliver (1997), for example, point out that many learning environments, particularly emerging practices, are not well grounded in theory. As they said: "Frequently the foundations of given efforts are unclear, the methods inconsistent with presumed underlying assumptions, and the design methodologies are not well articulated" (1997, p. 104). Another goal of this study is to comment on the role that such theorizing takes within educational practice.

1.3   Rationale

Vygotsky's work has had an immense impact on educational psychology in the West since the release of selected pieces of his work after they were suppressed for approximately 20 years under the Stalin regime. In Russia, Luria, one of Vygotsky's closest colleagues, commented that, "Virtually every branch of Soviet psychology, both its theory and practical applications, have been influenced by his ideas" (1979, p. 56). Two interpretations of his work, the 1962 book Thought and Language, and the 1978 book entitled Mind in Society, spearheaded a revival of interest in Vygotsky's socio-historical theory of cognitive development. Vygotsky's writing has contributed to, and influenced, both constructivist (see Von Glaserfeld, 1995), and socio-cultural movements that now predominate in the education literature (see, for example, Wertsch, Rio, & Alvarez, 1995). Bruner comments that:

> Vygotsky was one of the great theory makers of the first half of this century – along with Freud, McDougall, Piaget, and a very few others. Like them, his ideas are situated in his times. But like the best of them, those ideas still point the way to the future of our discipline (1987, p. 16).

Daniels, however, points out that Vygotsky's work, "was composed some 60 years ago by a writer who was both ill and working on the edges of disciplines with which he was only partially familiar" (1996, p. 3). Vygotsky's background was in law and the arts, and his chosen profession was not psychology but pedeology, a field best described as applied educational psychology (Blanck, 1990). Van der Veer and Valsiner (1994) believe that Vygotsky's rise to fame was largely socially constructed, based on the two questionably translated books mentioned above (see also Valsiner, 1988). And some add that his theory was unfinished (Daniels, 1996; Joravsky, 1989). In light of this, one may ask why I have chosen Vygotskian theory and its offshoots for the present study.

I chose a neo-Vygotskian approach for a number of reasons. The first is because I believe that the disparate context makes Vygotskian theory a good foreground for the present study. One of the concerns of this study is to discover the role that theorizing has to offer practice. How better to test a theory than to apply it to a completely different context? In this case we have a theory of individual psychology

developed in Soviet Russia largely around the observation and study of children. According to Newman and Holzman, "Vygotksy's practical goal during his lifetime was to reformulate psychology according to Marxist methodology in order to develop concrete ways to deal with the massive tasks facing the Soviet Union – a society attempting to move rapidly from feudalism to socialism" (1993, p. 6). Vygotsky was substantially influenced by the political and academic movements of the times (Rosa & Montero, 1990; Valsiner, 1988). It is therefore a challenge to place this theorizing in the context of group project work with university students in the present day in New Zealand, a very different context and unit of interest than those in which the theory was formulated.

Second, I believe that his psychological theories are relevant to the present situation even though they were constructed in a vastly different environment. Vygotsky believed that the source of cognitive development was in the socially and historically directed activity of the culture, and that this development was mediated through language as well as other psychological and technical tools. As Vygotsky said, "The actual movement in the development of the child's thinking occurs not from the individual to some state of socialization but from the social to the individual" (1987, p. 76). Although Vygotsky's emphasis was on the interactional and mediated underpinnings of individual thinking, his ideas appear relevant to a study of groups as some neo-Vygotskian authors have explored (see, for example, Lave & Wenger, 1991). In this thesis the concept of collective mediation can be seen as extending Vygotsky's notion of individually mediated activity to a group context.

A third motive is educational. Both Moll (1990) and Bruner (1987) comment on the educational focus of much of Vygotsky's theorizing. As mentioned above, he was interested in developing practical solutions for problems of the day, and education was one of his primary interests influenced by his background in teaching and Pedeology. One of his practical proposals was the Zone of Proximal Development (ZPD) which, as Molls comments, is a key "connecting" concept between educational theory and practice (1990, p. 3). As Vygotsky exclaimed:

> we cite the well known fact that with collaboration, direction, or some kind of help the child is always able to do more and solve more difficult tasks than he can independently. What we have here is only an example of this general rule (1987, p. 209).

The idea of a zone in which individual learning can be fostered collaboratively is very attractive to the research of groups in which more capable peers assist other students learning in a community environment. The associated concepts of "communities of practice" and "guided participation" are applicable here as an explanatory way of setting up these zones in a group setting (see, for example, Larochelle, Bednarz, & Garrison, 1998; Rogoff, 1990; Wenger, 1998). This research investigates one such educational community in which the students work in collaborative groups, within a mediated environment or zone, to jointly construct a project. The educational focus of Vygotsky's practical orientation seems ideally suited to this topic.

The fourth motive for wanting to study Vygotsky's ideas in the present context is methodological. Vygotsky was a methodologist as well as a psychologist. As Newman and Holzman point out, "he remained true to the scientific task of investigating the very nature of psychological science even as he made a host of practical-critical discoveries within the science of psychology" (1993, p. 12). Many of Vygotsky's suggestions on research method are attractive to the present study. His critiques of both positivist – reductionist and subjective methods, and his analysis of the crisis in psychology, are of direct application to the present context. It is his methodology as well as his psychology that will be applied in this research.

A final reason that I have chosen this particular theoretical foundation for this study is because of the various "appropriated" forms of Vygotsky's theory (Wertsch, Del Rio, & Alvarez, 1995, p. 6). Vygotsky's concepts have been developed further and I believe that it is these developments that will aid this research in developing and applying Vygotskian theory to the present context. In this thesis I will evaluate theories of activity, developed by Vygotsky's contemporary, Leont'ev, the concept of scaffolding introduced by Wood, Bruner and Ross (1976), and two major schools of thought that have derived from Vygotsky's work, the socio-cultural and constructivist perspectives (see, for example, Hedegaard, 2002; Rogoff, 1990; Wertsch, 1991, 1999).

1.4   The focus of this thesis

As mentioned, this study investigates the dynamics of undergraduate group projects from a neo-Vygotskian perspective through primary research on the mediational effects of computer technology as tools, or objects, on joint problem solving activity. The activity of the group in attempting to solve a problem through group consensus will be studied on several levels, which complies with Vygotsky's methodological concerns. The research question, which will be elaborated upon later, is concerned with the extent to which the groups perceived of the computer as a collective mediator, in the neo-Vygotskian sense of this term. The focus of this study is to explore how Vygotskian theory can help us understand how the computer, as a mediational means, is adopted by both individuals and groups within a particular educational context.

The study rests on an extensive body of knowledge on the use of groups in education, in general, and specifically on the use of collaborative, project based groups in undergraduate education. These areas are reviewed from a neo-Vygotskian perspective in the next three chapters. This treatment begins with a narrow focus upon Vygosky's work, then to a broader discussion of various appropriations of his work and then to a chapter on other pertinent, but not necessarily Vygotskian perspectives of group work with computers. This interpretation then leads to the presentation of a model of collective mediation in chapter five, which forms the theoretical basis of this research and a research protocol, or framework. Chapter six outlines various methodological approaches that have been used previously to study Vygotsky's theories. Chapter seven will elaborate upon the research question and will discuss the specific method chosen for the research. This discussion will address a number of key methodological issues including the operationalization of collective mediation. Chapters eight and nine present the results from two different perspectives as mapped out by the protocol; first, a description of the interactivity that occurred, and second, a deeper look at the meanings associated with this joint activity. The final two chapters will then discuss the implications and theoretical ramifications of the results and will address the primary research question. The conclusion will also discuss suggestions for further research and will comment on the role that theorizing makes in this particular context.

Chapter Two: Contextualizing the theory of Lev Semovich Vygotsky

What has happened to make the work of a psychologist who has been dead for over 50 years so relevant now? What is it in Vygotsky's works that invites psychologists and educators to scrutinize his writings when in the normal course of events they would be subject matter mainly for historians of science? (Rosa & Montero, 1990, p. 59).

The choice of a neo-Vygotskian perspective may seem arbitrary. Why not some equally (or better) known writer on educational psychology such as Piaget, Dewey, or even Skinner? In this section I will elaborate upon the reasons why choosing a neo-Vygotskian approach, in fact, was not arbitrary at all. I will approach this task thematically by first taking note of Vygotsky's emphasis on the social and historical bases of learning and human functioning. Like Marx and Engels, Vygotsky believed that history was "not a collection of dead facts" (Marx & Engels, 1969, pp. 25-26) but instead a living dynamic. Following this principle, I will start by situating Vygotsky in context through summarising the circumstances of his time. Then I will review the key concepts of his theory, which form the basis of this thesis.

2.1   Vygotsky and the Revolution

Newman and Holzman ask:

Was he really a Marxist: did he merely pay lip service to Marxian conceptions; was Marxism just one of several intellectual traditions that Vygotsky – according to some, a classical eclectic – incorporated in to his very original thinking; or did the new world view that was Marxism permeate his entire life's work? (1993, p. 10).

Numerous biographical accounts have been written about Vygotsky and his psychological and political perspectives (see for example, Bauer, 1959; Blanck, 1990; Daniels, 1996, 2001; Joravsky, 1989; Kozulin, 1984; Leont'ev, 1997; Luria, 1979; Minick, 1987; Newman & Holzman, 1993; Sutton, 1993; Valinser, 1988; Valsiner & Van der Veer, 2000; Wertsch, 1985). Blanck's is the most detailed of these accounts, giving an insight into Vygotsky's formative years as well as his theories. Luria's

biography is probably the closest we can get to Vygotsky as he worked closely with Vygotsky for the last ten years of his life, although there is evidence that he was somewhat biased. Luria helped archive much of Vygotsky's work after his death and "urged" publication of his work in the West from the 1960s on through academics such as Michael Cole (Newman & Holzman, 1993, p. 20). I do not intend to reproduce the content of these biographies in fine detail but rather will place his ideas in context and discuss the sources of his theorizing.

By all accounts, Vygotsky was an exceptionally talented and versatile intellectual who, while still young, earned the name, "little Professor". He was widely read in Russian, German, Hebrew, English and French and also learned Latin and Greek. He could speed read and had an amazing memory (Blanck, 1990, pp. 33-34). Luria commented that, "It is no exaggeration to say that Vygotsky was a genius" (1979, p. 38). He was an eclectic writer and his poetic style and deep knowledge of literature permeated his work. In <u>Thought and Language</u> for instance, he uses examples from Tolstoy and Dostoevski to support his arguments concerning the relationship between inner speech, thought, and language (Vygotsky, 1962, pp. 140-3). Vygotsky was, in addition, a highly skilled orator. He loved theatrics, dramatic tragedy in particular and was known for "dazzling recitations" (Blanck, 1990, p. 33). By the late 1920s he had developed quite an entourage of followers. Luria commented, for example that, "When Vygotsky went on a trip, the students wrote poems in honor of his journey. When he gave a lecture in Moscow, everyone came to hear him. His lectures were always a great occasion" (Luria, 1979, p. 52). He was very popular, almost evangelical apparently, which perhaps was exacerbated by legitimate fears for his health due to his terminal illness with tuberculosis, the disease that killed him in 1934.

Vygotsky's life spanned the Russian Revolution of 1917, a time of huge upheaval marked by an attempt to reform a feudalist society into a socialist one (Newman & Holzman, 1993, p. 6). The political scene in Russia was intense; initially a period of idealist fervour and optimism during Lenin's time and later tempered by economic hardship and increasing political control over freedom of expression with the ascent of Stalin to power. In academic circles, the 1920s and early 30s were a rich period of conflicting views and ideologies. This period peaked in the early 30s after which the relative freedom of expression and access to literature spiralled downwards

to a strict system of "partinost,"[1] meaning a strict adherence to communist party philosophy or else face dire consequences (Bauer, 1959, p. 103). Dissidents resigned, were shot, or were sent to labour camps (Knox & Stevens, 1993, p. 8; Kozulin, 1984, p. 22). As Daniels says, "This creative fusion and development of many perspectives and persuasions was cast adrift in the tragedy that befell the Soviet Union under Stalin" (1996, p. 2). With the demise of Lenin and the rise of Stalin, various decrees and purges were put in place to ensure compliance. By 1936, free academic thought had pretty much been smothered. Within this increasingly difficult environment, Vygotsky, along with numerous others had to survive.

In the late 1950s Krushchev "denounced Stalinism" and decreed that the Soviet Union should be more open to the West (Rosa & Montero, 1990, p. 72). Following this announcement selected pieces of Vygotsky's work were published, culminating recently in six translated volumes of his collected works (Vygotsky, 1987-99). In 1959, Bauer explained that Vygotsky's work was singled out for republication as an example of "progressive tendencies" and represented, "the most deviant trend of the period" (1959, p. 73-4). These remarks, from one of the first western reviewers of Vygotsky's work, capture the perspectives of the time. But in what sense was he deviant? Knox and Stevens comment that:

> There can be little doubt that Vygotsky was committed to a radical political perspective. Born into a Jewish family in Byelorussia in 1896, his early life was unavoidably circumscribed by the restrictions the Russian Empire imposed on its Jewish subjects. His own abilities and his family's relative prosperity helped him partially to overcome these; he was privately educated, graduated a gold medalist from a Jewish Gymnasium, and entered Moscow University in 1914 under the tsarist quota system, which limited Jews to three percent of that institution's student body (1993, p. 3-4).

The fact that Vygotsky was Jewish has received very little mention. Perhaps because the new Soviet Russia of that era promoted a non-racist policy; it was not a topic for discussion. However, there are signs that his ethnicity influenced his

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[1] Literally "Partyness"

thinking. He was brought up in the Jewish Pale[2] where there was evidence of persecution (Newman & Holzman, 1993, p. 156). Vygotsky published early work in a Jewish periodical, which was later banned (Joravsky, 1989, p. 255). His admittance into university was difficult, as not only was there a quota system which limited the number of Jewish students, but there was an additional poll designed by the Tsarist government to, "diminish the intellectual quality of Jewish students in the best Universities" (Blanck, 1990, p. 34). In spite of these restrictions, Vygotsky became one of the chosen few. The regime at the time wanted to minimize the number of talented non-Russians attaining qualifications. Tsarist restrictions also dictated what courses were suitable for Jews. They could not, for example, enter into the public service and it is apparently for this reason that Vygotsky studied law at Moscow University as well as philology (educational philosophy) simultaneously at Shaniavsky People's University – an "unofficial" anti-tsarist institution (Newman & Holzman, 1993, p. 156). He also studied illegal editions of Marx and Engels (Leont'ev, 1997, p. 12). With the Revolution in 1917 and the dismantling of anti-Semitic restrictions, Vygotsky graduated and took up his preferred profession of teaching.

It is not surprising, based on the scant information we have, that Vygotsky was in favour of the revolution (Blanck, 1990, p. 35). Other influences from his Jewish roots appeared later when Vygotsky wrote about Neitzsche's theories. In 1930 he wrote, for example:

> Nietzsche concluded that a new creature can arise during the process of evolution, a superman, who will have the same relation to contemporary man, as contemporary man has to the ape...This theory is erroneous, because it ignores the fact that the laws of historical evolution of man differ fundamentally from the laws of biological evolution and that the basic difference between these two processes consists of the fact that a human being evolves and develops as a historical, social being. Only a raising of all of humanity to a higher level in social life, the liberation of all of humanity, can lead to the formation of a new type of man (1994, p. 182).

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[2] A restricted housing region.

Later on in 1933, Vygotsky was alarmed when the Nazis came to power in Germany, almost in anticipation of the Second World War. He comments, in "Fascism in Psychoneurology" on the work of several psychologists who supported fascism, including Erich Jaensch who published a treatise entitled "The Situation and Tasks of Psychology, its mission in the German Movement and in the Cultural Reform" (Vygotsky, 1994). In 1934, Vygotsky wrote:

Jaensch carried out his task in the manner of a sergeant major and he does not seem at all worried by the fact that, whilst striving to present us with an ideal German type in the attractive guise of a superman, all he has actually managed to do is present what Nietzsche has called "die blond Bestie", the savage face of zoological nationalism… Two worlds and two ideological systems now stand pitched against one another... This puts an especially heavy burden of responsibility on the shoulders of Soviet Psychology. It now has to focus its mind on its international foreign front, to which it has hitherto not paid sufficient attention. In this struggle its allies will include not only German proletariats, but all the proletariats of the world. Times are approaching when it will become clear even to a blind man that, whilst the people on one sixth of the earth's surface are fighting for the liberation of all humanity and for the achievement of everything which is truly higher, new, and unprecedented in the history of the human personality, when one after another the oppressed and backward nations are joining the vanguard of humanity, in the bourgeois camp people's consciousness continues to be moulded among the debris of a resuscitated Middle Ages (1994, p. 335).

This style of writing not only reflected Vygotsky's anti-semitic concerns but also his public support for the socialist movement in Russia. Some biographers, specifically, Wertsch, (1981) and Newman and Holzman, (1993) question whether Vygotsky was just conforming to the party line, but I think that the fervent tone of some of his writings at the time clearly suggests that he was supportive, if not passionate, about the revolutionary movement in Russia.

By the time of the 1917 Revolution, Vygotsky was a teacher in his hometown of Gomel and afterwards worked with the progressive education movement that spearheaded education at the time, together with the huge effort on the "Liquidation

of Illiteracy" (McLeish, 1972, p. 309). One of the tenets of the <u>Communist Manifesto</u> was, "free education for all children" (Marx & Engels, 1969, p. 127) and after the revolution one of Lenin's first tasks was to reform education in the Soviet Republic. But it was a huge task. In pre-revolutionary times the majority of the population were illiterate peasants who lived outside the towns where the only schooling was available. And the schooling offered was dictated by class membership with only the elite having the opportunity to receive a high level of education. Partly as a reflection of this selective education system, the literacy rate in 1920 was estimated at between 22 and 33 percent, with a large proportion of adult illiterates (Sutton, 1988, p. 91). The effects of war and famine following the revolution also took its toll. In the 1920s, bands of children, many orphaned or disabled, reputedly roamed the countryside (Knox and Stevens, 1993, p. 3). The new government therefore placed a huge emphasis on educating all children as well as the "backlog" of adult illiterates (Sutton, 1988, p. 91).

A major goal of the new government was to build up the skills of the workforce to support a program of industrialization with a hidden motive, of course, to politically indoctrinate the population as well (McLeish, 1972). As Lenin said at the time, "The illiterate remains right out of politics: to begin with it is necessary to teach him the alphabet. Failing this, it is not possible to have any politics at all: failing this we have rumours, gossip, fairy tales, prejudices but we cannot have politics" (in McLeish, 1972, p. 310). To address this enormous task, the new regime supported the implementation of a radically liberal system of education proposed by Pavel Blonskii, which capitalized on the limited resources available (Kozulin, 1984). Blonskii, primarily a philosopher, attained power by being one of the first educationalists to cross the line and join the Bolsheviks (Joravsky, 1989, p. 220). He admired Dewey's child centred, active learning approach to education, criticised openly traditional rote learning techniques and proposed the introduction of "labour schools", institutions where students learned by doing projects instead of regular scholastic lessons. Blonskii was an opportunist of the times according to Kozulin (1984), leaping onto theoretical bandwagons, making great pronouncements, and achieving promotions quickly. Joravsky reflects that, "Blonskii's revolutionary treatises were synthetic in the mocking sense – ersatz, inauthentic...Striving for synthesis, he achieved clutter" (1989, p. 221). However, he had the support of Nadezhda Krupskaja, Lenin's wife, a

fellow pedeologist, who held a high ranking position in the system of state education. The programme was implemented (Kozulin, 1984, p. 132).

Vygotsky supported Blonskii's developmental approach to psychology (Valsiner, 1988, p. 123). In his writings on consciousness, for example, he quotes Blonskii criticisms of reflexology as, "psychology without consciousness" (1997, p. 64). Like Blonskii and Krupskaja, Vygotsky was a pedeologist, teaching the practical implications of educational psychology in a teachers' college when the programme was being developed and implemented. Valsiner and van der Veer say that, "he was always trying to improve the practical conditions for children's education" (1994, p. 3). He, therefore, believed in educational reforms and change. In 1925, for example, while on tour to Germany, France and England he explained the Progressive Education programme as follows:

> The chief principle upon which our schools are based is that education is considered as a part of social life; school is an organisation where children participate in the life which surrounds them…Work, Society, and Nature are the three leading subjects upon which the training and educational work is based. Such a practical education is the best and safest way into life, because the child becomes accustomed to take an active part in life and are quite prepared for an independent future. (Vygotsky, 1994, p. 24)

Evidently Vygotsky supported the Progressive Education movement, although there is some debate on the extent of his contribution. Kozulin, for example, argues that, "the Soviet educational system of the 1930s to 1950s was incompatible with Vygotsky's theory" (1987, p. 336). However, Vygotsky did have strong views on learning, development and education in general and was actively involved in the reforms (see Daniels, 2001, p.2). As Moll points out, "Vygotsky was unusual because he was an educator turned psychologist…His writings clearly reflected his pedagogical concerns" (1990, p. 2). Perhaps, like Blonskii and others caught up in the revolutionary spirit of the time, he was also idealistic. Consider, for example, the following tract of writing:

> And with some exaggeration it may be said that the whole reform of contemporary pedagogics revolves around this theme: how to reduce the role

of the teacher as closely as possible to zero, when he, like, just like the rickshaw puller, plays the role of the engine and a part of his own pedagogical machine, and how to base everything on his other role – the role of the organiser of the social environment? (Vygotsky, 1997, p. 160)

His recommendation to reduce the role of the teacher to zero would have fitted well with the Progressive Movement in revolutionary Russia. One gets the picture of a young, "revolutionary" thinker. This view is supported by Vygotsky's involvement in the theatre and the subsequent reputation he had as a literary critic (Blanck, 1990). It is curious that very little of Vygotsky's early critical work has surfaced. Joravsky comments that his Russian publishers, "refrain from republishing or even adequately describing the earliest articles he is known to have published in 1915-23, though literary art was their topic. If he wrote on anything on politics, it has been kept in the dark" (1989, p. 255). A heavily abridged major piece of early work written by Vygotsky entitled, "The Psychology of Art" was not published until 1965, for example. Leont'ev, the publisher and editor, explained that this was because Vygotsky thought that the work was unfinished, although he submitted it successfully in 1925 for a doctorate degree (Leont'ev, 1997, p. 13). In any case, the literate world in Russia had become used to Vygotsky's critical reviews.

It was in a speech that Vygotsky came to prominence in the psychological world in Soviet Russia. He gave a speech on consciousness in 1924 at the Second All-Russian Psychoneurological Congress, a conference proclaiming a Marxist view of psychology (Blanck, 1990). He was a major speaker, although little account is given as to how he was invited. Given the theme, perhaps he was selected for his pro-revolutionary views. In any case, his speech was extraordinary (and brave) by all accounts for a newcomer. Luria gives the following account:

When Vygotsky got up to deliver his speech, he had no printed text from which to read, not even notes. Yet he spoke fluently, never seeming to stop and search his memory for the next idea. Even had the content of his speech been pedestrian, his performance would have been notable for the persuasiveness of his style. But his speech was by no means pedestrian. (1979, p. 38)

Vygoskys' speech was impressive, as will be discussed in further detail. Soon after the conference, Kornilov, the newly appointed Director of the Institute of Psychology at Moscow State University, which "was rapidly becoming a prominent center for Marxist Psychology" (Knox & Stevens, 1993, p. 4), offered Vygotsky a position at the Institute. Vygotsky agreed and very quickly made an impact. As Blanck describes, "The morning after his arrival he met with Luria and Leont'ev to plan an ambitious project that was in marked contrast to the modest position of second-class assistant with which Vygotsky started his career: the creation of a new psychology" (1990, p. 39). Most of Vygotsky's major psychological work was produced from then until his premature death ten years later in economically, socially, and politically very turbulent times (Van der Veer, 1997). The point is that Vygotsky was influenced by the efforts of the time to develop a Marxist based psychology. He wrote, for example:

> The whole internal tragedy of capitalism consists in the fact that at the time when this objective, i.e. thing orientated, psychology of man, which contained within itself infinite potential for mastery over nature and development of his own nature, was growing at a fast pace, his actual spiritual life was degrading and went through the process which Engels so graphically depicts as the crippling of man (1994, p. 180).

Notwithstanding his revolutionary views, Vygotsky was a prolific and eclectic writer. He wrote more than 190 works according to a recent compilation (Vygotsky's Collected Works, 1999, pp. 283-300). His writings in psychology not only included reviews of Piaget, Kohler, Buhler and Spinoza but also included writing that addressed diverse fields including child development, personality, language, defectology, comparative psychology, memory and perception. Early in Vygotsky's teaching career, his interest in reading and reviewing literature became supplemented, then overtaken, by psychological works. He read the two contrasting perspectives of Freud and James, then he read more: Pavlov, Vagner, Bacon, Descartes, Spinoza, Feverbach, Hegel, Marx (Blanck, 1984, p. 37). Why did Vygotsky become interested in psychology when he had so many paths to choose from such as, medicine, law, or literature? Blanck believes that Vygotsky was drawn to psychology by its potential to solve practical problems and illustrated this with the fact that seven out of eight of

Vygotsky's first writings had to do with problems in education (Blanck, 1984, p. 37). Underlying this concern was an evolving theory of mind that focused on developmental and cognitive issues.

Vygotsky was undoubtedly immersed in the culture and times of the Socialist Revolution. As Knox and Stevens comment, "Indeed, Vygotsky's activities and influence in this period seem almost to epitomize the unprecedented opportunities the Revolution could provide for young Marxist scholars" (1993, p. 3). Yet his ideas still have impact today, which is unusual considering the situated nature of his work. With his knowledge of the literature and the intellectual environment of the times, Vygotsky distinguished himself from others by incorporating numerous non-Marxist views into his theories. Dialectical materialistic ideas originating from Hegel, Marx, and Engels were, in fact, just some of the influencing factors in Vygotsky's work. Spinoza, for example, was equally influential as were numerous other sources including the Gestalt school of thought, early American Behaviorists such as Watson, French authors including Pierre Janet and Piaget, Freud and fellow Russians, such as Pavlov and Bekheretov (Valsiner, 1988). The referral to these sources throughout Vygotsky's work help make it still relevant today. Without this "breadth of empirical, theoretical and philosophical enquiry", that Lloyd and Fernyhough (1999, p. xxiii) similarly observe, Vygotsky's approach would have been much more narrow, parroting Marxism and the party line that would, therefore, be of lesser interest now.

It was, in the end, this eclecticism that got him into trouble with the politicians of the day. Criticisms of his ideas claimed that they were too "cosmopolitan"[3]. He was criticised for being a "bourgeois psychologist" using foreign theoretical perspectives and passing them off as Marxist psychology (Valsiner, 1988, p. 120). Stalin had little tolerance for theoretical deviations from the official line, which, in the field of psychology, became "Marxist Pavlovianism" (Knox & Stevens, 1993, p. 9). These "political errors" led to the blacklisting of Vygotsky's ideas for twenty years (Rosa & Montero, 1990, p. 71) with his wife and colleagues then secretly storing his work during that period of time (Boris, 1999; Luria, 1979). One wonders how Vygotsky would have survived in the political and academic environment following his death. The unfavourable and contradictory, judgment of Vygotsky's theory by the Stalinist

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[3] that is, "Westernizing"

government is ironic considering some of the pro-revolutionary viewpoints that Vygotsky had acknowledged.

Vygotsky developed his position by first stating the psychological theses of others, then criticising them and finally adapting or revising these views into a new perspective based on cultural historicism. This dialogical method corresponded to the very core of Vygotsky's theorizing (Knox & Stevens, 1993, p. 11) and mirrored the Hegelian-Marxist formula: thesis, antithesis, synthesis. He was fascinated, for example, with the dualistic mind/body split mentioned by Descarte in 1649, which was (and still is) a fundamental issue in psychology. Vygotsky, like many other academics of the day, had to walk a fine line politically, yet as the next section will show, by using a dialogical approach and drawing from an eclectic knowledge of the literature, he conceptualized a theory of mind that would shatter the academic world and which still influences it today.

2.2   Addressing the Crisis

Vygotsky distinguished himself by attempting to bridge broad differences in various theoretical positions that were being fought over in his time to come up with an all-encompassing theory. He was a generalist rather than a specialist. In trying to make sense of his work Newman and Holzman, for example, comment that:

> The attempt to categorize Vygotsky, to 'dualize' him either as a psychologist or a methodologist, contradicts, ironically not only Vygotsky's life-as-lived, but his self conscious intellectual revolt against dualism (1993, pp. 14-15).

In Russia, during Vygotsky's formative years, contrasting and seemingly incompatible views on the foundations of human behaviour were being offered. Freud's theory of the unconscious was very popular, while Pavlov's and Bekhterev's similar, yet competing physiological approaches to behaviour predominated the academic world (see, for example, Kozulin, 1984, chapters two and four). Vygotsky believed that Freud's thinking was "courageous", "intrepid", and "revolutionary" because it challenged the academic establishment of the time (Vygotsky, 1994, p. 10). Yet, he was also influenced by physiological based explanations, as reflected in his continuous references to behaviourist thinking and terminology, particularly in his

earlier works. Overall, Vygotsky, like others, perceived psychology as a fragmented discipline, with competing and incompatible perspectives on human behaviour. As he questioned:

> What is most common to all phenomena studied by psychology, what makes the most diverse phenomena into psychological facts – from salivation in a dog to the enjoyment of a tragedy, what do the ravings of a madman and the rigorous computations of the mathematician share? Traditional psychology answers: what they have in common is that they are all psychological phenomena which are nonspatial and can only be perceived by the experiencing subject himself. Reflexology answers: what they share is that all these phenomena are facts of behaviour, correlative activity, reflexes, response actions of the organism. Psycholanalysts answer: common to all these facts, the most basic factor, which unites them is the unconscious which is their basis (1997a, p. 238).

Vygotsky believed that there was a crisis in psychology illustrated by the fundamental differences in interpretation of the same fact by different theoretical perspectives (Valsiner & Van der Veer, 2000). Psychology, as Vygotsky perceived it, was neither a consistent nor a coherent system of science. He believed that a struggle for "unification" was necessary, while the struggle between disciplines within psychology was not and began his psychological work by searching for ways of integrating these disparate approaches (Vygotsky, 1997a, p. 241). Yaroshevsky and Gurgenidze describe his view at the time as follows:

> Before his eyes was the picture of a crisis in Psychology which was engendered, as he wrote more than once, by the confrontation of the biotropic and the sociotropic currents. He attempted to avoid dualism (1997, pp. 350-1).

Vygotsky, therefore, set out to build a general psychology based on "Marxist methodology" that attempted to unify these different perspectives in a dialectical manner (Newman & Holzman, 1993, p. 6). In his 1924 speech he criticised both the behaviourist position of the reflexologists, who were interested primarily in biologically determined reflexes, and the subjectivists, who focused more on the

unconscious. He was very direct in his criticism that they were too narrow in their perspectives. He stated in the speech, for example:

> When reflexology excludes mental phenomena from the circle of its investigations because they do not fall under its jurisdiction, it acts just like idealistic psychologists who study the mind as having nothing whatsoever to do with anything else, as an isolated world (1994, p. 41).

To address this crisis, Vygotsky suggested that psychology should examine consciousness as the bridge between the two views. The idea that consciousness derives from and is created by, an individual's mediated relationship with the world was not actually new. Not only was it influenced by Vygotsky's eclectic reading of such people as Spinoza and Janet, but it had clear roots in the works of Marx and Engels, who stated that, "The production of ideas, of conceptions, of consciousness, is at first directly interwoven with the material activity and the material intercourse of men, the language of real life… Life is not determined by consciousness, but consciousness by life" (Marx & Engels, 1969, p. 25). Vygotsky believed, like Marx and Engels, that human consciousness was a given fact, one that the behaviourists in particular had ignored. He envisaged consciousness as something that derived, or developed, from social interactions and the historical development of culture within which these interactions take place. As he said:

> Psychologically speaking consciousness is an indisputable fact, a primary reality, a fact of the greatest significance, and not a secondary or accidental one. About this there is no dispute. Thus we should have and might have put aside the problem, but not have removed it. As long as in the new psychology one does not make both ends meet, the problem of consciousness will not be stated clearly and fearlessly and it will not be solved in an experimentally objective way (1994, p. 41).

Vygotsky's ambition in his speech in 1924 was to bridge the gulf between the two perspectives while retaining credibility. That he did this successfully, according to Luria, brought Vygotsky to prominence in the academic world at that time. Vygotsky thought that the "enigmas of consciousness" as he termed them (1997a,

p. 47), needed to be addressed from a scientific rather than an introspective perspective. He also realised the need to explain the mechanics of consciousness, its genesis and function. On this he said:

> Scientific psychology must not ignore the facts of consciousness but materialize them, translate them into the objectively existing. It must forever unmask and bury fictions, phantasmagorias, etc. Without this all work is utterly impossible – both teaching, critique, research... Consciousness is the problem of the structure of behavior (1997a, p. 67).

Vygotsky differed from others in that he saw no solution either in the new behaviourist psychology, nor the old subjective empirical psychology. He offered an alternative perspective of the development of mind that incorporated the social construction of consciousness as part of the process. He announced that consciousness was secondary and derivative from the outside world and was based on a system of reflexes. He explains:

> Psychology has to state and solve the problem of consciousness by saying that it is the interaction, the reflection, the mutual stimulation of various systems of reflexes. It is what is transmitted in the form of a stimulus to other systems and elicits a response in them. Consciousness is a response mechanism. That is why subjective experiences are only accessible to me – only I perceive my own reflexes as stimuli (1994, p. 40).

This fresh view was palatable, but challenged the "hawks of reflexology", as Kozulin termed them (1984, p. 103); the established academic world at the time. The solution proposed by Vygotsky was essentially environmental. He envisaged consciousness as being constructed by its mediated relationship with various stimuli in the outside world. This new perspective highlighted the interactive, reflective, dynamic nature of the process. Vygotsky's synthesis of ideas was couched within behaviourist terminology perhaps because, as he said in 1925, "this theory must form the foundation of psychology: psychology must begin with it" (1997a, p. 59). Vygotsky's speech brought consciousness, an internal and therefore unverifiable phenomenon, within the realm of acceptable "scientific" analysis. Being able to

explain this nebulous and controversial concept within an environment that was dominated by behaviourist theories and yet allowed consideration of such a radical position is Vygotsky's legacy that continues today. This viewpoint within the post-revolutionary pro-Marxist environment became his starting point and ambition, following his debut as a psychologist.

2.3   The Higher Mental Functions

Vygotsky's fame centred on his ability to not only highlight, but to explain the mechanics of the concept of socially and historically determined consciousness to the field of psychology. His view on the development of mind centred around the idea of internalizing external stimuli to create, what he termed, the Higher Mental Functions and the externalization of these phenomena back out to the outside world, using mediators or, what Vygotsky termed in his 1924 speech, "the reversible reflexes" (1994, p. 35). In simple terms, Vygotsky proposed the existence of a separate category, or system of mental functions unique to humans that was derived from social and historical relations (see Vygotsky, 1997b, chapters 1, & 3- 5). These entities provide the foundations of his theory. As he said:

> We are confronted here by a process of greatest psychological importance: what was an external operation with a sign, a certain cultural method of controlling oneself from outside, is converted into a new intrapsychological layer and gives rise to a new psychological system incomparably higher in composition and cultural-psychological in genesis (1999, p. 55).

Vygotsky viewed the mind during psychological development initially as derivative, secondary, unlike contemporaries like Piaget and Binet, who believed that the mind drove psychological development (see Kozulin, 1984, p. 104). Vygotsky disagreed also with the emphasis that many behaviourists placed on studying lower order functions such as elementary perception and reflexes, in the belief that they were building blocks to understanding higher order, or mental, processes. Although higher functions can be deconstructed to leave only lower order ones which many psychologists had studied, this missed the point in Vygotsky's view. As Kozulin put

it, "decomposition shows us only the material, but says nothing about the construction of higher functions" (1984, p. 105).

Vygotsky stated instead that the human mind was made up of two distinct functions; lower order functions that develop biologically that we have in common with other species and unique higher mental functions, which arise historically and that are mediated (Vygotsky, 1999, p. 40). The concept was illustrated in Vygotsky's well known "genetic general law of cultural development", which according to one translation, illustrates the development of these higher functions, as follows:

> Each higher form of behavior enters the scene twice in its development – first, as a collective form of behavior, as an inter-psychological function, then as an intra-psychological function, as a certain way of behaving. We do not notice this fact, because it is too commonplace and we are therefore blind to it. The most striking example is speech. Speech is at first a means of contact between the child and the surrounding people, but when the child begins to speak to himself, this can be regarded as the transference of a collective form of behavior into the practice of personal behavior (1997a, p. 95).

Proposing such a stratified, or layered, model of the mind was a bold step, one that has since been criticized as "too sharply" separating the two functions (Van der Veer & IJzendoorn, 1999, p. 381). However, by creating this dualistic model of the mind, Vygotsky not only supported the behaviourist position by validating research on biologically determined elementary, or lower order functions, but he was then able to derive the development of what he saw as unique human characteristics such as consciousness, speech, planning and concept development from the wider social environment. Human consciousness, according to Vygotsky, was unique from other species in its ability to interact and mediate with the environment via these higher functions in a socio-historical sense. It is specifically this process of mediation that Vygotsky proposed that I wish to investigate further in this thesis.

Vygotsky believed that at some point, "human history made the dialectical leap from biological necessity to human self-mastery and freedom" (Valsiner & Van der Veer, 2000, p. 383). That is, the Higher Mental Functions become developed to an extent where they become self-regulating and the mind becomes fully active and capable of voluntary attention. The human mind from that point on, according to

Vygotsky, is active in its relationship with the world and a unique personality is thus formed. He illustrated the uniquely human aspects of the mind by quoting comparative research carried out on apes by Koehler, Yerkes, and Buehler (Cole, 1990, p. 91; Vygotsky, 1999, chapter one). As Vygotsky stated:

> The main difference between the behavior of man and of animals consists not only in that the human brain is immeasurable above the brain of the dog and that the higher nervous activity so strikingly sets man apart from the rank of animal, but most of all because it is the brain of a social being and because the laws of higher nervous activity of man are manifested and act in the human personality (1997b, pp. 54-5).

Vygotsky proposed that the transference of activity from inter to intra-psychological, from the social and historical environment to the internal mind, is defined by a process termed internalization, or interiorization, and is facilitated via mediators. This process describes the development of higher psychological functions from the external social environment. Internalization, therefore, represents a neuro-physiological channel of information flow between external and internal stimuli and reflexes. Blanck adds that Vygotsky was describing a socio-genetic process, one in which, "Culture is internalized in the form of neuropsychic systems that form part of the physiological activity of the human brain" (1990, p. 44).

Internalization, Vygotsky added was, "not at all a purely mechanical transfer" (1999, p. 53, v.5). He envisaged instead a process of cyclical reconstruction, or mediation, that he termed "revolution" (Vygotsky, 1999, pp. 53-55). This reconstruction led to the new and higher form of function being created in the mind. As Vygotsky put it, "we obtain a qualitatively new interweaving of the systems which sharply distinguishes human psychology from the elementary functions of animal behavior" (1999, p. 55). The mind, in Vygotsky's view, is a system consisting of linked complexes of internal reflexes and functions, all internalized and reconstructed from socialization in the outside world (Vygotsky, 1997a, p. 92). The mind then, directly reflects the social and historical context within which it is formed.

By stressing the role of consciousness in transforming external reality, the processes of internalization and revolution, therefore, neatly bridged the mind/body controversy by linking physiological with psychological mental processes. The next

step for Vygotsky was to describe the means by which internalization occurred. Borrowing from Marx again, Vygotsky emphasized that it was "human tool-mediated labor activity" that historically determined mental development (Leont'ev, 1997, p. 21). The existence of mediators as devices that aided internalization and that defined the higher mental functions was a vital aspect of Vygotsky's theory. Indeed, the concept of mediation represents the central linking element in Vygotsky's scheme, the catalyst that represents the essence of human psychological functioning (see, for example, Daniels, 2001, p.13).

2.4   Mediation

Vygotsky once said, "We shall consider mediated mental operations as a specific characteristic of higher mental functions" (1999, p. 49). Higher mental functioning and internalization are enabled in Vygotsky's theory of mind by the presence of internally orientated mediators. Although they interface, as Valsiner and Van der Veer point out, "The terms mediated and internal do not have the same meaning" (2000, p. 371). That is, mediation works in both directions, internally and externally. Vygotsky's view was that although consciousness derived from the wider environment through a process of internalization, it then became an active participant, operating upon the external world through mediators that could have many different forms. This "new regulatory principle" (1997b, p. 55), as Vygotsky termed it, explained the way in which human consciousness dynamically interacts with the environment. Mediators, then, provide the vital connections, or links, between the internal and the external in Vygotsky's theory. They explain the transformations that can take place during the development of Higher Mental Functions when an individual is trying to make sense of the world via the various media and filters by which it is experienced. Mediation, generally, then represents the crux of his theory, the glue tying the various components together. It is this phenomena and the modern interpretations of it that are of key interest in this thesis.

The presence of mediators between the behaviour, or response, and the outside phenomena radically differentiated Vygotsky's theory from the widely espoused stimulus-response models of behaviourism and reflexology (Daniels, 2001, p.13). Into the S-R scheme Vygotsky figuratively inserted an X to depict the psychological mediator that becomes the centre or focus of the activity, determining

the processes of a "complex indirect act" (Vygotsky & Luria, 1994, p. 145). The relationship was depicted by Vygotsky as follows:

Figure 2.1: The Instrumental Act (from Vygotsky, 1997a, p. 86, 1997b, p. 79).

A   B

X
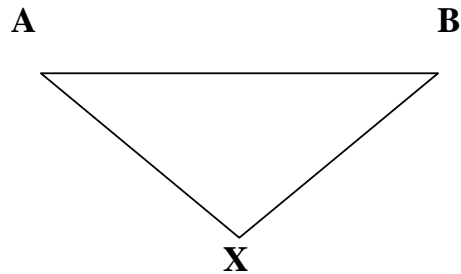
The X in the diagram is unique to higher mental functioning and illustrates their functional and mediational aspects in Vygotsky's view. The mediator is clearly depicted as being in the middle, between the stimulus (A) and the response (B), or a "behavioral act" (Vygotsky, 1997a, p.86). The mediator is thus an artificial device, or tool, created by humans to filter or alter the relationship between activity, or behavior, and elements, or stimuli, in the environment. With this insertion Vygotsky pointed out, "Any behavioral act then becomes an intellectual operation" (1997a, p. 87). The presence of the X let Vygotsky differentiate what he termed the process of signalization, which referred to lower order processes common to both man and animals, from that of signification, which referred to the active mediational aspects of consciousness. He explains this difference as follows:

> Man's active adaption to the environment, the change of nature by man, cannot be based on signalization, passively reflecting natural connections of all kinds of agents. It requires active closures of the kind that are impossible under purely natural type of behavior, that is, behavior based on a natural association of agents. Man introduces artificial stimuli, signifies behavior, and with signs acting externally, creates new connections in the brain (Vygotsky, 1997b, p. 55).

Signs, as illustrated in the above quote, comprise psychologically constructed tools including the unique human use of language in various forms such as speech and

writing, as well as the use of other conceptual devices such as numeracy and pictures. They are used by humans to filter the inward movement of information from the world. However, "man's active adaption", as Vygotsky termed it above, works both ways. The outside phenomena, or "stimulus", applying Vygotsky's instrumental method, can either be viewed as an object or as "the psychological tool of the instrumental act" (Vygotsky, 1997a, p. 86). In one case it is a stimulus-object directing behaviour and, in the other, it is a stimulus-tool for solving a problem (although not all stimuli can become mediators). The idea that an outside phenomenon, or stimulus, can become both an object and a mediator, or tool, two functionally different entities, at the same time stretches the metaphors a bit, something that Vygotsky also noted (1997b, p. 62).

An often quoted example that Vygotsky used to demonstrate this concept throughout his writing was tying a knot in a handkerchief as a reminder of something (1978, p. 51). A key point that Vygotsky pointed out about this example was that, "man made the necessary closure by tying the knot" (Vygotsky, 1997b, p. 60). That is, humans actively created this connection using available stimuli in the environment. Creating this artificial, or auxulary, stimulus allows the human to control their future remembering (Daniels, 2001, p.16).

Mediation then is more than just a matter of connections between the inner and outer world. Mediation in its various forms is transformative, changing both the world and our minds, hence its importance in Vygotsky's theory. As he said:

> The phylogenetic history of man's practical intellect is closely linked not only with mastery of nature, but also with mastery of self. The history of work and the history of speech can scarcely be understood one without the other. Man created not only the tools for work with the help of which he subjected his will to the forces of nature, but also the stimuli that induced and regulated his own behavior, subjecting his own powers to his will (1999, p. 63).

Based on these different functional properties, Vygotsky differentiated between two broad classes of mediator, termed signs and tools. He depicted the relationship between the two in the following diagram:

Figure 2.2: Signs and Tools (from Vygotsky, 1997b, p. 62)

Mediating Activity

Use of Tools   **Use of Signs**
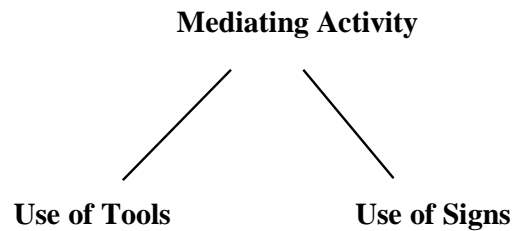
Vygotsky explained the difference between signs and tools via the "instrumental method" (Vygotsky, 1997a, chapter 5, 1997b, chapter 2). While both could be envisaged as types of tools, one psychological and the other physical, he was careful to point out that the analogy was incomplete and misleading. As he said:

> Since the principle of signification leads us into the area of artificial devices, the question arises as to its relation to other forms of artificial devices, of its place in the general systems of man's adaption. In a certain specific relation, the use of signs shows a certain analogy to the use of tools. Like all other analogies, this analogy cannot be carried to the bitter end, to a full or partial coincidence of the major essential characteristics of the concepts being compared (1997b, p. 60).

There were clear functional differences, or "diverging lines", that need to be demarcated between tools and signs in Vygotsky's view (1997b, p. 62). Although both are mediators, signs are orientated inwards; they act on mind and behaviour and are therefore "reversible" (Lee, 1985, p.76). Daniels adds that signs "were seen as artificial and of social rather than organic or individual origin" (2001, p.15). The term "sign" reflects Vygotsky's literary roots and emphasizes the meaning making aspects of psychological tools, or "means-stimuli", as they were also referred to (Leont'ev, 1997, p. 26). Tools, typically labeled physical or technical, refer to "the mediating function of some object or means of some activity" (Vygotsky, 1997b, p. 60). They are orientated outwards and modify the object directly, that is, they are instruments. Both signs and tools are located in the middle between behaviour and the object, but they are orientated in different directions and serve different functions.

While tools and signs are divergent in function, the two categories, however, are not mutually exclusive in terms of specific physical and psychological entities, or

devices. Vygotsky also specifically noted that the two classes were not "equivalent" nor were they "exhausting of the whole range of the concept of mediating activity" (1997b, p. 62). Technology, for example, was one mediator that Vygotsky specifically discussed as having aspects that could be both considered as tool and sign. On this he said:

> Phenomena that have their own psychological aspect, but in essence do not belong wholly to psychology, such as technology, are completely illegitimately psychologized. The basis for this identification is ignoring the essence of both forms of activity and the differences in their historical role and nature. Tools as devices of work, devices for mastering the processes of nature, and language as a device for social contact and communication, dissolve in the general concept of artefacts or artificial devices (1997b, p. 61).

It is the transformative, meaning making aspects, of mediators that were "discovered" and emphasized in Vygotsky's theory rather than the physical or psychological aspects according to Davydov and Radzikhovskii (1999, p. 133). Newman and Holzman similarly point out that mediators, in both the Marxian and Vygotskian senses of the word, cannot be separated from their product but must be considered simultaneously as "tool-and-result" (1994, p. 47). They are used uniquely by humans in that meaning is modified by mediators during internalization in a dialectical manner not, "freely or spontaneously along lines demarcated by the child himself", as Vygotsky once said (1987, pp. 142-3). Newman and Holzman add that mediator use within the Vygotskian paradigm must be viewed from a practical-critical standpoint. As they explain:

> The activity of making meaning is a fundamental expression of revolutionary activity. It is the toolmaker (our species) making tools-and-results using the predetermining tools of the hardware store variety (including nature and language) and the predetermined tools of mind developed by them to create something – a totality – not determined by them. It is the meaning in the emerging activity, not the preconceived imagining followed by its realization, which is transformative, revolutionary, and essentially human (1994, p. 49).

Mediators can then take many forms in Vygotsky's view and essentially explain the departure of human functioning from other species. In this new perspective of humans, Vygotsky was able to describe how humans uniquely developed an active relationship with the outside world throughout the cycle of psychological development via artifacts including both objects and people (Daniels, 2001, p.17). This perspective is of immediate interest to the present research concerned with groups of people using computers. The machines and the people then can be envisaged as key mediational forces, or influences, within this joint activity.

The successful explanation of the concepts of internalization, mediation and higher mental functions to the field of psychology was a major breakthrough and comprises the essence of Vygotsky's theory of mind, a theory that still has impact today. The concept of mediation explains clearly how individuals act upon the world and are acted upon by the world in a dynamic, historically constructed fashion. As Vygotsky commented, the, "transition to mediated activity radically reconstructs the whole mental operation" (1997b, p. 63). The existence of active, socially and historically determined mediation is the crux of Vygotsky's model of human development.

Vygotsky was also a pragmatist and so one of his major goals was to apply his theory of mind or, in other words, to put it to practical use. Two major areas in which he applied his theory were to speech acquisition and to pedagogical concerns. I wish to review each of these in turn before examining the implications of Vygotsky's work to the present context.

2.5   Speech

At the end of a series of writings entitled "Tool and Sign in the Development of the Child" that explained the development of Higher Mental Functions and the role of speech, or semiotic mediation, in this process, Vygotsky concluded that:

> If the act, independent of the word, stands at the beginning of development, then at its end stands the word becoming the act. The word, which makes the action of man free (Vygotsky, 1999, p. 68).

Words and the mediating aspects of speech were central to Vygotsky's theory of the development of mind. Language was seen as the "tool of tools" as Luria once commented (cited in Lee & Smagorinsky, 2000, p. 2), or simply, the most important mediator: the one that most separated man from other species. Vygotsky commented at one point that studying the development of speech was "the most convenient phenomenon for tracing the mechanism of the formation of behavior" (1997b, p. 121), that is, speech provided an example of unique human mediation that formed many of Vygotsky's theoretical ideas. Vygotsky based much of his work on observations of children and apes in experimental studies of problem solving tasks. On one instance of these he said, for example, that:

> Due to the participation of speech in operation, the child acquires an incomparably greater freedom that is observed in the instrumental behavior of the ape; the child has the possibility of resolving the practical situation by using tools that are not in the direct field of his perception; he controls the external situation with the help of preliminarily mastering himself and preliminarily organizing his own behavior… Speech included in the operation was the system of psychological signs that acquired a very special functional significance and resulted in a complete reorganisation of behavior (Vygotsky, 1999, p. 27).

It was Vygotsky's view that speech, because of its basic communicative function, mediates much of the social construction of our minds. It is the primary form of mediation that transforms cognitive development. In Vygotsky's view language, or semiotic mediation, which he once referred to as "the grandiose signalistics of speech" (1997b, p. 57), enables humans to act upon the world and be acted upon by the world. Externally, language manifests itself as primarily a device for communication in its various forms, such as verbal or written speech. Turned inwards, Vygotsky saw speech as primarily responsible for the creation of practical intellect, memory, perception, verbal thinking and inner speech and, therefore, the development of consciousness through an iterative spiraling process. This reflects his general socio-genetic law that higher mental functions result directly from "converting means of social behavior into means of individual-psychological

organization" (Vygotsky, 1999, p. 41). Speech, naturally, was seen as the means of carrying out this uniquely human process.

However, the development of speech, while important, was envisaged as being fundamentally the same as other higher mental functions in its socio-historical development; for as Vygotsky explained, "the word does not stand at the beginning of the development of the child's mind" (Vygotsky & Luria, 1994, p. 166). That is, speech does not come first, practical activity does. Then, when children are around two years of age, Vygotsky postulated that, "lines representing the development of thinking and speech, lines that up to this point have moved in isolation from each other, cross and begin to coincide" (1987, p. 110). At this crucial point, speech begins to distinguish humans from other species. Vygotsky envisaged external social speech transforming into verbal thought and then internalizing eventually into, what Vygotsky referred to as, "inner speech", which then intersects with consciousness (1987, p. 112). Vygotsky gives the following example as an illustration:

> The child begins to command herself: "one, two, three, go!" – just as the adults commanded her before, and then she carries out her own command. A union of those functions that were originally shared by two persons thus emerges in the process of psychological development. The social origin of higher mental functions is a very important fact (1997a, p. 96).

The development of inner speech, like all mediated higher mental functions, was not seen as a mechanistic process by Vygotsky and, instead, was subject to a cyclical process of revolution as discussed in the previous section. Vygotsky explained that, "speech itself is not based on purely associative connections. It requires a fundamentally different type of relationship between the sign and the structure of the intellectual operation, a relationship characteristic of the higher intellectual processes generally" (1987, p. 133). Vygotsky believed that speech developed in the everyday course of conversations with others, with egocentric speech in children, for example, not disappearing, but rather no longer being publicly audible, transformed beyond recognition into inner speech (see Vygotsky, 1987, chapter 4). As he explained:

Functionally external speech serves social adaption and inner speech serves individual adaption. Structurally through abbreviation and economization, inner speech comes to differ so radically from external speech that it is nearly incomprehensible (1987, p. 113).

A crucial marker in the development of speech, both externally and internally, in Vygotsky's view, was word meaning. He pointed out that word meaning changed in accordance with the construction of higher mental functions, from the general naming of objects to understanding them as concepts (Vygotsky, 1987, p. 234). Concept development was, therefore, closely aligned with the use of speech, as reflected in the two chapters Vygotsky wrote on concept development in <u>Thinking and Speech</u> (1987, chapters 5 and 6). Written in the early 1930s, these chapters not only explicated the important interrelationships Vygotsky saw between word meaning and concept development, but the importance of the context within which this development takes place, that is, the social and historical environment. An example provided by Vygotsky is the "pseudoconcept". He elaborated that:

The paths through which word meanings are extended or transferred are determined by people around the child in their verbal interaction with him. However, the child cannot immediately learn adult modes of thinking. The product he receives is similar to that of the adult. However, it is obtained through entirely different intellectual operations. This is what we call a pseudoconcept (1987, p. 143).

The synergy between the development of thought and speech was illustrated by Vygotsky in other ways as well. He studied people with inadequate speech ability where he predicted fundamental changes in development. With deaf and mute children, for example, Vygotsky observed differences in the development of word meanings based on what he saw as a lack of available illustrative or indicative information. He gives the example of the word "tooth" which without such information could mean "white", "stone", or "tooth" to a deaf and mute child (1987, p. 155). His work in the field of defectology revealed similar examples (See Vygotsky, 1993). Vygotsky invested a lot of energy studying word meaning as the link to understanding the relationship between thought and speech. In rationalizing the

use of word meaning as a unit of analysis, a complete break from the norms of the time, Vygotsky wrote:

> We found the unit that reflects the unity of thinking and speech in the meaning of the word. As we have tried to show, word meaning is a unity of both processes that cannot be further composed…In psychological terms, however, word me aning is nothing other than a generalization, that is, a concept…Any generalization – any formation of a concept – is unquestionably a specific and true act of thought. Thus, word meaning is also a phenomenon of thinking (1987, p. 244).

To Vygotsky, word meaning not only captured the essence of human development but creates a window into the mind. Vygotsky's essential approach was to interpret the superficial to a deeper level, to find an "alternative explanation of what something means" as Bruner similarly reflected (1987, p. 16). His holistic approach towards the study of word meaning was influenced by his reading of Gestalt theory, which supplemented Vygotsky's views against reductionism. One of Vygotsky's contributions in the period 1933-34, for example, was a discussion on the use of language in developing so called everyday and scientific concepts (1987, chapter 6). In Vygotsky's methodology the function of speech in mediating specific forms of social intercourse, such as the teaching of scientific concepts in formal schooling, were analyzed for their role in determining different types of psychological functioning. According to Vygotsky, everyday concepts were formed spontaneously over time during the course of natural development whereas scientific concepts were formed differently via "a mediated relationship to the object" (Vygotsky, 1987, p. 219). Vygotsky added that, "With the spontaneous concept, the child moves from the thing to the object. With the scientific, he is forced to follow the opposite path" (1987, p 219). That is, scientific concepts were usually mediated by instruction and communication within a system of formal schooling. Whilst Vygtotsky was clear to highlight the interrelationship between the two, this dichotomy can be seen to represent a practical application of his theory of mediated cognition, which reflects the importance of communicative meaning.

There have been criticisms of Vygotsky's approach, particularly by those concerned with more measurable, external phenomena. Minick alludes to the

vagueness of Vygotsky's concepts and the difficulty he had in operationalizing them (Minick, 1987). Leont'ev similarly commented at one stage that Vygotsky's descriptions were "in many ways unsatisfactory and extremely abstract" (1974, p. 22). I think that Vygotsky was aware of this issue (see also V. P. Zinchenko, 1985, p. 100), but fought against reductionist tendencies and insisted on a "holistic approach" to the development of mind as Moll also commented (1990, p. 6). Vygotsky defended this argument towards the end of <u>Thinking and Speech,</u> published in 1934, for example, by stating emphatically that, "No further evidence is needed to support this basic thesis" (1987, p. 244). He envisaged speech and thought as dynamic, intersecting and mediating entities, ones that could not be studied any other way except through word meaning.

This seemingly narrow focus on speech perhaps constrains Vygotsky's contributions. Lloyd and Fernyhough, for example, point out his "somewhat excessive emphasis on the role of speech as a form of social intercourse" (1999, p. lii). Yet Vygotsky's work needs to be understood within the context of his stated problem, or puzzle area that he was analyzing at the time, the relationship between thought and speech in humans. As a result, much research has since been conducted on the psycho-linguistic aspects of his theory (see, for example, Lantolf & Appel, 1994). Yet speech acquisition was not the only area of higher mental functioning that Vygotsky was concerned with – even though it may seem that way. As Minick (1987) points out, he wrote about parallels with other processes, such as the internalization of play into imagination, the growth of perceptual abstraction, and the internalization of emotion. Vygotsky did not ignore other processes (see also Vygotsky, 1993), but envisaged speech as the primary sign, the main vehicle, or catalyst for the creation of consciousness and, therefore, spent most of his time analyzing it. As Bruner commented, "for Vygotsky, language is a powerful system of tools for use – for use initially in talk but increasingly, and once inwardness is achieved, in perception, in memory, in thought and imagination, even in the exercise of will" (1987, p. 15).

2.6   The Zone of Proximal Development

Perhaps Vygotsky's most famous contribution to the field of education resulted from an attempt in the final years of his life to formulate a pedagogical approach that embodied his socio-genetic approach to human development (see Daniels, 2001; Valsiner & Van der Veer, 2000). This effort was grounded in his involvement with educational reform, as discussed previously, and was possibly influenced by Vygotsky's own home schooling experience; he was tutored by Solomon Ashpiz, a revolutionary activist, who used Socratic dialogues for teaching (Blanck, 1990, p. 32). Vygotsky was openly critical of the teaching and assessment methods of the time, particularly the static IQ tests widely used, and was aware of the huge challenges facing Soviet Russia in attempting to educate a large population of illiterates. As a result of these practical concerns, Valsiner and Van der Veer observe that Vygotsky was "extremely anxious to find the optimal student-education mix" (2000, p. 378). One of his primary concerns was to find solutions for educational problems of the day. He once wrote, for example:

> It is education which should play the central role in the transformation of man
> – this road of conscious social formation of new generations, the basic form to
> alter the historic human type. New generations and new forms of their
> education represent the main route which history will follow whilst creating
> the new type of man (1994, p. 181).

In applying his theories to these concerns, Vygotsky envisaged a direct link between the unique form of human mental development as espoused by his theory and learning. His analysis and critique of pedagogical practice at the time not only provided a good example of mediated activity but also a model for learning. Once again he emphasized that the learning process was unique to humans. He said:

> Not even the most intelligent animal can develop his intellectual capacities
> through imitation or instruction. He cannot learn anything that is
> fundamentally new. He can learn only through training. If we consider
> instruction in this specifically human sense, animals cannot be instructed. In
> contrast, development based on collaboration and imitation is the source of all

the specifically human characteristics of consciousness that develop in the child. Development based on instruction is a fundamental act. Therefore, a central feature for the psychological study of instruction is the analysis of the child's potential to raise himself to a higher intellectual level of development through collaboration, to move from what he had to what he does not have through imitation. It is also the content of the concept of the zone of proximal development (1987, p. 210).

The zone of proximal, or next[4], development (ZPD) was proposed by Vygotsky to integrate and illustrate key features of his theory in an educational context. The ZPD was based specifically on the principles of his "Genetic general law of cultural development" (see page 24) which proposed two distinct and causal stages in the development of a higher mental function, the first at the collaborative, or inter-psychological level, and the second after internalization, at the intra-psychological level, that is, inside the mind. Vygotsky's analysis of the difference between everyday concepts, those functions developed spontaneously without guidance or help, and scientific concepts developed within a collaborative and guided learning context, can also be seen to contribute to the concept of a ZPD (1987, chapter 6). The ZPD addresses the differences between these theoretical concepts in terms of social mediation. In one case it is present, in the other case not. It is this gap that led Vygotsky to propose the existence of a zone of potential development that could be achieved through social assistance and mediation. Mediation, therefore, is the underlying principle of the ZPD.

Directed into an educational testing context, Vygotsky saw learning divided between what has been learned (or fossilized, to use another one of Vygotsky's terms), and what could potentially be learned based on collaboration with, and assistance from, others (see Valsiner and Van der Veer, 2000, p. 378). Valsiner and Van der Veer point out that, Vygotsky transposed " a fundamental law of ontogenesis ... to the domain of prognosis" (2000, p. 379). That is, he turned a perspective on human development into a predictive concept, with a theoretical distance occurring between a student's actual learning and his or her potential learning ability, a

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[4] An alternative translation offered by Sutton (1988)

speculative theory in other words. This gap in Vygotsky's view could be bridged by social mediation, or assistance. Vygotsky explained this idea as follows:

> What lies in the zone of proximal development at one stage is realized and moves to the level of actual development at a second. In other words, what the child is able to do in collaboration today he will be able to do independently tomorrow. Instruction and development seem to be related in the same way that the zone of proximal development and the level of actual development are related. The only instruction which is useful in childhood is that which moves ahead of development, that is which leads it (1987, p. 211).

The ZPD, therefore, describes a social system. It stresses the importance of joint mediated activity and, in particular, the relationship between the learner and the teacher, or more capable peer (Lee and Smagorinsky, 2000, p. 2; Newman and Holzman, 1993, p. 55). It is the social mediation and assistance within an individual's unique zone, or range, of capabilities that leads directly to internalization of new concepts. That is, the knowledge is co-constructed by the student and the more capable 'other'. As a result, Vygotsky differed from many educational and developmental psychologists in his day who believed that students should not be taught things until they were psychologically ready or mature enough. The ZPD emphasizes instead that students learn best when they are challenged with the support of teachers or peers who understand more than them about the topic and are able to help them attain a higher level of understanding. Imitation and instruction, when mediated appropriately, were viewed as important processes in learning for as Vygotsky pointed out:

> Instruction is useful when it moves ahead of development. When it does, it impells, or wakens a whole series of functions that are in a stage of maturation lying in the zone of proximal development (1987, p. 212).

The concept of the ZPD emphasizes the socially mediated and contextual aspects of learning, which lead, rather than follow, psychological development. One of its attractions, as Lloyd and Fernyhough point out, "is doubtless its simplicity. Like many ideas it is quite straightforward" (1999, p. x). On a pedagogical level, the ZPD

appears to have very direct practical implications. Vygotsky probably had this in mind when he said:

> When we observe the child's development and instruction in school, it becomes apparent that each subject demands more than the child is capable of, leading the child to carry out activities that force him to rise upon himself. This is always the case with healthy school instruction. The child begins to learn to write when he does not yet have the mental functions that are required for written speech. It is for precisely this reason that instruction in written speech calls these functions to life and leads their development (1987, p. 213).

The ZPD is an example of an application of Vygotsky's views on the development of human mind via higher order processes with the help of mediators, in this case, other more capable participants. However, Vygotsky's theory provides much more than just a technique, or the "glib" view that, "two heads are better than one" as Crook puts it (1999a, p. 418). Although, as Moll points out, it is a "connecting concept" between theory and practice (1990, p. 3), it is important to look beyond the ZPD as a practical teaching principle. Newman and Holzman, for example:

> cautioned against using turning the ZPD into a technique for learning (even if it be group or collective learning). We stated … that the ZPD is not a technique or an experiment, but a reorganising of environmental scenes to create new meaning and a learning that leads development (1993, p. 147, parentheses in original).

The ZPD clearly describes more than just a pedagogical approach or, as Moll comments, "a clever instructional heuristic" (1990, p. 4). It comments on the process of learning within individuals and it is for perhaps this reason, as Lloyd and Fernyhough point out, the notion "has led to more research than any other Vygotskian concept" (1999, p. x). The ZPD highlights the importance of social mediation in learning, and the dynamic process of internalization that results from this mediation.

Criticisms of Vygotsky's concept centre on observations that the ZPD, in practice, may be too optimistic and, perhaps, even naive. Lloyd and Fernyhough, for example, "caution against a simplistic operationalization of ZPD and a belief that

ZPD in itself is a causal explanation" (1999, p. xiii). There are cases where the ZPD does not work. Tudge, for example, found learning contexts in which development was "impeded" as the result of peer collaboration, which questions the assumption inherent in Vygotsky's theory that, "when a zone is created it is unfailingly in a developmentally appropriate direction" (1999, p. 216). Tudge added that although peers do indeed influence each other's learning, this may be either in a regressive or progressive direction and suggested that perhaps Vygotskian theory needed to be amended to account for this. Similarly, Lee and Smagorinsky discuss the problem of "subversive discourse" in collaborative learning situations, activity that could only be accounted for "within the larger social goals of the group" (2000, p. 10). Other cautionary evidence is presented by Blank and White who discuss the difficulties of implementing the ZPD into a classroom setting (1999, pp. 296-330). This evidence suggests that, although the ZPD may be straightforward and simple in concept, there is simply no way of predicting the meaning that individuals glean from any particular collaborative activity and indeed, development in a negative direction is "possible and also likely" (Hogan & Tudge, 1999, p. 52). As Valsiner and Van der Veer explain further:

> The problem is that we cannot know what use the child will make of the guidance and assistance. The problem is that the child will creatively and idiosyncratically transform the assistance given, and therefore the attempt to capture the future by determining the zone of proximal development is misguided (2000, pp. 379-380).

Regression was not specifically mentioned in Vygotsky's discussion of the ZPD, although he did mention at one point that a "competent child in a group of incompetent children" will be "delayed in his development" because the instruction is "too easy"(1987, p. 213). Vygotsky believed that instruction needed to be within the ZPD to be effective, but did not address other possible outcomes nor did he elaborate on aspects such as degrees, or properties, of ZPD. This reflects some limitations in his theory, I believe; ones that perhaps resulted from Vygotsky's hurried conversion of a theoretical ideal into a practical, causal entity designed to assist educational reform. Perhaps these limitations also highlight the point made earlier that the ZPD is not so

much a practical technique as a perception on how individuals make sense of their social worlds in a learning context.

A perspective that the inter-psychological activity of learning could be influenced by other participants negatively and by a plethora of other mediators is, however, consistent with Vygotsky's broader theory of socio-historical development. Human behaviour is unpredictable and is accounted for within Vygotsky's view that human development is active and involves a dynamic intercourse, or transformation, between the internal activity of the mind and the outside world. The ZPD then, can be viewed as representing an ideal model of how this transformative process takes place with more capable peers or adults in a learning context. It is an optimistic view of education, which was made clear in Vygotsky's description of the differences between everyday and scientific concepts. He discussed guided learning within a ZPD specifically in the positive sense and did not, therefore, address other, more negative, influences using this particular terminology. This is not to mean that he did not think negative influences existed; he just did not discuss them in any detail.

2.7   Implications of Vygotsky's theories

Vygotsky's successful rise as a psychologist in Soviet Russia in the 1920s lay in his ability to interpret and extend Marxist principles into a psychological acceptable perspective. In addition, he integrated these in with findings from other writers at the time and then created a theory of mind that could explain to the psychological world how conscious thought develops in humans. As Valsiner points out, "He did not invent it – instead he creatively integrated differing existing viewpoints into a new general principle" (1988, p. 142). Consider, for example, the following Marxist concept:

> Labour is, in the first place, a process in which both man and Nature participate, and in which man of his own accord starts, regulates, and controls the material re-actions between himself and Nature (Marx, 1906, p. 197).

In this quote a possible origin of Vygotsky's idea of instrumentality can be illustrated, which he then extended from an economic into a psychological force. The new terminology created by Vygotsky in assimilating numerous ideas was then a

mark of distinction as well as an explanatory concept for his theory of mind. I believe that Vygotsky's conception of an individual's mind can be represented as follows:

Figure 2.3: A graphical view of Vygosky's concept of Mediated Activity.
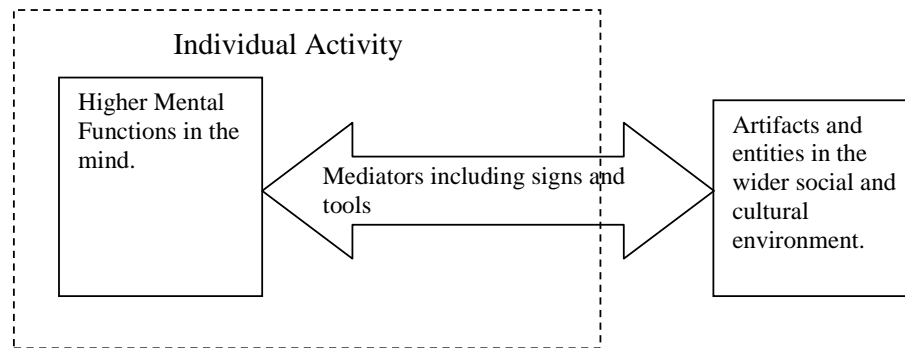
I present this figure, which essentially embellishes Figure 2.1 (on page 27), as a summary of Vygotsky's key ideas, as a way of visualizing the process and function of his terms. The centrepoint of Vygotsky's theory is the presence of active mediational processes between the internal constructed mind of the individual and the outside world, situated socially, and historically. The two are co-dependent with the relationship being bi-directional, dynamic, and transformative, separating humans from other species. The existence of Higher Mental Functions, consciousness, speech, and the ZPD are directly derived and enabled by the processes of internalization and mediation. The use of tools in any form to operate on entities in the outside world can also be understood only in terms of mediation. As mentioned previously, mediation is the key connecting element, the 'glue' tying various aspects of Vygotsky's theory together.

Extending this model into a collective learning environment, in the form of collaborative group projects as in the present context, is tempting and yet has some challenges. The social and collective aspects of a group project bring forth his ideas on the importance of socially and historically mediated meaning and, therefore, joint activity. As mentioned in chapter one, Vygotksy's theory has direct relevance to the present context because of its emphasis upon the social fabric within which knowledge is co-constructed. Group projects provide a fertile arena for peer supported joint activity and for the internalization of group ideas and, as such, the concept of a ZPD is relevant. The ZPD emphasizes that learning within any context should challenge students to grapple new understandings with the help of more capable

others which is of direct relevance to group work. The more capable other in these situations could include other group members as well as outsiders brought into the process by the task. The ZPD highlights the mediational role that these others play in helping the student to internalize understanding via their unique, situated relationship. However, as discussed earlier, applying this concept to practice is problematic. The ZPD is a theoretical and ideal concept rather than a pragmatic one and is not, therefore, easily operationalized. The concept does not take into serious consideration the quality, or type of mediation present within a peer group project beyond emphasizing that, "what the child can do in collaboration today he will be able to do independently tomorrow" (Vygotsky, 1987, p. 211). This assumes positive rather than negative influences whereas, in reality, as Tudge (1999) has pointed out, it is not as simple as this. It is practically impossible to predict the direction of the influence particularly in a group of unsupervised students at the same academic level. So while, in theory, the concept of the ZPD provides an explanatory framework for positive peer influence in the present context, its help in discussing other aspects of group work is seen as limited within Vygotsky's general concept of mediated human functioning.

The positive influences of human resources that exist within a ZPD are not the only possible mediators operating within a group project. Artificial devices, such as computers, can be envisaged as mediators operating both on the outside world as individual tools and also transforming the inward movement of meaning. The numerous opportunities provided for sharing such non-human resources within collaborative contexts support Vygotsky's ideas on mediation and social determination of development. Vygotsky argued at one point that any type of mediator "whether physical or conceptual" is constructed historically (Lee & Smagorinsky, 2000, p. 5). Computer technology, which plays a central role in the efforts of the collective projects, can then be discussed within a Vygotskian framework. Vygotsky's notion of mediation between the individual's mind and the wider social environment, including that of a specific group project with its human and non-human resources, can help us to discover and identify the form and meaning of this mediation.

Applying Vygotskian theory does, as mentioned, present some challenges. A major issue is that, perhaps because of the context within which it was developed, Vygotsky's theory represented an individual theory of mind rather than a wider

perspective upon collective group processes (see also Van der Veer & Valsiner, 1994). As I depicted in Figure 2.3, his analysis of mediated activity is that of an individual making sense of the social world. The individual's mediated activity, as depicted, may or may not be physical and visible to the wider social environment. The mediators present are within the individual's grasp. They become part of his activity and the vital process of internalization is, therefore, private. Vygotsky provided no analysis on groups or group work aside from discussing the communicative and collective nature of human mediated activity.

There are other challenges. The environment and subject population of the present study is vastly different to that of Vygotsky's. He was interested primarily in the psychological development of children in Soviet Russia in the early 20th Century, whereas here, the interest is with undergraduate students at the beginning of the second millenium in New Zealand. In addition, many point out that Vygotksy's theory of mind was unfinished (Daniels, 1996; Joravsky, 1989; Valsiner & Van der Veer, 2000). Lloyd and Fernyhough comment, for example, that, "he was a man interrupted in the midst of his creative flow" (1999, p. xxiii). This is perhaps to be expected considering Vygotsksy's premature death from tuberculosis in 1934. Some charge that his ideas are controversial and seemingly paradoxical (Tudge & Hogan, 1999; Wertsch, 1999). His elevation of humans with possession of their unique higher mental functions, for example, clashes directly with the views of social anthropologists of the time, such as Darwin's theory, which Vygotsky dismissed as purely descriptive (Vygotsky, 1997, p. 69). Research on Vygotsky's theories carried out by Luria in Central Asia, under Vygotsky's direction, on illiterate peasants was criticized as being insulting and racist (Kozulin, 1984, p. 110). Consider the following passage, for example:

> How do primitive people make it rain? They try to do this by magical ceremony. First they begin to blow through their fingers in imitation of wind, then they arrange to have water fall on sand and if the sand gets wet, it signifies that such a ceremony will bring rain (Vygotsky, 1997b, p. 115).

His exclusive, almost arrogant view, of the hierarchy of human development as illustrated in the quote above would offend many, although it is perhaps explainable given the revolutionary times in which it written. There are other issues

with Vygotsky's views as well. For example, John-Steiner and Meehan point out in a volume on Vygotsky's theories that his view of the socio-historical determination of thought has difficulty explaining the concept of originality and creativity (2000, p. 31, see also Valsiner, 1998). And some take issue with his explanations of how exactly activity is internalized (Wertsch, 1999). What is apparent is that many of Vygotsky's ideas were provocative and speculative, rather than proven. Moll, in support of this view, points out that, "The power of Vygotsky's ideas is that they represent a theory of possibilities" (1990, p. 15). This is perhaps because Vygotsky died relatively young, as Davydov and Radzikhoviskii observe, he was "in a great hurry" (1999, p. 117) and, therefore, did not have the opportunity to reflect upon such criticisms and carry out large amounts of research to support his theorizing.

However, there are two key aspects of Vygotsky's theory that, I think, make it particularly relevant to the present context. The first is his illustration that the mind is an active and dynamic participant in cognition, which I believe was a complete breakaway from views at the time of the mind as a passive entity. The second is his emphasis on the socially and historically determined nature of cognition and, therefore, the influence of others on psychological development. This was a complete change from the decontextualized examinations of stimuli and response espoused by the behaviourists of the time. The concept of mediation underlies both these key ideas with mediators working in both directions under the active control of an individual to make sense of the outside cultural world. This is the theme than runs through all of Vygotsky's work and is also the theoretical focus in this study, tool mediation within a social context. Also of direct relevance is the fact that Vygotsky was interested in applying his theory to an educational setting via the concept of ZPD, an application of his views on mediation in education. A neo-Vygotskian approach therefore supports research on the grounding of pedagogical practice. Moll explains this approach as follows:

> this work is characterized as research on practice: the effort is to analyze existing systems from a Vygotskian perspective to draw implications for the delivery of instruction and for clarifying and developing the theory (1990, p. 15).

A neo-Vygotskian approach was chosen then because Vygotsky's ideas were primarily concerned with education and pedagogy and because his concerns with the social and cultural aspects of learning are relevant to understanding those aspects of group projects. What is of interest is the possibility that a socio-historical theory of human development can be applied in a vastly different context to that in which it was conceived.

Before I centre on the present study however, I shall discuss some of the many theories that have been spawned directly by Vygotsky's writing and theorizing since it was constructed, both in Russia and outside, in a quest for seeking more information about how his theories may pertain to groups. My goal is to gain a sense of how Vygotsky's theories may, or may not, help me to understand this particular joint activity. There is a wide literature to cover. However, I will review this collection of researchers, whom I refer to as the neo-Vygoskians, briefly, with the primary focus being on understanding the joint activity afforded by the present context.

Chapter Three: Neo-Vygotskian appropriations

> Vygotsky arrived at an internationally prominent status and yet the bases for
> such an ascent are embedded in the history of the development of
> (developmental) psychology and education in different countries. Fame is a
> socially constructed entity which functions for the purposes of the
> constructors, rather than for the designated bearers of the role themselves (Van
> der Veer & Valsiner, 1994, p. 5, parentheses in original).

The numerous appropriations of Vygotsky's work since it was originally written in the 1920s and 1930s have led Van der Veer and Valsiner to talk of the "socially constructed" nature of his work, particularly in the West where they point out that what has been presented to us via academics such as Luria and Cole has been of a "selected" nature (1994, p. 33). It may indeed be true that we will never achieve a truly accurate picture of Vygotsky. There are some disagreements in the literature on Vygotsky about the Marxist underpinnings of his theories (see for example Newman & Holzman, 1993; Valsiner & Van der Veer, 2000) and some point to the dearth of early literature and wonder if more will surface (Joravsky, 1989). Clearly Vygotsky's ideas were developed in a vastly different context to that of the present study and were prematurely cut short by his death (Lloyd & Fernyhough, 1999, p. xxiii).

Vygotsky set out on his academic career in 1924 at the Institute of Psychology in Moscow with two colleagues, Luria and Leont'ev, who are now commonly referred to as his students, or "disciples" even though they were contemporaries (Kozulin, 1984, p. 111; Sutton, 1988, p. 98). These three formed a "troika" for investigating the development of a Marxist based psychology with Vygotsky the proclaimed leader (Luria, 1979, p. 40). Leont'ev and Luria developed and extended Vygotsky's ideas further within Russia after his death and through the Stalinist era (Leont'ev, 1972; Luria, 1979; Kozulin, 1984, p. 111). Indeed, there is speculation that Leont'ev claimed many of Vygotsky's ideas as his own in the 1940s within his theory of activity, which nevertheless branched away in key areas (Kozulin, 1984, pp. 110-111). Luria, a self-proclaimed fan of Vygotsky, helped archive and store his writing following his death and then was instrumental in publishing it later in the West. Luria also carried out studies on the developmental aspects of Vygotsky's work following

his death, including some of the first known comparative studies of identical and fraternal twins (Luria, 1979, pp. 56-57).

It is since the translation of some of his writings in books such as <u>Thought and Language</u> (1962), <u>Mind in Society</u> (1978), and <u>Collected Works</u> (1987-99), that the importance of Vygotsky's work has become well known outside Russia, even though there were a few minor publications in the 1920s and 1930s (Lee & Smagorinsky, 2000; Valsiner & Van der Veer, 2000). However, there are numerous issues concerning the accuracy of early translations of Vygotsky's work (see Daniels, 2001, pp. 9-13; Kozulin, 1984, p. 116; Wertsch, del Rio & Alvarez, 1995, p. 6). With <u>Thought and Language</u>, for example, Bruner admitted that, "In translating the book, we have simplified and clarified Vygotsky's involved style, while striving always to render his meaning exactly" (in Vygotsky, 1962, p. xii). Actually, this "simplification" involved truncating the original from 318 to 153 pages and deleting all reference to Marx (Daniels, 1996, p. 2; Valsiner, 1988). <u>Mind in Society</u> was similarly pieced together (Glick, 1997, p. xii).

Vygotsky became internationally prominent after these renditions appeared and as a result, as Sutton points out, "much of this interest has been based on a rather limited range of translations, sometimes rather mutilated ones at that" (1988, p. 113). This is a shame. As Lloyd and Fernyhough point out, these translations are a "serious underestimate" of the richness of his writing (1999, p. xxiii). Unfortunately, without understanding Russian, we are dependent upon various translations and interpretations of Vygotsky's writing. I address this issue by avoiding the earlier "translations" of his work (notably the 1962 and 1978 books) in this thesis, primarily referring to later, apparently more accurate although still controversial, translations of his work.

The 'revival' of Vygotsky's theories, following the suppression of his work for so long, has instigated a huge interest in the development of his ideas in a wide variety of disparate contexts. Some have explained this renewed interest in his ideas as a reaction to individualistic, reductionist tendencies in psychology in general, which mirror many of Vygotsky's original concerns (see Daniels, 2001, p.7; Newman & Holzman, 1993, p. 8; Valsiner & Van der Veer, 1994, p. 5). In 1988, Valsiner discussed the "saturation" of this work, believing that this renewed analysis had exhausted all the applications of Vygotskian ideas and that it was time to move on (Valsiner, 1988). Yet, the applications of his work still continue at a fast pace and, as Lee and Smagorinsky observe:

In learning from Vygotsky, we have learned new ways to extend him. Modern applications of Vygotsky have contributed to research in literacy practices and development, which in turn have contributed to the evolution of Vygotsky's theory of human development (2000, p. 1).

These evolving appropriations of Vygotsky's work should be also taken in context and examined for theoretical holes. As Daniels comments, "The Vygotskies who are being created in the 1990s in the West as well as in post-Soviet Russia are diverse and must be seen in their own cultural context" (1996, p. 3). Modern appropriations of Vygotsky's work emphasize different aspects of his theory. The field of cultural psychology, for example, stresses the primary influence of the cultural environment on the individual, as does the similar socio-cultural perspective (see, for example, Cole, 1990; Martin, Nelson, & Tobach, 1995; Tomasello, Kruger, & Ratner, 1993). The constructivist perspective, on the other hand, while broadly based around the views of Piaget, essentially discusses the Vygotskian principle concerning the active human construction of meaning internally, or within social contexts (see, for example, Gergen, 1995). Much work that is pertinent to the present context has been carried out in these related, but divergent fields that will be discussed later in this chapter. There are a number of other viewpoints that also intersect with Vygotskian principles, which has created what Valsiner and Van der Veer refer to as a "web" or "epistemic marketplace" of discourse (2000, p. 386). In general, a neo-Vygotskian perspective reflects a concern for the social, cultural and historical derivatives of human cognition, as well as a perspective on the mind as constructive and mediated.

What is of interest here is the incorporation of these ideas into a new, general approach for understanding activity in the context of undergraduate group projects. For this reason I will discuss in this chapter a selected number of neo-Vygotskian perspectives that are applicable, in particular, to the study of groups. These include the notions of "activity", "scaffolding" and "communities of practice", and a summary of the major differences between socio-cultural and constructivist appropriations of Vygotskian theory as mentioned. These will help build a neo-Vygotskian model for the study.

3.1   Activity

Vygotsky wrote as much about methodological issues as theoretical and puzzled particularly over what to study within his new theory of mind (Vygotsky, 1997a, chapter 2). The involvement of socio-historical factors in human functioning implied a move away from a study of purely individual phenomena. Lloyd and Fernyhough observe that, "In dislodging the individual as the primary unit of analysis, Vygotsky's work requires the reader to make a fundamental reorientation to the problems of mental development" (1999, p. xlii). Vygotsky's solution, as discussed in the previous chapter, was to consider word meaning as a sufficient unit of analysis, one that encapsulated the mediated functioning and avoided reductionism, or 'atomization', as Vygotsky termed it (1997b, p. 66). However, as V. P. Zinchenko[1] notes, Vygotsky himself was aware of the "inadequacy of the category of meaning as a unit for analysing higher mental functions" (1985, p. 100). Alternative concepts were therefore investigated by Vygotsky's colleagues.

In the 1930s a group of Vygotsky's students and colleagues, including Leont'ev, one of the original troika, and P. I. Zinchenko, escaped the difficult circumstances in Moscow and based themselves in the town of Khar'kov (Kozulin, 1996). Later termed the "Kharkovites", led by Leont'ev, this group introduced a theory of activity viewed as an extension to Vygotskian theory but which, in fact, differed from his approach significantly (Kozulin, 1996, p. 111). In discussing these developments in relation to Vygotsky's work, Davydov and Radzikhovskii comment that:

> Notwithstanding the differences among these various phases and various tasks, Vygotsky's students have always considered his work from the perspective of the theory of activity that they were developing. Vygotsky's works were viewed as one of its early stages. His work was reconstructed proceeding from the theory of activity, and the valuable characteristics of Vygotsky's work were inevitably formulated in this context (1985, p. 36).

A key difference was in the role of external actions in the development of internal functions (Kozulin, 1984). What P. I. Zinchenko termed "Vygotsky's

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[1] V.P Zinchenko and P. I. Zinchenko are different people.

principal mistake" was the reduction of development to "a limited dialogue of human consciousness with culture" (see Kozulin, 1984, p. 111). P. I. Zinchenko "attacked" Vygotsky's theory and Leont'ev then reworked it to encompass a new methodological focus (Kozulin, 1984, p. xlvi). Instead of focusing on the mediational role of psychological tools including language, these academics considered the role of practical, material activity as the primary mediator; that is, "the actual relations between the child and reality" (Kozulin, 1996, p. 111). Although a major change, this new emphasis was seen by the Kharkovites to be a natural development of Vygotsky's ideas and their origins in Marxist theory. Leont'ev, the prime proponent of the theory of activity, noticed Vygotsky's original emphasis on the Marxist concept of "human tool-mediated labor activity" and used this idea to develop a new model (Leont'ev, 1997, p. 21). While Vygotsky emphasized word meaning as a fundamental unit of analysis, the Kharkovites believed that Vygotsky's theory would have evolved to understand action as a preferable unit (Wertsch, Del Rio, & Alvarez, 1995, p. 13).

Since that time, Vladimir Zinchenko (V. P.) and Wertsch have further argued that "mediated action", in particular, is more appropriate within the framework of Vygotskian theory (Wertsch, 1985, 1991, 2000; V. P. Zinchenko, 1985, 1995). As V. P. Zinchenko points out, "The Khar'kov school of psychology changed its focus to activity from what had been a focus on consciousness, the central problem for the cultural-historical school" (1995, p. 39). In essence Vygotsky's disciples, as previously mentioned, believed that Vygotsky's theory was unfinished – in this case because he had not sufficiently resolved the analogy between the Marxist notion of "tools of labour" and "psychological tools" identified in his instrumental method (Davydov and Radzikhovskii, 1985, p. 58). Leont'ev then proposed a theory of activity as a natural development of Vygotsky's work. He stated:

> Human psychology is concerned with the activity of concrete individuals, which takes place either in a collective - i.e. jointly with other people – or in a situation in which the subject deals directly with the surrounding world of objects - e.g., at the potter's wheel or the writer's desk…if we removed human activity from the system of social relationships and social life, it would not exist (Leont'ev, 1981, pp. 46-47).

While adopting many of his ideas, Leont'ev believed that Vygotsky had placed too much emphasis on the role of internally focused and unobservable mediational processes, specifically internalization, and argued instead that practical activity was the real solution to overcoming dualism in psychology (see Leont'ev, 1974, pp. 4 -14). In discussing the expansion of the S→R model using similar logic and sources to Vygotsky's originals, Leont'ev believed that, instead of a mediational tool, "this middle link is the subject's activity and its corresponding conditions, goals, and means" (1974, p. 9). Thus, activity within a social and object-orientated context provides the vehicle for development, rather than mediators that are difficult to operationalize. Leont'ev additionally viewed the relationship between S and R, or the subject and the object, as the "same thing" and envisaged the connection between them as being not unidirectional as in the traditional S→R scheme, but instead "a reciprocal transformation between two poles" (1974, p. 9). The diagram below reflects this model:

Figure 3.1: Leont'ev's modification of the S → R scheme.
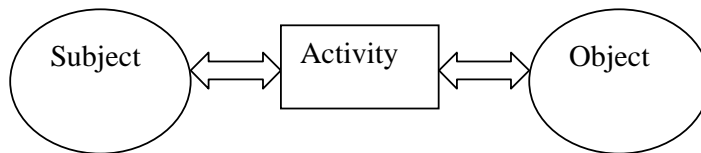
Instead of signs and tools, Leont'ev assigned to "activity" the responsibility of both internalization and externalization with a "feedback loop" describing the mechanics of this process (1974, p. 12). Activity explains mediation and the X in Figure 2.1 on page 27, in effect. This perspective reflected an adaptation of Vygotsky's genetic general law of cultural development, with activity taking two forms in ontogenesis. Inner activity, that forms consciousness, is the result of the internalization of external activity that takes place socially. In other words, "interpsychological processes" are converted into "intrapsychological processes". The role of a tool, therefore, is not lost but just de-emphasized in Leont'ev's version of Vygotskian theory. As he put it, "A tool mediates activity that connects a person not only with the world of objects but also with other people" (1974, p. 19). Although the

theory of activity may appear to be, and is, very similar to Vygotsky's, Leont'ev's insisted that activity should be the primary unit of analysis.

As part of this theorizing, Leont'ev also created a defining structure for the notion of activity. He split the concept of activity as a socio-historical entity up into three levels and integrated it into a model containing the subject and the object. All activity carried out by a subject, he argued, has an object. Activity is object-orientated and therefore goal-directed. As Leont'ev points out, "activity is the unit of life mediated by mental reflection whose real function is to orient the subject to the world of objects" (1974, p. 10). Objectless activity is nonexistent and "devoid of sense" according to this perspective. The object of an activity provides its motive. To achieve this objective, subjects carry out goal-directed actions and these actions can be further subdivided into concrete, condition-constrained operations (Leont'ev, 1974, p. 23). Thus, Leont'ev's theory not only reinterpreted Vygotskian concepts in terms of goal directed activity, but it provided a hierarchical framework, or breakdown, of activity into levels. A representation of this "three level model of activity", as Engestrom termed Leont'ev's model (Engestrom, Miettinen, & Punamaki, 1999, p. 4), is represented in the diagram below:

Figure 3.2: Leont'ev's three-level theory of activity (from Daniels, 2001, p.87)
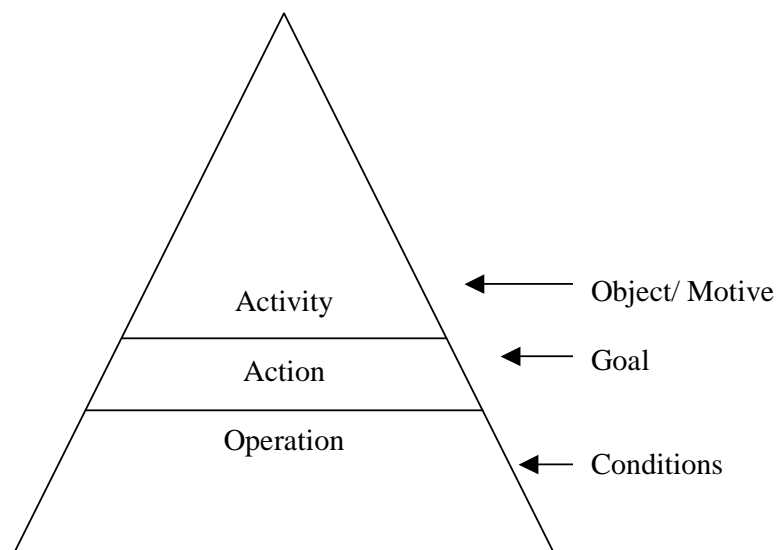
The major developments, when compared to the Vygotskian original, include a focus on activity as the entity that is both internal and external in form, the layering

of activity into smaller units and an emphasis on the motivational aspects of activity. Other aspects of Vygotsky's theory are retained within Leont'ev's new model but are rephrased to suit the new terminology. Instead of Higher Mental Functions being created via internalization, for example, Leont'ev speaks of "internal planes" of activity that are "formed" from external practical activity (1974, p. 20). Leont'ev, widely quoting Marx, therefore agreed with Vygotsky's basic socio-historical model but disagreed on the instrumental aspects.

Leont'ev's theory of activity, which then captured in the minds of supporters the dialectical materialist reconciliation of the subjective and objective components of human activity, has been further expanded to the point where some have suggested that the entire, "edifice of psychology" should use the language of activity theory (Davydov, V. P. Zinchenko, & Talyzina, 1982, p. 38). However, a theory centred around the concept of activity is not without problems. Indeed the perspective is fraught with fundamental issues. One of the major ones was explained by Kozulin as follows:

> Leont'ev's theory of activity, being elevated to the level of an all embracing psychological doctrine, ran precisely into the trouble against which Vygotsky had warned in his early article on consciousness. The notion of activity was used at one and the same time as the explanatory principle and as a subject of concrete psychological study. The phenomena of activity were "explained" through the principle of activity (1996, p. 118).

In other words, Leont'ev's theory of activity caught itself in a semantic circle, with it being impossible to research activity within self imposed, tautological categories. Vygotsky foresaw this problem (Lloyd and Fernyhough, 1999, p. xlvi) and avoided it, by explaining the formation of higher mental functions through mediated psychological activity, with word meaning, as discussed earlier, becoming the key unit of analysis. Activity in the form of speech thus served an explanatory rather than a theoretical role. This criticism of the activity-centred approach remains today and led Kuutti, a proponent of the concept of activity, to observe:

> Both parts of the term activity theory, referring to the Soviet-originated cultural-historical research tradition, are slightly misleading, because the

tradition is neither interested in activities in general, nor is it a theory, that is, a fixed body of accurately defined statements. Nevertheless, the term has become established in use, and so we have to cope with it (1996, p. 25).

It would be, perhaps, more appropriate to think of Leont'ev's 'theory' as a methodological approach than as a model of human development. However, other problems in using activity as the unit of analysis have been raised. The concept of activity, as depicted above, veers away from the socio-historical aspects of human functioning and towards a view of activity as representing an individual relationship with an object, or as Lomov comments, "as a closed system with its own intrinsic driving force" (1982, p. 59). This represents a 'black box' view of activity, one that precludes outside, environmental influences. Certainly Leont'ev's description of layered activity as depicted above includes little consideration of contextual factors unless they are incorporated within the three layers, or within the object, or subject. Lomov adds that:

> In, reality, however, any individual activity is inseparably linked with the activity of society, every individual relating to other individuals. Activity is only a factor, a component part, of the joint activity of people in society as they interact. Individual activity could not exist apart from social relations and bonds. Robinson Crusoe, on his uninhabited island, organized his life in accordance with the norms, rules, principles etc., that he had learned in his life in society (1982, p. 59).

In other words, studying activity in isolation does not adequately encompass the contextual factors that Vygotsky pointed out are so important in human development. Even in isolation, activity is influenced by the social and historical environment within which it takes place, although this may not always be apparent. This is another important criticism of Leont'ev's theory. Lomov clarified that one could not equate the socio-historical Marxist philosophical notion of activity with that of real, individual, physical acts. From Lomov's perspective, human activity needed to be understood in context, as part of a system of social relations. It could not be separated from the social fabric where it took place, or "atomized" to use Vygotsky's term (1997, p. 66). In attempting to reconcile this issue, Lomov argued, therefore, that

social and cultural aspects had to be included into the equation. He said, for example, that "the starting point, therefore, of an analysis of individual activity consists of determining its place, its role, in joint activity" (1982, p. 81). That is, he highlighted the social underpinnings of joint activity, something that a purely isolated view of activity might ignore.

Lomov mentioned some other issues specifically regarding the collective activity of groups that are particularly pertinent given the context of the present study. He queried the motive-driven nature of individuals in joint activity and suggested that, rather than analysing these factors on an individual level, it was more pertinent to see how well each individual's goals correlated with the group outcome. That is, we should examine the interrelatedness of group participants' goals. In addition, he discussed the communicative function of the mind as essential to joint activity and the consequent "synchronisation" of activity that may or may not occur (1982, p. 84). As he said:

> The "interlacing" of individual motives in joint activity sometimes creates a very complex picture, giving rise to a multitude of different effects, for example, the change in individual motives and goals under conditions of joint activity, the enrichment of the motivational sphere of each of its participants, or the disintegration of joint activity as a result of a conflict of motives (however, even when individual motives conflict, a general goal may be preserved). Moreover, interpersonal relations become manifest in the way goals and motives of people brought together by activity are interrelated (1982, p. 83, parentheses in original).

Lomov, in criticising what he saw as limitations in a purely object-orientated individual account of human activity, then illustrated ways for extending the concept based on what he saw as its multidimensional aspects, particularly in joint activity, which he saw as being "in psychological terms, much richer" (1982, p. 85). These suggestions, I think, relate back to earlier criticisms of the underlying Vygotskian focus on a theory of the individual development of mind and also to limitations of the ZPD. Leont'ev's model also was primarily concerned with individual activity rather than joint and this also constrains its application. Lomov addressed those constraints by discussing the multitude of motives and other factors present in groups.

Lomov is not the only one who has attempted to expand the concept of activity into a wider social domain. Engestrom (1987) also noted the lack of social factors in Leont'ev's theory of activity, incorporated wider social entities into it, and popularised the term "Activity Theory". Although he stated that, "Activity theory is a commonly accepted name for a line of theorizing and research initiated by the founders of the cultural-historical school of Russian psychology, L. S. Vygotsky, A. N. Leont'ev, and A. R. Luria" (Engestrom, 1999, p. 1), I believe that the title refers to his own major reconfiguration of Leont'ev's theory of activity. While retaining the original ideas formulated by the Kharkovites, Engestrom, Miettinen and Punamaki argue similarly to Lomov that instead of two entities affording the concept of activity, there should be more, namely, "the object, subject, mediating artefacts (signs and tools), rules, community, and division of labor" (1999, p. 1). Only through the inclusion of these factors could historically and socially situated mediated activity be accounted for in Engestrom's view.

Kuutti (1996), inspired by Engestrom's analysis of Leont'ev's original, offered two models which depicted activity theory, one at the individual level, which does not include environmental factors, the critical point made earlier and a second, which included Engestrom's additional points. These artifacts form a basic pyramidal structure, or model of activity, as illustrated by Kuutti in the following diagrams:

Figure 3.3: Mediated relationship at the individual level (from Kuutti, 1996, p. 28).
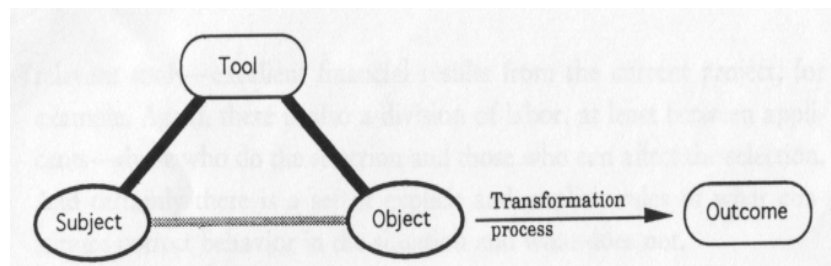
Figure 3.4: Basic structure of an activity (from Kuutti, 1996, p. 28).
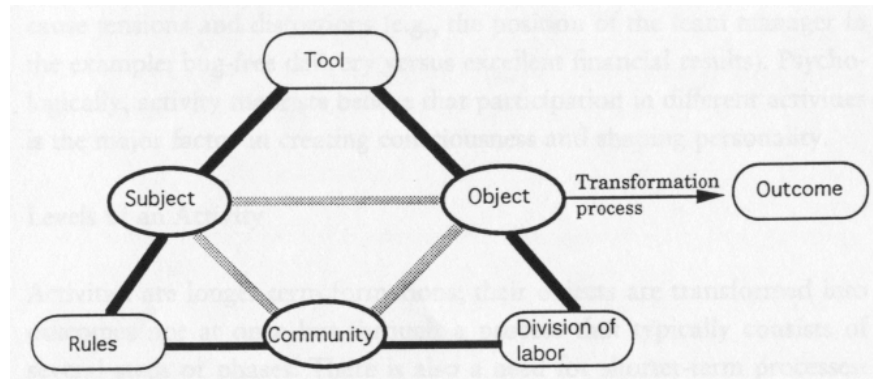
The first diagram captures the major aspects of Leont'ev's theory of activity discussed earlier, yet it leaves out the three levels of activity he discussed and adds a depiction of the transformation of the object into an outcome by the subject, using tools. This transformation process was referred to but not made as explicit by Leont'ev. The second diagram adds the second tier of the socio-historical-cultural aspects of activity, as proposed by Engestrom. This diagram, therefore, depicts the evolution of an individual model to a richer, environmentally mediated one. As Kuutti summarized, "The relationship between subject and object is mediated by tools, the relationship between subject and community is mediated by rules and the relationship between object and community is mediated by division of labor" (1996, pp. 27-28). These categories provide a useful summary, or framework, for the analysis of activity in a given social context. One tidy aspect of these models is in the way that they specify the direct and indirect relationships between the various entities involved in an activity and highlight the importance of mediation in that activity.

The models depicted are descriptive rather than predictive in the sense that behaviour in a given context on both an individual and a collective level can be observed and examined using the categories provided and the relationships between each can be identified. They provide a system for structuring analysis and there is nothing to prove as such, except for the relationships between the entities. While explaining the interconnections between the various aspects of an activity, which may be of interest to some researchers, they do not explain how these links develop, or form within a subject, or where the mind actually is in this process, if indeed one exists. They are not, then, psychological theories, as such, which limits their ability to explain such phenomena as internalization via psychological mediators.

These models have been successfully used for illustrative purposes in a number of studies. Lewis (1997), for example, has used the second model to describe collaborative activities in distributed communities. Engestrom has applied modifications of 'the pyramid' to a variety of contexts. One example included an analysis of the failure of the "Postal Buddy" system (Engestrom & Escalante, 1996), which was essentially an expert system set up in Post Offices to answer queries. Another application was to create a new model for teaching the phases of the moon in a school setting (1996a). In this second study Engestrom presented an "expansive learning" version of the pyramid depicted in Figure 3.4 below, which attempted to reflect a transformation of school learning into, "a collective instrument for teams of students, teachers, and people living in a community" (1996a, p. 167).

Figure 3.5: An expansive learning model for acquiring understanding of phases of the moon (from Engestrom, 1996a, p. 167).

Instruments:

School as a collective instrument

Instruments of criticism, plus
The method ascending from abstract to concrete, models
Technologies of transparency and simulation,
Stories, tools of the established practice

Subject: Team of students, teachers, practitioners, local people

Object: astronomical phenomena in the contents of criticism, discovery and application

Outcome:
a) a grasp of astronomical knowledge as socially constructed practice.
b) expanded structure of learning activity itself.

Student

School text

Rules:
Complementary codes of criticism, discovery and application

Community:
network of learning

Division of Labour:
designed according to the specific object and context

Code of behaviour, Standards of grading

Classroom

Teachers teach and control, students study

60

According to Engestrom, this model explicates not only a Davydovian "abstract to concrete" approach to learning, but Lave and Wenger's concept of "communities of practice", and notions of "progressive problem solving" and "working at the edge of one's competence" (Engestrom, 1996b, p. 167). On this last claim there are some parallels with Vygosky's concept of ZPD that is of interest to this thesis. The student's activity can seen to be assisted by others within a community. Engestrom's concern with abstract to concrete, based on Davydov's work, can also be seen to reflect Vygotsky's concern with everyday and scientific concepts. The flexibility of the pyramid model to adapt to this particular study is demonstrated by the creative use of vocabulary in the figure above, which reflects Engestrom's belief in its ability to adapt to different contexts. Engestrom does this by changing, not the basic shape, but the descriptions of each nodal point. For example, he readily adapts the subject category to include individuals, groups, and anybody associated with an activity. This seems to be a radical departure from Vygotsky's emphasis on the individual internalization of the external. Activity theory can include other entities, such as groups, within a study of mediated activity, but it appears to leave out consideration of internal factors, such as psychological mediation, aspects that a neo-Vygotskian perspective would include.

Engestrom's rendition of Leont'ev's original theory of activity has not been the only elaboration. Another that is of interest, particularly to a study of collective activity, elaborates upon Leont'ev's notion of internal and external planes of activity and to an entity termed a "functional organ" (Leont'ev, 1981). This adaption focuses more on psychological aspects of individual and group activity than Engestrom's approach. Kaptelinin explains that, "Functional organs are functionally integrated, goal orientated configurations of internal and external resources" (1996, p. 50). In other words, they represent an individual plus resources acting in a particular environment. Technology such as a telephone would be a good example; a telephone extends the natural capacities of an individual and would, therefore, become part of the functional organ of the individual when they are making a telephone call – the machine becomes an integral part of the activity. To represent this concept visually, Kaptelinin provided the following Venn diagrams that illustrate the functional organs of two individuals participating together in joint activity:

Figure 3.6: Mediated group activity (from Kaptelinin, 1996, p. 39).
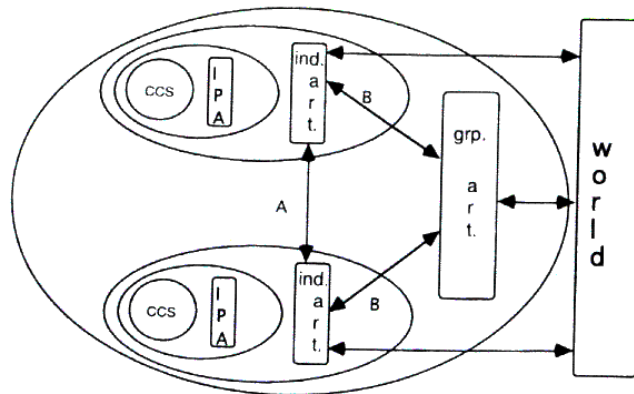
In this model, the smallest inner circle labeled "ccs" stands for the "central cognitive structures" described by Kaptelinin as essential individual psychological functions, such as memory, cognition, and perception. The concept of the internal plane of actions (IPA) is directly from Leont'ev's theory of activity and comprises the internalized intra-psychological activity that Leont'ev postulated, or as Kaptelinin explains, "the human ability to perform manipulations with an internal representation of external objects" (1996, p. 51). These two objects together form the individual's subjective reality and can be seen closely to resemble Vygotsky's theory of higher mental functions, plus inner-directed mediators, in the form of signs.

The next level up, or circle labeled B in the model, represents the individual's personal space according to Kaptelinin, which contains tools, artifacts and resources (labeled ind. art.) that then comprise an individual's functional organ. This includes physical resources such as computer technology, a tool that Kaptelinin specifically used as an example. Beyond this is the group context (A), which contains resources used by the group (grp. art.). In terms of computers this would mean the resources used by both individuals. The interface to the wider world, depicted as a rectangle, is then represented by arrows, as are relationships between the two functional organs and the group resources.

Kaptelinin's model attempts to make sense of human joint activity by indicating its intersections and relationships with other entities including resources, participants and the wider environment and, at the same time, represents the internal form of this activity. The concept of functional mediators has been used within other

models as well (see for example, V. P. Zinchenko, 1996), but this one appears to have particular relevance to a study of group projects as it includes consideration of individual and group factors, as well as the wider environment. This gradual change in focus retains the Vygotskian concepts of mediated activity and inner functions, but employs Leont'ev's idea of inner and outer activity and also describes the existence of joint resources as separate from individual resources, a useful concept for the study of groups.

Activity centered approaches, although limited, are of value to the present context because of several contributions that they provide to a neo-Vygotskian perspective on joint activity, the theoretical focus in this thesis. First of all, they reformulate Vygotsky's notion of mediation in terms of practical activity, which has obvious methodological advantages and explains the process of internalization in different terms. The active, participatory role that a person takes, both psychologically and physically, in the internalization of social, cultural, and historical factors is highlighted by a theory of activity. Second, Leont'ev's model of the different levels of action highlights the motivational aspects of human activity that tended to be ignored by Vygotsky and, in doing so, provides a hierarchical structure for describing human activity in terms of actions and operations. Third, Engestrom's rendition of the concept of activity into a pyramid shaped model provides a framework for understanding activity within a social environment, with the various relationships between entities spelled out. Fourth, it allows the reformulation of the unit of analysis beyond the individual level to one of collective activity. The activity rather than the meaning becomes the focus. The concept of a functional organ containing internal cognitive structures plus internalized activity, in the form of an IPA, creates another perspective on Vygotsky's original ideas of mediated activity and allows the inclusion of others into this scheme.

However, while providing a useful framework for analysis, employing the notion of activity is limited for research purposes, for it cannot be both an object of study and the method simultaneously. Engestrom has demonstrated that activity theory can provide a useful description of what is going on but there are questions concerning its adequacy as a theoretical model. The functional organ concept, in particular, illustrates that vital aspects of human activity include the internal, non-physical structures that develop, such as the IPA. As a unit of study then, it seems that more is needed than a specification, or description, of physical activity. We need to

know more about the internal aspects of activity and of ways to access this. A possibility is the concept of scaffolding, which is described in the next section.

3.2   The scaffolding metaphor

In a 1976 article, Wood, Bruner, and Ross introduced the notion of "scaffolding" to describe a process whereby the intervention of a tutor in a social context "enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted effort" (1976, p. 90). There were many parallels with Vygotsky's ideas in the article. For example, it mentioned unique child development "as a hierarchical program in which component skills are combined into 'higher skills' by appropriate orchestration" (1976, p. 89). Closely resembling the concept of internalization described by Vygotsky, the authors described a key psychological process with "comprehension preceding production". Even though Bruner was instrumental in producing the 1962 translation of Vygotsky's work entitled Thought and Language, which discussed higher mental functions at length and was therefore aware of his ideas, Vygotsky was not mentioned in this particular article, which seems strange. Perhaps the authors did not want to identify the source. In any case the article can be viewed as an early interpretation of Vygotsky's theory of mind, to which the term scaffolding was added to explain the benefits of collaborative efforts. Appropriate orchestration in the form of tutoring has many similarities with the concept of a ZPD and the metaphor of scaffolding helps to explain how tutors can assist students to learn by providing support.

Since the article by Wood et al was published, the notion of scaffolding has become almost inseparable from the concept of a ZPD. Both are relatively practical concepts and have become popular in the field of education in particular. As Bliss, Askew and Macrae comment, "The concepts of 'scaffolding' and ZPD have become important guiding ideas in education because within them are embedded a psycho-social model of teaching and learning" (1996, p. 38). While restrictive in some aspects, the term 'scaffolding' has been widely used since to explain mediated learning within a social context such as that provided by a ZPD (Rogoff & Wertsch, 1984). As if to verify this point, Bruner later on after the 1976 article was published, explained the scaffolding term strictly from a Vygotskian perspective, saying that the tutor, by scaffolding the learning task, makes it possible for the learner "to internalize

external knowledge and convert it into a tool for conscious control" (cited in Wertsch, 1985, p. 25). Thus, scaffolding entered the stream of vocabulary used for explaining potential mediation within the social context of learning.

The social form of this scaffolding, or mediation, of learning has been the subject of much study. Webb (1989, 1991), for example, discussed the related concept of peer elaboration at length in her analyses of group work. She found that the extent of this elaboration is a key influence in the productivity of groups in general. Rogoff's (1990, 1995) notion of "guided participation", the term "means of assisting" (see Bliss, Askew, & Macrae, 1996), and Brown and Palincsar's "reciprocal teaching" (1989) are similarly related to the notion of scaffolded learning in a Vygotskian sense. Some also draw parallels with scaffolding and the social nature of Dewey's active learning approach (Wertsch, 1991; Rogoff, 1995). Including Vygotsky's, there seem to be many versions of the idea of assisted learning.

In terms of group activity, the Vygotskian idea that more capable others can scaffold student learning has immediate application. In a group context, the concept of "collective scaffolding" has been mooted by Donato as an explanatory principle for this specific type of assistance. He demonstrated this concept in a language learning context to show how "three learners are able to construct collectively a scaffold for each others' performance" (1994, p. 45). The students apparently achieved this collective scaffolding through social interaction in general and through a "dialectical process of argumentation" in particular (Donato, 1994, p. 45). Rogoff agrees that argumentation is a key aspect of collective scaffolding. She adds that this "process of building consensus and common ground can lead the partners to a more considered view than either of them contribute independently" (1990, p. 172). It is this process of attaining inter-subjectivity that is envisaged as the crux of collective scaffolding within joint activity.

However, the metaphor of scaffolding clearly has its limits. One issue is whether the term contributes to Vygotskian theory on anything other than a syntactical level. A "scaffold" can be envisaged as a physical support, a temporary static structure that is taken away when it is no longer needed; one that is required in order to function adequately. Unless reconceptualized as a more dynamic phenomena the concept constrains rather than explains Vygotskian theory (see Daniels, 2001, p. 59). As Cazden points out:

it is a good name if we remember that this is a special kind of scaffold – one that has to change continuously as the child's competence grows, just as a physical scaffold is raised higher and higher up on a building as construction proceeds. In the strictest definition, the name scaffold properly applies only if we have evidence that the learner's competence does indeed grow over time (2001, p. 63).

It is a useful metaphor, but it tends to limit a conceptualization of the ZPD to purely pedagogical theory and practice, when in fact it is more of a theoretical ideal, as was discussed in chapter two. Bliss et al echo many of these concerns when they discuss issues of "directionality" and "ambiguity" with the notion of scaffolding. In addition, they ask "do pupils' internalizations mirror teachers' messages?" (1996, pp. 40-41). Similar to the concept of a ZPD, scaffolding represents an ideal process, one that may not always be in a positive direction and one that, according to Bliss et al, may be difficult to implement because of the many contingent factors apparent in learning.

The collective learning described by Vygotsky specifically within a ZPD requires more than a consideration of scaffolding. It requires the inclusion of the social and historical aspects of the learning context as a minimum, something that scaffolded learning does not address. I suggest that these aspects of Vygotskian theory are better supported by a community perspective of learning - one that incorporates Vygotsky's emphasis upon the dynamic, socially mediated nature of learning as well as other aspects, such as goals as motives.

In fact, "The importance of inter-subjective, joint problem solving in peer interaction has been noted with a variety of labels" (Rogoff, 1990, p. 176). Rogoff prefers to use the term "guided participation" to explain how other students and teachers assist with learning within a culture and community of education. She argues that, "children's cognitive development is inseparable from their social milieu in that what children learn is a cultural curriculum" (1990, p. 190). Hedegaard similarly discusses the "double move" approach, which rests on similar ideals (2002, p.17). These approaches eclipse the concept of scaffolding, incorporating the basic principle within a wider, less rigid, framework and emphasize the learner's active role. The notion of intersubjectivity, or the ability to see something from each other's point of view, essentially explains how the scaffolding, or tutoring, process operates (Bruner,

1999). Within the context of joint activity, perspectives upon how participants "mutually construct a scaffold" are of particular interest (Donato, 1994, p. 42). It is the intersubjectivity within joint activity that is of more interest than the scaffold and it is this social construction process that will be discussed further in the next section.

3.3   Sociocultural versus constructivist interpretations

Currently, considerable debate focuses on whether mind is located in the head or in the individual-in-social-action, and whether development is cognitive self-organisation or enculturation into established practices (Cobb, 1994, p. 13).

Two major theoretical perspectives that claim to descend from Vygotskian principles dominate the literature and yet seem at odds with each other, as Cobb points out above. In order to ground the present study within a Vygotskian perspective, the issues created by these two seemingly disparate interpretations need to be analyzed for relevance to the present context. Huge amounts of work have been carried out on each of these two fields in recent years and on their intersections with other associated viewpoints, such as the cultural and ecological perspectives (see for example, Rogoff, 1995; Steff & Gale, 1995; Wertsch, 1991, 1998). How are they different? The two general approaches, labeled socio-cultural and constructivist, have taken different aspects of Vygotsky's theory, as well as the 'extensions' contributed by the activity theorists and have worked them into two distinct, but encompassing perspectives of learning (see, for example, von Glaserfeld, 1995a; Wertsch, 1998). It is beyond the scope of this thesis to review both perspectives extensively; instead the following section will summarize and compare how these approaches have applied Vygotsky's theory to a study of collectives of people, most notably learning groups. The emphasis is on how these viewpoints have employed Vygotsky's ideas to explain learning and activity in groups rather than a study of them in their own right. In some way it seems ironic that we are back to another dichotomy, something that Vygotksy actively tried to avoid.

Luria commented once that Vygotsky referred to his theory as "cultural, historical, or instrumental psychology" (1979, p. 44). Socio-cultural perspectives can be envisaged as emphasizing the social and cultural, or external aspects, of

Vygotsky's approach, whereas the constructivist perspective is concerned primarily with the instrumental aspects; that is, the construction of the internal aspects of an individual's mind via a process of mediation. The socio-cultural perspective intersects with a general anthropological cultural, or ecological, perspective upon human activity and the constructivist with a psychological perspective of cognition.

Wertsch explained that he used the term socio-cultural, not to downplay the historical dimension, but in order to "recognize the contributions made by contemporary scholars of culture" (1991, p. 16). He felt that the more accurate term socio-historical-cultural would be simply too cumbersome but that the approach does include cognizance of all three aspects. The socio-cultural approach then, according to Fernyhough, "takes the three main themes of Vygotskian theory as the basis for an investigation into how human functioning is located within cultural, historical and institutional contexts" (1999, p. 165). The constructivist perspective, on the other hand, emphasizes Vygotsky's concept of the ongoing determination, or construction, of higher mental functions from interpersonal activity and the mediation of these by signs. Both of these appropriations of Vygotsky's work have tended to embellish it with new terms and concepts that intersect. Scaffolding, as discussed previously, is a good example.

Of interest is the culture within which some of these views were constructed. The socio-cultural approach was largely developed within the American academic community and, while discussing culture, tends to avoid discussing the Marxist roots of Vygotsky's approach. Perhaps this was to gain acceptance for Vygotskian concepts within the completely different cultural context to which it was introduced via the first translated works. As mentioned earlier, all reference to Marx was removed from the 1962 translation of Thought and Language and Wertsch, in particular, has questioned the emphasis on the evolutionary, or historical roots of human behaviour (Wertsch et al, 1995). While recognizing the "heritage" from the early Soviet psychologists, Wertsch has questioned Vygotsky's tendency to view history as "universal human progress" rather than simply as dynamic change (Wertsch et al, 1995, p. 9).

Wertsch has also pointed to, what he sees as, a "hidden agenda" in Vygotsky's proposed ZPD and has stated that, "the ZPD is a direct expression of the way in which the division of labor expresses itself in a collectivist society" (1984, pp. 94-5). As many others have pointed out (e.g. Blanck, 1990; Bruner, 1995; Daniels, 2001; Kozulin, 1984), Vygotsky was actively immersed in the events of his time and indeed,

these events may have helped him rise to fame. In terms of the 1917 revolution, for example, Wertsch argues that, " The ZPD was its instrument" (1984, p. 96). That Vygotsky was a revolutionary psychologist who supported many of the Marxist ideals is reflected in his work, or as Newman and Holzman reflect, his "life-as-lived, his writings, methodological discoveries and psychological insights" (1993, p. 160). Therefore, to make his views "palatable to the West" the historical and political aspects of his theory have clearly been downplayed by some authors (Kozulin, 1984). The socio-cultural perspective can perhaps be seen then as an attempt to work around the political-social ramifications of his theory and to apply it to a contemporary "Western" context along with its own socio-political ideologies. Early American scholars such as Dewey, Mead, and Baldwin are often cited as founders of the socio-cultural perspective, for example, along with Vygotsky (Cole, 1990 ; Rogoff, 1995, p. 141; Wertsch et al, 1995, p. 3). Popkewitz (1998) points out, however, that there were indeed common historical precedents for both Dewey's and Vygotsky's ideas. They both worked through similar times of rapid industrialization, modernization, and political reform and these contexts then provided a distinctly rich cultural and social circumstances that profoundly influenced their thinking.

The essence of learning in the socio-cultural view, then, is in the "acculturation" of an individual into a social and cultural community (Cole, 1985, p. 158; Wertsch & Stone, 1985, p. 177), or, as Lave and Wenger word it, as "legitimate peripheral participation in a community of practice" (Lave & Wenger, 1991). That learning involves others, whether through formal arrangement or on a casual ad-hoc basis, is assumed within the socio-cultural perspective. Such "cultural practices" (see Scribner, 1985) as apprenticeship, joint activity, and collaborative enquiry have been investigated by socio-cultural scholars as methods for encapsulating the ideals of this viewpoint (Brown, Collins & Duguid, 1989; Lave & Wenger, 1991; Rogoff, 1995). Collaborative groups, in particular, are seen from this perspective as enabling participants to take advantage of others' views within a community of practice. Rogoff offers the terms "participatory appropriation" and "guided participation" as alternatives to Vygotsky's notions of internalization and social mediation within a ZPD, to explain how student learning is dynamic and interdependent on others within a socio-cultural context. Although the basic intent is the same, alternative terms are offered by Rogoff to reflect a broader, less static application of Vygotsky's original concepts. Guided participation still reflects social

mediation involving adults and more capable peers. However, as Rogoff explains further:

> The concept of guided participation is intended to encompass scenarios of cognitive development that are less central in the Vygotskian account – especially the arrangements and interactions of children in cultural communities that do not aim for school-based discourse and concepts (1995, p. 148).

Rogoff presents "participatory appropriation" as an alternative term for the Vygotskian notion of internalization, which she criticizes as describing a situation "in which something static is taken across a boundary from the external to the internal" (Rogoff, 1995, p. 151). Instead, a socio-cultural perspective takes a broader activity-oriented look at this process through the study of "social defined activity" and it is this emphasis on activity as a basic unit of analysis that also helps define the socio-cultural perspective (Cole, 1985, p. 158; Wertsch, 1998, p. 17).

The socio-cultural approach towards research focuses on understanding the outward manifestations of people's mediated activities within their unique environments rather than on attempting to analyze the inner, more subjective, aspects of thinking. As Rogoff points out, "questions of where memories are stored, or how information is taken from external events of how children accumulate knowledge or implement plans all become less relevant ways to study development from this socio-cultural approach" (1995, p. 157). In general, the socio-cultural school of thought steers attention away from the individual and towards a broader study of the individual plus cultural context in any study of behavioural phenomena, or activity, as these theorists prefer to term it. A key element in this approach is the concept of intersubjectivity, the way that individuals come to understand others' points of view. Thus this school of thought is not as interested in internal psychological function, as it is in the defining social and cultural contexts within which the individual operates. Rogoff reflects on this that:

> As researchers we have only recently begun to notice the social context of individual achievement and to develop methods for studying the real

complexity of life rather than trying in vain to isolate human specimens for study (1990, p. 4).

Constructivist perspectives of learning, in contrast, are centred around issues of cognitive functioning and, in particular, on how individuals create meaning out of their environments. The emphasis in this view is more on the individual than on the context within which the individual participates. Essentially constructivism implies that all knowledge is constructed by humans, a concept unsettling on many levels because, as Larochelle, Bednarz, and Garrison point out, it "breaks radically with the foundations of empirico-realism, which claims to encode reality in terms of substances and phenomena which are independent of the observers involved" (1998, p. 5). That is, a constructivist account argues that reality is subjective rather than objective. This relativist perspective of knowledge, assumed by constructivism, views individuals not as passive spectators but rather as "organisms who create for him, or herself, a theory of the world" (Steffe and Cobb, 1988, p. 253). It is this vision of an individual constructing knowledge that coincides with Vygotsky's theory concerning the human development of voluntary thought and consciousness, although constructivists also commonly cite Piaget as a founder of this school of thought (see von Glaserfeld, 1995a). Constructivists adopt Vygotsky's view of an individual as an active participant in the learning process, of one who is creating an internal system of knowledge in order to create meaning out of the external. However, there are varying points of view within constructivism as to how an individual carries out this process. Radical constructivists, for example, believe that essentially the entire world, or a representation of it, is constructed inside an individual's head; that is, everything is relative. Social constructionism, an offshoot of mainstream constructivism, agrees with Vygotsky's view that knowledge arises out of social relationships within a cultural and historical context. Gergen explains that this version of constructivism:

> finds a close ally in Vygotskian formulations. Both standpoints place
> community prior to the individual; both look at individual rationality largely
> as a by-product of the social sphere; and both hold cooperative or dialogic
> processes as central to the process of education (1995, p. 24).

Although similar in form, social constructionism, or social constructivism as described by Gergen, is less "internal" than either Vygotsky's or von Glaserfeld's perspectives. Rather than envisaging individuals constructing models of the world independently, this genre incorporates others into the process; that is, social and cultural influences are included as part of the process. One such model for social constructivism in a learning context has been illustrated as follows:

Figure 3.7: A socio-constructivist model of the teaching-learning process
(from William & Burden, 1997, p. 43).
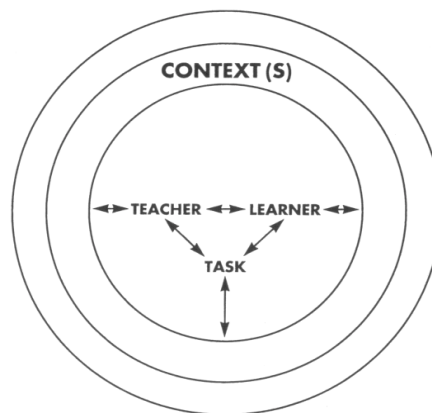
As depicted, William and Burden stress the situated nature of construction with various contexts of ever-increasing generality being marked as a series of concentric circles around the core constructive activity. These authors identify four key aspects which they say interact and influence the learning process, "*teachers, learners, tasks and contexts*" (1997, p. 43, italics in original) The core elements embedded in the context are said to be in "dynamic equilibrium" by Williams and Burden which is similar in some aspects to the Activity Theory triad discussed earlier. In effect, this model of socio-constructivism reinforces the socially and culturally embedded nature of teaching-learning activities.

This use of concentric circles, or "onion rings", as originally proposed by Bronfenbrenner (see Daniels, 2001, p. 19), has also been employed by Kaptelinin as depicted in Figure 3.6 and by Cole, illustrated below, for similar purposes; that is, for indicating ever-increasing units of analysis. First, the inner circle represents the internal activity of an individual, with the next levels reflecting the social context of the activity and then outwards again to the cultural and historical bases of the activity.

Cole's diagram, like William and Burden's, illustrates the application of this model to school-based learning. He comments that viewing contexts as sets of embedded systems is a fairly typical way that context is viewed with "the image of a unit that is simultaneously constituted by and constituting of the successively larger levels of the system" (Cole, 1999, p. 82).

Figure 3.8: An application of the notion of context to thinking about the organization of educational activities in schools, illustrating the general tendency of contextual approaches to employ the visual metaphor of embedded circles (from Cole, 1999, p. 83).
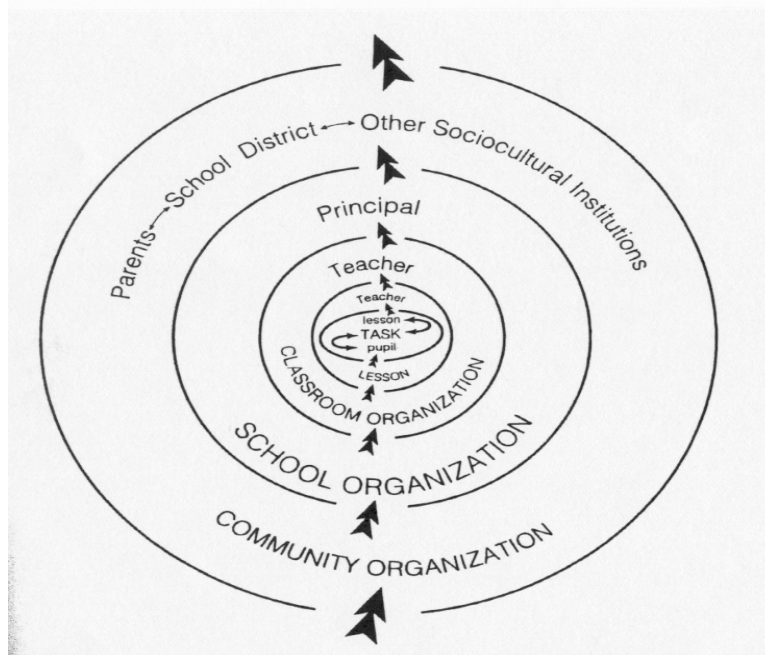
This embedded context representation tends to highlight the complementary nature of both socio-cultural and constructive processes as viewed in ever increasing specificity. Similar to the socio-cultural approach, the socio-constructivist perspective is more concerned with studying outer forms of activity such as negotiation and conflict management rather than internal activities such as concept formation (Gergen, 1995, p. 25). A great deal of emphasis is placed on the process of interaction and the role of language by social constructivists; that is, social mediation. Stetsenko and Arievitch comment that this approach, by borrowing from Vygotskian theory, conceives of human development "as a social co-creation of new reality of

psychological processes by people acting together in a sociocultural milieu" (1997, p. 161); that is, it is interactivity itself that defines development as Vygotsky believed. In a social constructivist account, the process of co-construction together with the mediational means, then becomes the unit of study (Stetsenko & Arievitch, 1997, p. 165).

Radical constructivists, on the other hand, perceive other people as objects that are then constructed by an individual out of elements of themselves and it is this internal process of construction that is the key point of interest (von Glaserfeld, 1995b, p. 12). Radical constructivists, as discussed, then just concentrate on the inner circle. The more socially orientated approaches discuss numerous levels, with some broader sociological and ecological perspectives tending to ignore the inner, more psychological aspects of an individual's activity. The debate between the radical constructivists and the social constructionists can be envisaged, therefore, as different lenses on the process of learning, with both offering pedagogical applications.

From an educational standpoint, both the radical and the social constructivist perspectives agree on the importance of creating resource-rich contexts within which individuals create knowledge, which, in a constructivist model, is neither "transmitted" nor "neutral" (Larochelle & Bednaz, 1998, p. 8). Von Glaserfeld, the so-called "father" of constructivism and a self-acclaimed radical constructivist (Williams & Burden, 1997, p. 49) criticized traditional didactic instructional techniques in which students are 'spoon fed' knowledge as he termed it. He emphasized instead that, "learning requires self-regulation and the building of conceptual structures through reflection and abstraction" (von Glaserfeld, 1995b, p. 14). The emphasis in this perspective is a student-centred one in which students are allowed to solve problems in their own ways, allowed to construct their own theories or models which are then tested by them against reality.

Similarly, social constructionists do not support formal, one-sided instructional settings but instead emphasize the importance of the social environment, or "contextualized dialogue", in creating meaning by an individual (Gergen, 1995). Newman, Griffin, & Cole (1989), have promoted the concept of a "construction zone" that attempts to capture the ideals of this approach. One example of this was reflected in the "fifth dimension" - a pedagogical practice which Cole developed to provide an enriched environment for remedial reading classes (Cole, 1995, p. 171). Such techniques reflect a view of knowledge that is relative, situated and created by

individuals in social contexts. The role of the instructor, or teacher, is limited strictly to that of a non-directive facilitator who performs an "orientating function"; that is, one who prevents students from, "constructing in directions which the teacher considers futile but which, as he knows from experience, are likely to be tried" (von Glaserfeld, 1995a, p. 184). A teacher, within this approach, is relabeled as a "coordinator, facilitator, or resource adviser" (Gergen, 1995, p. 32). Students involved in joint activity would create meaning based on their situated dialogues and interactions with each other.

The relativist nature of constructivist pedagogy has led to criticisms of its almost "bewildering" nature (Perkins, 1999, p. 7). Perkins observes that constructivist techniques require "high cognitive demands on learners" and adds that they "can even seem deceptive and manipulative" (1999, p. 8). Clearly there may be situations in which requiring students to create their own constructions of knowledge may not be effective for example, in the case of highly detailed objects where presenting pre-existing facts may be necessary. Perkins suggests that we be pragmatic rather than idealist regarding such pedagogies, therefore, and view constructivism as a "tool box" for problems that require a certain type of thinking rather than as a global technique (1999). Bruner (1999) also makes similar comments that pedagogy should match the purpose of the learning activity.

The focus in this study is with grounding a specific pedagogical practice, the use of groups and computers in an undergraduate setting, in neo-Vygotskian theory. As can be seen from the above discussion, both socio-cultural and constructivist ideas have direct application to the use of such pedagogies. The use of collaborative groups for learning is an approach that is not just supported, but specifically encouraged by, the constructivist emphasis on the creation of meaning from joint activity. The projects include a task provided by the academic system to meet its own assessment criteria and organisational–community requirements within the expectations of a tertiary environment. In this way the projects also reflect their cultural-historical underpinnings. Yet the projects also allow the students the freedom to construct, within a social context, their own meanings and solutions to the task using tools and mediators of their choice. Computers can be envisaged as cultural and collective tools used to construct meaning within a community of practice. In this sense the projects reflect a social constructivist philosophy. Both elements exist.

As Wertsch illustrates, many of the differences between the constructivist and socio-cultural perspective are like "the case with the three blind men with different images of the elephant, none of these ideas about human nature is simply or completely false" (1998, p. 4). Although both perspectives may believe, as with the men and the elephant, that their view is 'right', there is much overlap and as Cobb has suggested, they can be viewed as complementary. He comments further that:

> The sociocultural perspective informs theories of the conditions for the possibility of learning, whereas theories developed from the constructivist perspective focus on what students learn and the process by which they do so (1994, p. 13).

Cobb, similarly to Wertsch, envisaged a multidimensional account of human functioning, one that takes into account the influence on individual factors by wider social factors as well as the individual construction that goes on. I think that Vygotsky also had this idea clearly in mind when he was developing his theory. As Hogan and Tudge point out, "Vygotsky did not distinguish between social and cognitive development as contemporary Western psychologists do" (1999, p. 44). Although Vygotsky envisaged two planes of development; the "natural", based on biological forces and the "cultural", based on environmental factors, he stated that "both orders of changes mutually penetrate each other and form in essence a single order of social-biological formation of the child personality" (1997, pp. 19-20). Vygotsky's perspective was holistic, attempting to bridge the nature-nurture issue and illustrating the variety of influences upon an individual operating in a social environment.

Both constructivist and socio-cultural viewpoints tend to agree with a holistic approach, but choose to highlight their own key areas of interest, that is, they foreground different places of analysis to use Rogoff's terminology (2001). Cobb, Perlwitz, and Underwood-Gregg elaborate that " the construction and validation of concepts are collective as well as individual activities and they occur via a process of argumentation within a community" (1998, p. 72). Social, historical, and instrumental influences are at play in any joint activity as Vygotsky originally postulated. Brown, Collins and Duguid term educational activities that include consideration of these aspects of learning and that are modelled upon "ordinary practice of the culture" as "authentic" (1989, p. 34). In this sense, both socio-cultural and constructivist

viewpoints support the use of collaborative groups and blend into a general socio-constructivist perspective. Wells goes so far as to name Vygotsky's theory this. He said:

> Vygotskian theory, or social constructivism, as we might call its application to education, thus calls for an approach to learning and teaching that is both exploratory and collaborative. It also calls for a reconceptualisation of curriculum in terms of the negotiated selection of activities that challenge students to go beyond themselves towards goals that have personal significance for them. These activities should also be organized in ways that enable participants to draw on multiple sources of assistance in achieving their goals and in mastering the means needed in the process (Wells, 2000, p. 61).

This "softer version of constructivism", as Larochelle and Bednarz term it, allows consideration of socio-cultural influences on learning within a constructivist perspective (1998, p. 3). However, while offering a synthesis of views that Vygotsky perhaps would have agreed with and one that also seems to fit the present context, there are still theoretical differences that need to be reconciled. There is an epistemological question concerning how and where knowledge is learned. Is it best described as a process of internalization through mediators, as Vygotsky explained, or construction, participation, enculturation - or something else?

3.4   Internalization

Naturally, within the academic world there is disagreement with the reconciliation of the constructivist and socio-cultural views offered above. Simply including wider socio-cultural factors in an account of how an individual constructs his or her own reality, or theory of the world, seems like an easy solution. Some point out that it is not that simple. Lewin points out, for example, that, "there is no graceful way to accommodate both individual epistemic activity and socially acceptable scientific knowledge" (cited in Steffe & Gale, 1995, p. 428). The problem is primarily a theoretical one. Cobb, Perlwitz, & Underwood-Gregg (1998) explain that it is the differing views of the role that cultural tools play in the process of development that split the two. This difference, which Bikhard worded as, "World mirroring versus

world making" (1995, pp. 229-267) is about how one views the process of internalization, the Vygotskian notion that results from mediation with the outside world, the key theoretical focus in this thesis. The constructivists essentially view this process as being driven from within, whereas the socio-cultural view describes external factors as having primacy. This is the essence of the argument, one that harks back to the mind-body and nature-nurture debate and reflects back on Vygotsky's basic dichotomy between inter-psychological and intra-psychological functioning.

The notion of internalization has been scrutinized extensively by both his contemporaries and more recent analysts of Vygotsky's work. Gal'perin, although conceding that, "we are greatly indebted to L. S. Vygotsky for bringing the concept of internalization into general use" (1966, p. 28), was not satisfied with either of Vygotsky's or Leont'ev's accounts of the process and developed a five step plan for understanding the transformation of an external activity into an internal psychological process (1966, 1989). Step one, in Gal'perin's view, consisted of the introduction, or orientation of the individual to the activity. At this stage it is presented as a material, physical activity. The second stage, consists of the material activity itself and includes some generalization of the activity due to subtle changes in instruction etc. This stage includes some intra, or mental activity, as do all the following stages. The third stage consists of verbalizing the activity without the support of objects. Gal'perin envisaged the mediating aspects of speech as vital for both processes of generalization and abstraction of the activity. The fourth and fifth stages, which tend more than the others to blend together, consist of a qualitative difference between "external speech to oneself" in the form of conscious thought, which then progresses to "inner speech" in the fifth stage, which essentially abbreviates the more external form of speech in the fourth stage. At this final point the individual, through this abbreviation, is able to attain mastery of the activity. Gal'perin's model is a descriptive rather than a theoretical one, pondering about the internal ramifications of external, introduced activities on the basis of the internalization process (see van Geert, 1987, p. 362). It can be seen as a further elaboration of Vygotsky's basic theory based on the Marxian notion of material activity.

Comments on Gal'perin's model include van Geert's breakdown of the concept into three main parameters, or themes that determine internalization (1987). Van Geert approached Gal'perin's model using, what he termed, a "generative approach" and argued that the process can be described by analysis of

external/internal, material/verbal, and circumstantial/abbreviated dimensions of activity (1987, p.365). By studying attainment or non-attainment of these dimensions, van Geert believed that the process of internalization was generated by a unique pattern based on these dimensions. He argued that other possible processes could also be described thus allowing for other outcomes. For example, van Geert explained a number of, what he termed, "deviant developmental processes"(1987, p. 367). While admitting that the three dimensions underlie traditional philosophical differences, namely the distinction between the inside, or mental, and the outside, or material, van Geert explains that what makes Vygotsky's and Gal'perin's concept of internalization "original" is the way that they "have provided an alternative model of the topological relations among these dimensions" (1987, p. 376). In other words, Vygotsky's model indicates just one pathway through these dimensions by individuals making sense of the world.

Both socio-cultural and constructivist perspectives tend to be critical of the concept of internalization, but for different reasons that comment on different aspects of the Vygotsky's notion of mediation. Constructivists tend to view it as being a one way process of transmission, while socio-culturalists view Vygotsky's concept of internalization as producing dualities such as those described by the dimensions above (see Daniels, 2001, p.39; John-Steiner & Meehan, 2000, p. 32). As Matusov explains:

> The internalisation model of cultural development, emphasizing transformation of social functions into individual skills, leads to a chain of mutually related dualisms between oppositional abstractions such as the social and the individual, the external and the internal, and the environment and the organism (1998, p. 326).

Matusov presents an alternative view on this debate. To Matusov, the participation concept offered by Rogoff and by Lave and Wenger, as discussed earlier (see page 69), presents a completely different perspective, or "world view" on human development. His principal criticism of Vygotsky's notion of internalization is that it is "ethnocentric" and centres, or "privileges" development around this process (1998, p. 328). He believes that this view is a Western bias, one that is limited within the historical context within which it was formed. To explain his point further, Matusov presents the following diagram of internalization as he envisaged it:

Figure 3.9: Internalization model of development (Matusov, 1998, p. 329).
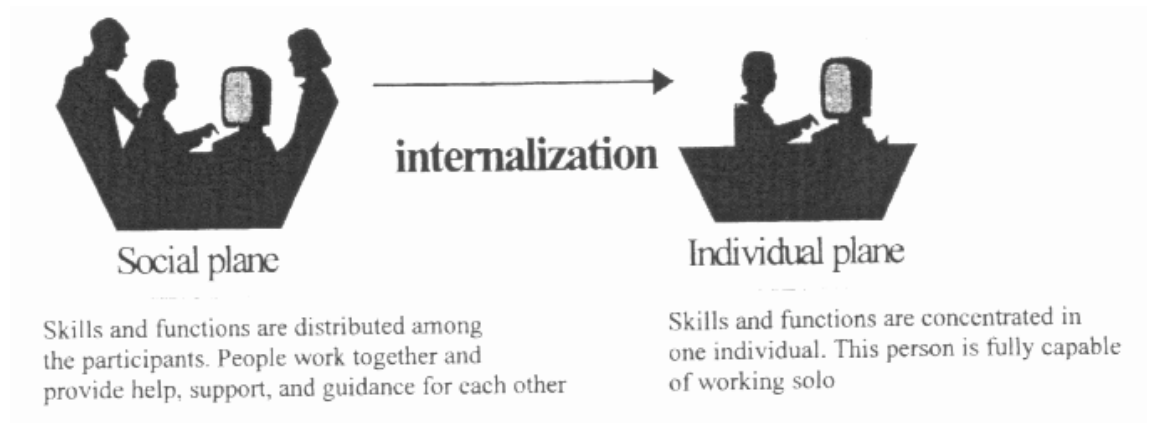
The model of development depicted illustrates a clear separation between social and psychological planes, between joint and solo activity; separations that do not actually exist in Matusov's view. He presents the following alternative:

Figure 3.10: Solo and joint aspects of a sociocultural activity: a research focus zooming in and out (Matusov, 1998, p. 337).

In this alternative model, Matusov depicts no distinct boundary between the individual and the joint activity. Instead, the individual is embedded completely in a socio-cultural context using concentric circles similar to Cole's illustration (on page 73). The notion of internalization, while useful for explaining the human use of tools and signs in the creation of knowledge, is limited within this model and displaced by the notion of participation better capturing the process in Matusov's view. This participation, or enculturation, model states that solo and joint activity are inseparable and "mutually constitute each other" and also that the notion of development and

learning is "grounded in meaning and thus is distributed, interpreted and renegotiated" (Matusov, 1998, pp. 329-30). In this model, individual or solo activity is always within some socio-cultural context. It is an "element of joint activity mediated by special means" (Matusov, 1998, p. 336). These mediational means could be comprised of many things in Matusov's view, such as money, technology, or some other entity determined by the particular cultural environment. Individual activity is then seen as simply a change in lens, or focus. The unit of analysis in this perspective is, therefore, wider, what Matusov terms the "totality of the activity, including direct and remote, past, present, and future dialogic negotiation of actual and potential meanings" (1998, p. 337).

I have described Matusov's model in detail because, to me, it represents an alternative view of Vygotsky's theoretical work on internalization, a socio-cultural perspective of mediation that is, after all, the focus in this thesis. The notion of internalization underlies much of the Vygotskian socio-historical model of human genesis in that it describes the vital process of the external forming the internal and it is this aspect that Matusov attacks. Perhaps, as Valsiner comments, Matusov's view "marks a move away from the glorification of Lev Vygotksy in North American educational and psychological discourse to a phase of discarding the previous hero figure" (1998, p. 350; see also Daniels, 2001, p.12). However, as Valsiner points out, Matusov's "crusade may backfire"(1998, p. 350). Some of the terms suggested by Matusov are not clear. The 'inseparability' of concepts such as the individual and the group is ambiguous, for example. Using the 'totality' of activity as a 'unit' of analysis is a paradox. In addition, as Chaiklin and Lave observe, "there are interpsychological functions that cannot ever be internalized by any individual" (1996, p. 60). That is, individual knowledge cannot always be seen as a subset of distributed knowledge. The critique of internalization offered by Matusov is not fatal, but calls for a fresh review of the concept.

The notion of internalization has been reconceptualized as a process of transformation, for example (see Atievisch and Van der Veer, 1995). These authors point out that mental activity can be considered in a transformative sense, as "the execution of actions independently of material presence of a problem situation" (1995, p. 122). That is, internalization is active and transformative rather than transmissive or "unidirectional" (Lawrence & Valsiner, 1993, p. 152). Saljo further explains that this transformative view:

builds on the assumption that learning has to do with how people appropriate and master *tools for thinking* and *acting* that exist in a given culture or society. Learning is located in the interplay between culture and individuals, and it implies the transformation of individuals and collectives in terms of the nature of the tasks they master (Saljo, 1999, p. 149, italics in original).

These new ideas represent possibilities, rather than threats, for a new interpretation of Vygotsky's concept of internalization, for as Wertsch et al comment, the term does make it "nearly impossible to avoid making the internal-external distinction so strongly suggested by this spatial metaphor" (1995, p. 128). The concept describes a process by which people make sense of the world via mediators and authors, such as Rogoff, have emphasized that this is not about "bringing something across a barrier … individuals are constantly involved in exchanges that blend 'internal' and 'external' – exchanges characterized by the sharing of meaning" (1990, p. 195). Although Vygotsky clearly did not envisage something mechanistic but rather something that reveals the "irreducible dynamic tension" between the inner processes and socio-cultural factors (John-Steiner & Meehan, 2000, p. 35), it is clear that internalization as a concept constrains and limits a view of human development to one of dualities between the inter and intra-psychological.

These limitations are avoided by an alternative model of participation and transformation, which represent a different view upon development, one that approaches this dynamic from a different angle (Daniels, 2001, pp. 39-44). Yet this view, by denying the existence of dualities, then has difficulty explaining the process of constructing knowledge. It goes too far the other way. The two views, therefore, have different purposes. As Valsiner puts it, "the two axiomatically different directions – those privileging participation and those privileging internalization - are aimed at partly overlapping phenomena, and are based on different goals of the researchers" (1998, p. 353). Bruner makes a similar point when he discusses different views on teaching and learning in terms of an "*internalist-externalist* dimension" (1999, p. 17, italics in original). That is, how the process is viewed determines methodological considerations. It is a practical rather than a theoretical difference. Bruner calls for an integrated view, one that he says is concerned:

with the child as an active, intentional being, with knowledge as man-made rather than simply there; with how our knowledge about the world and each other gets constructed and negotiated with others, both contemporaries and those long departed (1999, p. 19).

In appropriating aspects of Vygotsky, authors like Matusov accept some aspects but reject others and may, indeed, be more semantically correct in promoting participatory models, or other concepts such as appropriation or co-construction. This does not mean that Vygotsky's underlying model of human practice in a social world is incorrect but perhaps the idea of internalization did not translate that well. As these neo-Vygotskians point out, co-constructing meaning through intersubjectivity and participation in communities of practice, or legitimate peripheral participation to use Lave and Wenger's terminology, are another viewpoint upon what happens amongst individuals engaged in joint activity sponsored by society.

In summary, the new vocabulary created by these emerging perspectives gives researchers access to better tools for describing, analyzing and explaining collaborative activity. As Wertsch points out, "The goal is to arrive at an account ...- that would make it possible to *link*, but not *reduce* one perspective to another" (1998, p. 7, italics in original). The term intersubjectivity, for example, is used widely to describe the fruits of negotiated meaning amongst participants in joint activity. It is a useful term for explaining how processes of internalization and transformation occur in collective contexts via a process of social mediation. This is the neo-Vygotskian concept that is of primary interest in this thesis, as discussed on page eight. That this type of activity, or process, is multidimensional and dynamic will be further demonstrated in the next chapter, which is about issues and findings related specifically to pedagogies that support joint activity with computers, the specific context for study in this thesis.

Chapter Four: Perspectives of joint activity and computers

> The most important and basic of the genetic laws, to which the study of higher mental functions leads us, states that every symbolic activity of the child was at one time a social form of cooperation and retains, along the whole path of development to its very highest points, the social method of functioning. The history of higher mental functions is disclosed here as the history of converting means of social behavior into means of individual-psychological organization (Vygotsky, 1999, p. 41).

Vygotsky's theory of mediation and his concept of the ZPD, in particular, appear to support collaborative learning environments and joint activity with computers. Yet he elaborated little on these aspects of his theory and did no research on joint learning activities as such nor, obviously, on the use of computers as mediators or cultural tools. It has been left up to others to develop these aspects of his work and, as illustrated in Chapter Three, this has resulted in a number of neo-Vygotskian theoretical perspectives that support this type of pedagogical practice. The previous chapters also revealed some limitations in his theory, particularly pertaining to the operationalization of the ZPD. In terms of group work, Hogan and Tudge report that, "although there has been relatively little research on peer collaboration from a Vygotskian perspective, substantial evidence has accumulated that social interaction can be beneficial to children's learning, as Vygotsky hypothesized" (1999, p. 45).

This chapter will discuss general literature concerned with group work and the educational use of computers, not necessarily directly related to Vygotsky's work. Although the field concerning groups and computers is huge, this particular research is concerned with understanding how groups of undergraduate students co-construct an interdisciplinary project using computers from a neo-Vygotskian perspective. Therefore, this chapter will be selective, focussing on key issues that pertain to the present context rather than a broad overview of the literature. The chapter will start off by examining general issues to do with groups and learning and theories underlying these. Then it will discuss specific concerns related to the problem solving and interdisciplinary aspects of the group projects. Finally, in this chapter I will include a review of the use of computers as mediational devices within collectives of

learners. The purpose in this chapter is to gain information about factors that may influence joint activities in the present study.

4.1 A theoretical perspective of learning in groups

Group work represents a complex process and a broad literature base, which, therefore, sets a challenge for research. If one considers the range of possible variables involved in studying an individual in a given learning context, and then considers a group of such individuals, the complexity of conducting research in this area becomes apparent. However, much has been completed. As Webb and Palincsar, point out:

> It is not for lack of history, enthusiasm, good ideas, or sound research, that group processes in the classroom remain enigmatic. It is, rather, the complexities of designing, implementing and evaluating learning and problem solving in groups that render it difficult to neatly summarise and draw conclusions from this work (1996, p. 867).

Learning in groups is a complex and problematic process. As Johnson, Johnson and Holubec point out, "there is nothing magical about simply working in a group" (1994, p. 6). Obviously, some groups work well; others do not. While the attempt to capture the multi-dimensionality of group work has led to a variety of perspectives, a number of key reviews have identified two broad psychological perspectives on the process of joint activity for learning, generally described as the motivational and cognitive learning models (Abrami & Chambers, 1996; Slavin, 1996; Webb & Palincsar, 1996). Hedegaard comments that this distinction can also be envisaged as a difference between irrational, "hot" and rational, "cold" paradigms reflecting the research concerns of both genres (Hedegaard, 2002, p. 55). This dualist stance corresponds directly to two different questions that researchers typically ask of groups, namely, are the students more active and motivated? And how exactly does group work lead to better learning? These questions describe a broad dichotomy between 'why?' and 'how?' theories. Issues contained within these two approaches are described in the next two sections.

4.1.1 Cognitive learning perspectives

Within the meta-model presented above, Vygotsky's view of human development can be placed within the cognitive learning, or 'how' category, even though he did not dismiss the importance of motivational factors, as will be discussed later. From a Vygotskian perspective, the social nature of groups, particularly those led by a teacher or more capable peer, provides the necessary zone for the development of an individual's knowledge beyond that which he or she would achieve in isolation. In light of the previous discussion in the last two chapters on this point, I need here just to highlight that Vygotsky envisaged the influence of the social environment to be instrumental in the creation of internal psychological functions via a process of internalization, or transformation as it has been reconceptualized some. Thus, within a Vygotskian framework, it is the mediation afforded by the existence of the group that is of interest, for, as pointed out previously in chapter two, this mediation could result in numerous outcomes. It could influence the individuals in an educationally positive direction, as indicated by the concept of the ZPD, or the influence could be negative. However, as Hogan and Tudge comment, "relying on the concept of the zone of proximal development reduces the theory in a way that seriously detracts from its value" (1999, p. 40).

From a neo-Vygotskian perspective, it is the intersubjective meaning as well as the group activity, or interactivity that is important. The joint negotiation of meaning that leads to action determines the quality of group functioning. Vygotsky, as argued previously in chapter two, envisaged the inward process of the social into the internal as a dynamic, iterative process of 'revolution'. The relationship between the mediational means and their instantiation is one of "irreducible tension" as John-Steiner and Meehan observed (2000, p. 38). It is therefore, the "discourse" (Smagorinsky & Fly, 1993, p. 160), or "process" (Rogoff, Radziszewska, & Masiello, 1995, p. 128) that is of more importance in a study of groups rather than the outcome. Within a Vygotskian account of groups, it would be the negotiation of understanding, the intersubjectivity, as well as the joint activity, or interactivity that would be of interest. I believe that Vygotsky would have been interested primarily in how the participants transform their joint negotiation and activity within a socio-cultural context into individual knowledge and understanding.

Piaget has also been widely discussed as a theoretician who has made great contributions to an understanding of how individuals cognitively learn within the context of a group engaged in joint activity. This is indicated by the extent of the constructivist theories based largely on his ideas, discussed previously in chapter three. Piaget, however, concentrated more on the individual construction of personal meaning and the individual attributes of human development associated with this process (Williams & Burden, 1997, p. 19). He, therefore, made only passing reference to social factors. Piaget's theory centred around a view of individuals actively constructing mental functions around experiences with objects in the world including the presence of others. Piaget summarized at one stage, for example, that:

> If we examine the intellectual development of the individual, or the whole of humanity, we shall find that the human spirit goes through a certain number of stages, each different from the other, but such that during each, the mind believes itself to be apprehending an external reality that is independent of the thinking subject (1930/1999, p. 237).

Piaget was mostly concerned with the precise definition of these stages rather than with the external factors of which he, nevertheless, acknowledged the importance of. Conservation of water, for example, was one concept that marked a stage in development of concrete-formational thinking. With learning benchmarks such as these, Piaget stressed the primacy of factors such as maturation, equilibrium and experience (Tudge & Rogoff, 1989, p. 19). But he did not totally ignore social factors and there is some evidence that, particularly towards the end of his life, Piaget's ideas became more socially orientated. In 1954, for example, he presented the following diagram to explain the early differentiation made by individuals between the internal and external worlds:

Figure 4.1: Piaget's Diagram (1954/1999, p. 355).
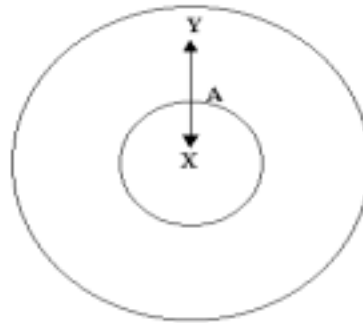
In this diagram Piaget depicted the interaction at point A using a two-way arrow between the internal, at point X, and the external, at point Y. Piaget explained that development thus depicted began as a "confusion of experience and of awareness of the self, by virtue of the chaotic undifferentiation of accommodation and assimilation" (1954/1999, p. 354). These two forces marked movement in either direction, or externalization and internalization, concepts similar to those proposed by Vygotsky. Thus the external social and physical environment played a primary role in cognitive growth in Piaget's view. At one stage, for example, Piaget commented that, "Social life is a necessary condition for the development of logic. We thus believe that social life transforms the individual's very nature" (1928/1977, p. 239; see also Rogoff, 1990, p. 33). It is this aspect of Piaget's theorizing that is pertinent to joint learning activity.

One oft-mentioned difference between Vygotskian and Piagetian perspectives is that Vygotsky viewed learning as resulting from socialization whereas Piaget viewed it the opposite way around (Tudge & Winterhoff, 1993, p. 67). That is, Piaget viewed learning as beginning within the child who then becomes more and more social. Piaget viewed the forces of egocentricism and maturation in children as determining when they were able to interact with others and able, as Tudge and Winterhoff point out, "to take another's perspective into account", that is, to attain intersubjectivity (1993, p. 68). Piaget's view does not deny the importance of outside factors in development but downplays them relative to Vygotsky's theory. As Daniels puts it, it is more "the extent to which the social dimension of development is refined" (2001, p. 37). Imitation in infants, for example, was directly explained by social influence, something that Piaget's theory discussed as an opposing force to assimilation, an internal intellectual operation. According to Piaget,

It would be sufficient to remember that assimilation and imitation are not only reactions to the physical environment, but also to the social environment ….
by collaborating progressively throughout the mental development of the child, imitation becomes adaption to others and assimilation turns into understanding and a sense of reciprocacy. (1930/1999, p. 290)

Thus, the social environment, in Piaget's view, was a crucial aspect of child development, particularly to the ability to understand things from another individual's perspective. The role of socialization was, therefore, not ignored by Piaget, but woven into his scheme for human development. He argued, for example, that social-arbitrary knowledge, a term which included such things as language, values, rules, morality, and symbol systems, can only be learned through interacting with others (Piaget, 1926, see also Slavin, 1996, p. 47). This has been supported by much research in the Piagetian tradition. With conservation of water as discussed above for example, there is much evidence indicating the benefits of peer interaction (Slavin, 1987, p. 1162).

Unlike Vygotsky, however, Piaget indicated that the key factor for learning in groups centred around the concept of "sociocognitive conflict" (Webb & Palincsar, 1996, p. 844). That is, that the disagreements amongst group members, and the cognitive reconstruction that follows this, results directly in learning. Within a Piagetian model, it is this process of negotiation, disequilibrium, and intersubjectivity that allows individuals to construct a new perspective on their own activity, and this is a key method by which they 'learn'. However, as Webb and Palincsar point out, this is not the only method, for there are plenty of examples of joint activity in which agreement occurs without argumentation (1996, p. 845).

Vygotsky's and Piaget's theories have been compared at length, and Vygotsky himself built many of his ideas on critiques and comparisons with Piaget's models (see 1987, chapter two). When Vygotsky interpreted Piaget's notion of the development of egocentric speech, for example, he said that:

Conceptualized in this way, development is not self movement but a logic of arbitrary circumstance. And where there is no self movement, there is no place for development in the true sense of the word. Here one phenomenon replaces the other, but it does not emerge from the other (1987, p. 87).

While criticizing the lack of an underlying mechanism to explain transition between distinct stages in development, Vygotsky supported Piaget's general description of cognitive growth in general (see Bruner, 1987, p. 10). It is apparent that there are commonalities and yet also fundamental differences between the two viewpoints. Tudge and Winterhoff comment however that research into this has "concentrated on relatively narrow aspects of each theory, in the process magnifying differences between them" (1993, p. 61, see also Daniels, 2001, p.37). A fundamental issue that both Vygotsky and Piaget agreed upon for example, was the importance of the communication, or negotiation between group members on learning. That is, both theories of cognitive development support the importance of social mediation in learning and specifically the negotiation of meaning, or "elaboration" as Webb terms it (1986). This finding reinforces the concept of collective mediation that is the focus in this thesis.

This particular aspect of joint activity, elaboration, has been researched in depth by Webb and her colleagues further (1986, 1996). Webb and Palincsar argue that it is, indeed, this process of elaboration that occurs between individuals that can be envisaged as the key to explaining cognitive development in groups. These authors distinguish between elaborated and non-elaborated help given between members of a group and explain that "from a theoretical perspective, both the help giver and the help receiver stand to benefit from elaborated help" (1996, p. 853). Webb argues that this happens through a process of "cognitive restructuring" that follows the social elaboration dynamic. Building upon both Piagetian and Vygotksian models, Webb then can be seen to be reconciling Piaget's ideas of cognitive conflict and Vygotsky's notions of social and semiotic mediation. From her perspective, Webb envisages cognitive learning as resulting directly from the helpful guidance given in a group environment, together with the subsequent corrections of misunderstandings and misconceptions. Unlike Vygotsky's ZPD, however, Webb et al spell out some negatives of interaction, stating that alternative possibilities, such as non-elaborated help, may have "fewer benefits for the help giver and help receiver" (1996, p. 854). This statement, I think, makes clear Webb's view that non-helpful negotiation within a group could have a damaging influence on the learning process.

From a pedagogical perspective, theories of elaboration support collective forms of learning, including peer tutoring, group work and the notion of cognitive apprenticeship (see, for example, Brown, Collins & Duguid, 1989; Lave & Wenger,

1991). Lucarello adds that viewing culture and cognition within learning collectives as "inseparable" leads to a view of the individual as "one with a view", that is one who interprets wider social activity into an internal meaningful form (1995, p. 16). This process of understanding through negotiation with others reflects the cognitive learning process, a process that Rochelle similarly refers to as "convergent conceptual change" (1992, p. 235), a key result from social mediation, or elaboration.

However, this conceptualization of the collective aspects of cognitive learning within joint activity also points the way to explaining some of the negatives accounted for within group learning contexts. If the negotiation, social mediation, or elaboration present within joint activity is not helpful or challenging and does not extend individuals beyond their own capacity to learn, then group work may not be an effective technique for learning. In fact, it may be completely irrelevant. This is a common complaint raised by researchers interested in special groups, such as gifted children.

Research on gifted learners raises much doubt as to the effectiveness of group techniques with these types of learners. The argument is that gifted children are at a distinct disadvantage within group situations where the gifted are placed together with low ability students. Allan (1991), for example, uses this point to criticize much of the research on the effects of group learning, particularly meta-analyses. He says that these are often biased against gifted students because of a "ceiling effect" and points out that "the most destructive aspect of the controversy over ability grouping is the misrepresentations of the findings" (1991, p. 62). There is much controversy about how best to group high achievers with others, in terms of not just learning outcomes, but motivation and self esteem.

Similar arguments have been offered for low achieving students. Hooper, Ward, Hannafin, and Clark, for example, conducted a study demonstrating that "heterogeneous group composition may offer little, in terms of achievement, for low aptitude post secondary students" (1989, p. 102). A study by Simsek and Tsai (1992) comparing homogeneous and heterogeneous low and high ability groups, on the other hand, indicated that, of the four groups, homogeneous low ability groups performed least well, and that low ability students in heterogeneous groups improved particularly in their attitudes towards the task. As a consequence, these authors argue that, "heterogeneous grouping is more effective and efficient than homogeneous grouping" (1992, p. 90). Unlike the findings of Hooper et al, this study suggests minimal impact

upon high ability students. There are two disparate views, therefore, concerning joint learning; one, the view that heterogeneous grouping, while perhaps being more effective for learners in general, lowers the self esteem of students in low ability groupings; and two, the view that this grouping results in the presence of role models.

Cazden points out that careful orchestration is sometimes required to make groups, especially heterogeneous groups, work and that these "have to be dynamic, open sites with opportunities to gain new competencies, and new identities as legitimate rather than marginal students and group members "(2001, p. 146). Groups, therefore, don't always work and we need to be "critical consumers" of research on collective methods of learning as Allan has also pointed out (1991, p. 64).

Many interpersonal and cultural factors may inhibit learning and activity within a group. A variety of labels have been awarded to these including free loading effects, conformity effects, committee effects, and social loafing. Influences related to conformity, norms, and other dynamics on decision making in groups have been studied for years and are now fairly well understood (see, for example, McGrath, 1984). Conformist, cohesive groups, under the influences of these group pressures, generally consider few alternatives; they stick to the "favorite" solution which is then probably not examined closely enough for errors (Pheysey, 1993, p. 127). While these groups with high cohesion generally have higher participation rates and a "less anxious" atmosphere, in a more disparate group "the competition among individuals can promote excellence", even though there may be more emotional differences (Pheysey, 1993, p. 128). Ironically, groups with smooth, harmonious discourse and interpersonal dynamics may not actually produce the best results. This view reflects issues related to the choice of unit of analysis; studying process will reveal different results than studying outcomes. I will return to this point later in this chapter.

Negative influences such as social loafing and free loading, describe non-participation in situations of joint activity; that is, individuals who choose not to take advantage of learning afforded by joint activity. These phenomena are difficult to account for within cognitive-learning theories and are best accounted for by motivational accounts as will be reviewed next.

4.1.2 Motivational perspectives

Although Vygotsky's theory was primarily concerned with cognitive development within a social world, he did not dismiss motivational factors. In fact quite the opposite, according to the following statement that he once made:

> Thought … is not born of other thoughts. Thought has its origins in the motivating sphere of consciousness, a sphere that includes our inclinations and needs, our interests and impulses, and our affect and emotion. The affective and volitional tendency stands behind thought. Only here do we find the answer to the final "why" in the analysis of thinking (1987, p. 282).

From reading the above, one can sense the importance that Vygotsky placed on motives and goals and other affective factors. They were primary in his view and as he said provided the 'why' for activity in the first place. However, as reviewed in chapter two, Vygotsky's construction of a cognitive theory of human development based on Marxist principles did not include consideration of motivational factors.

From a motivational perspective, the potential socialization enabled by group work provides a potentially rich field of motives for inducing individuals to participate. These include both intrinsic and extrinsic motives including those directed towards achievement, as addressed by "achievement goal theory" (Dweck & Legget, 1988), and those encapsulated by social goals, as postulated by Urdan and Maehr (1995). Indeed, various frameworks and categorizations of group work pedagogy can be based upon an analysis of the various types of individual motives possible for completing tasks within a group environment, or "task goals" (Urdan & Maehr, 1995, p. 213). Deutsch, for example, listed the basic forms of learning by goal structure into cooperative, competitive, and individualistic (1949). Similarly, Fiedler differentiates between interactive, coacting, and counteracting groups (1967).

Groups can, I believe, be defined into four overlapping types based on how the rewards for completing joint tasks are structured, that is, competitive, cooperative, collaborative, and individualistic (or coactive) groups. Most notably, these terms differentiate between two types of interactive group, cooperative and collaborative. There is much discussion over the relative benefits of each of these types, with one perspective, the traditional 'Western' focus on the individual arguing against a more

socialized, cultural view of learning (McConnell, 1994). I will now review these categories in order to find out more about theoretical links with social mediation, the key neo-Vygotskian point of interest in this thesis.

Competitive groups are defined as those in which the individuals in each group are competing against each other within the group for limited outcomes such as prizes or grades. In competitive learning situations students, or groups, work against each other to achieve a ranked goal (Johnson & Johnson, 1984). In these situations there is a distinct negative relationship between each student's (or group's) grade; they counteract each other as there are only so many A's, B's and so on to be received. An everyday example would be competitive sports with teams (or individuals) competing against each other for first or second place.

There is clearly a difference between individualistic and group competition in terms of the participating unit. However, in some situations this distinction can become fuzzy. Johnson, Johnson and Holubec (1994) discuss pseudo-learning groups for example, in which students work in groups but compete against each other on an individual basis. As they say:

> Students are assigned to work together but have no interest in doing so. They believe they will be evaluated by being ranked on individual performance. While on the surface students talk to each other, under the surface they are competing. They see each other as rivals who must be defeated, so they block or interfere with each other's learning, hide information from each other, attempt to mislead and confuse each other, and distrust each other (1994, p. 6).

The importance of understanding the underlying motives and goals of individuals in groups is demonstrated by this example. Competitive methods of learning are widespread in education, particularly in more traditional settings that tend to defend these types of learning/teaching strategy (Gardner, 1991; Kohn, 1996). There has been much debate concerning the use of competition in education. In the United States in the 1950s, for example, there was a ban against non-competitive learning techniques with cries of socialism and burning of books that advocated these types of pedagogy by the "Daughters of the American Revolution" (Webb & Palincsar, 1996, p. 844). The issue is clearly not politically neutral which may help explain the early reluctance in the West, already noted, to adopt more collective

theories of human development, such as Vygotsky's, and to move towards accepting more cultural, less individualistic models of learning (Wertsch, 1999). To me, these types of controversial action support, rather than detract from, cultural perspectives upon learning.

The emphasis in competitive learning pedagogies is on rewarding individuals directly for attainment. But some question the use of obvious, external rewards and point to research indicating the greater importance of intrinsic motives and other internal factors such as self-worth (Abrami, Chambers, D'Appolonia, Farrell, & De Simone, 1992 ; Ames, 1981; Cameron & Pierce, 1994). Self determination theory, for example, provides a bridge between Vygotskian and motivational perspectives by describing "social-contextual factors that nurture intrinsic motivation and promote internalization, leading to the desired educational outcome" (Deci, Vallerand, 1991, p. 325). In this view, the importance of promoting independence and an interest in learning is greater than that of using external rewards to drive students' learning activity. This view led Cameron and Pierce (1994) once to worry whether external rewards as such actually damage intrinsic motivation, a concern, however, not supported by their subsequent meta-analysis. Promotion of internal, rather than external motives has led to a different view of group activity; one in which the reward structure may not be easily apparent.

A second category of group work, described as co-active, individualistic, or co-learning groups, provides a good example of joint learning for which there seems to be little incentive. In these scenarios the students work together in groups but their learning outcomes are unrelated to each other. The students just happen to be assigned to groups perhaps because of limited resources or some other factor. An example would be students collecting data together, or sharing equipment in a laboratory. Achievement in these learning environments tends to be criterion, rather than norm, based. Johnson, Johnson and Holubec comment that in this situation, "They interact primarily to clarify how assignments are to be done. They seek each other's information, but have no motivation to teach what they know to their group mates. Helping and sharing are minimized" (1994, p. 6). From a motivational perspective concerned with external rewards, therefore, these types of groups represent an anomaly.

Zajonc however, was not so negative in his view of co-acting in his formulation of social facilitation theory. He believed that co-acting, or the "presence

of others increases the individual's general arousal or drive level" (1965, p. 273). His view was that individuals like to learn together regardless of the structure; they like the interaction anyway. That is, the presence of others provides sufficient internal reward in itself. This view of group work highlights the value of joint activity, not just from an analysis of identifiable outcomes or rewards, but also which results from the interaction process itself. Any form of interactive activity, from this perspective, may be intrinsically motivating.

The terms cooperative and collaborative learning, which make up two other group work types, have been used almost interchangeably in the literature to explain situations in which students are structured into groups to achieve a shared goal, yet there are distinct and important differences between the two. Both types of groups are interactive rather than counteractive in that the student's achievements are positively linked to the groups. However, the primary difference according to Lewis (1997) is in the intention of the activity. He defines the terms in the following way:

> Cooperation depends upon a supportive community of actors who agree to help each other in activities aimed at attaining the goals of each person involved. Collaboration, on the other hand, depends upon the establishment of a common meaning and language in the task which leads to the community setting a common goal (Lewis, 1997, p. 212).

Cooperative learning techniques tend to focus on individual goals and achievement, whereas collaborative learning scenarios are primarily concerned with the group outcome. Slavin (1987) suggests that the two terms refer to different research traditions with cooperative learning situations being more concerned with motivational factors and theories, and collaborative being concerned with cognitive processes. This observation is supported by McConnell (1994), although he uses different terminology. He identifies different approaches by source: one the "American" view with its emphasis on group and individual rewards structures, individual accountability and a high degree of structure versus a more relaxed "European" view towards self assessed progression towards a group goal (McConnell, 1994, p. 25). Brody and Davidson make a similar observation (1998) and provide the following table, which summarizes the different types of research questions asked by each approach:

Table 4.1: Questions for Teaching and Learning in the Classroom

(from Brody & Davidson, 1998, p. 8, italics in original).

I. *Questions Teachers Ask From the Cooperative Learning Perspective:*
1. How do we teach social skills?
2. How can we develop self-esteem, responsibility, and respect for others?
3. How does social status affect learning in groups?
4. How do you promote problem solving and manage conflict?
5. Are extrinsic or intrinsic rewards most effective?
6. How can we prove that cooperative learning increases academic achievement?
7. How do we teach children to take on various roles?
8. How do you structure cooperative activities?
II. *Questions Teachers Ask From the Collaborative Learning Perspective:*
1. What is the purpose of the activity?
2. What is the importance of talk in learning?
3. To what extent is getting off the topic a valuable learning experience?
4. How can we empower children to become autonomous learners?
5. What is the difference between using language to learn and learning to use language?
6. How can we negotiate relevant learning experiences with children?
7. How do we interact with students in such a way that we ask only real questions rather than those for which we already know the answer?
8. How can we use our awareness of the social nature of learning to create effective small group learning environments?

One defining issue concerns the amount of control a teacher or supervisor has over the joint activity. On the one hand, collaborative learning situations are not determined so much by external control and structuring as with self-determined activity towards a shared task or problem that is generally too complex to be completed by an individual. Cooperative learning tasks, on the other hand, tend to be highly structured by the teacher and geared towards younger students, situations in which group work skills may also need to be specifically addressed in the introduction of teamwork (Johnson and Johnson, 1984).

The cooperative learning genre is based around constructing learning groups that are deliberately structured to incorporate, as Slavin puts it, both "goal interdependence" and "individual accountability" (1996, p. 49). For ensuring group success in terms of achievement, the cooperative learning approach concentrates on providing rewards for both positive group outcomes and appropriate individual

activity towards this outcome. In practice this has led to a number of widely used classroom techniques that have been heavily researched such as the "Jig Saw" technique and the "learning together" technique (e.g. Brown & Palincsar, 1989; Johnson & Johnson, 1984; Kagan, 1992). All involve a high degree of organization and teacher intervention to encourage goal interdependence. As a result, the cooperative learning approach reflects essentially a motivational perspective. As Slavin, a key supporter of cooperative learning, remarked, "cooperative learning has its greatest effects on student learning when groups are recognized or rewarded based on individual learning" (1996, p. 49). Johnson, Johnson and Holubec similarly list individual and group accountability as essential elements of cooperative learning. They say:

> No one can hitchhike on the efforts of others. The group has to be clear about its goals and be able to measure (a) its progress towards achieving them and (b) the individual efforts of each member (1994, p. 9).

In contrast, collaborative groups are less interested in 'driving' students towards appropriate goal-directed activity. The word 'collaborative' can, therefore, be envisaged as being a broader, less constraining term, one which describes groups set up to attain a common objective with no specified structuring of goals apart from the final outcome. Collaborative groups are more independent and self sufficient in this particular genre even though in practice the activities may appear similar to cooperative learning activities. Collaborative learning situations tend, therefore, to be less teacher centred, in that the group decides within itself how to address a complex problem. The group has to do a lot more work on its own, there is less imposed structure, and the leader is usually a member of the group. The group may not even have one leader as such but nevertheless needs to make key decisions about how it will perform the task. Crook suggests that collaboration is "a state of social engagement that is defined in terms of a striving after shared understanding" (1994, p. 155). And Schrage once made the following observation about collaborative joint activity:

> Collaboration is like romance ... It can't be routine and predicable. People collaborate precisely because they don't know how to - or can't - deal

effectively with the challenges that face them as individuals… The issue isn't communication or teamwork - it's the creation of value. Collaboration describes a process of value creation that our traditional structures of communication and team work can't achieve (1990, p. 36-39).

Collaborative group pedagogy is, therefore, more concerned with cognitive aspects than motivational, as Slavin suggested (1987). This does not mean that motives are not apparent or important in collaborative learning situations, however. The main purpose of collaborative learning is to address a shared problem or task, and individual goals are incidental except where they influence the process. Lewis observes that:

> In undertaking a collaborative activity, a group may decide upon a strategy which results in a division of labour. At this point, members may have personal goals for a phase of activity but then come together again once this cooperative phase is complete (1997, p. 212).

Collaborative groups can be spontaneous, in Schrage's sense, or highly organized. They represent a more flexible genre than the cooperative learning approach. Individual rewards are incorporated into the group goal, and individual learning may necessarily differ among members. The emphasis, unlike cooperative learning situations, is not on homogeneous individual learning so much as constructing a strategy towards the attainment of a group goal, with the initial convergence then perhaps leading to each individual completing different aspects of the task.

There is obvious tension between the terms cooperative and collaborative, which reflects wider epistemological concerns. Crook asks, for example, "are we basically cooperative or collaborative creatures?" (1994, p. 226). In an attempt at reconciliation, Slavin suggests that they represent different, yet complementary views of learning (1987). Crook agrees that both cognitive and motivational aspects of group work are important, but adds the opinion that motivational issues are not easily explored within cooperative research strategies (1994, p. 133). Axelrod incorporated this point into a theory of cooperation based on "mutual reciprocacy"; that is, that there is always an element of self-interest in any cooperative effort (cited in

McConnell. 1994, p. 13). Individual goals exist in collaborative activities but the realization of these is largely incidental to those of the groups.

Vygotsky opposed dichotomies such as the two perspectives upon joint activity discussed and preferred a 'holistic' approach centred upon the dynamic processes of social-historical mediation (1997b, p. 67), that is, the principal area of interest in this thesis. Slavin similarly attempted to reconcile the two views by looking at a broader view of joint activity. Indeed a strict analysis of motives is confusing. The four types of groups, as mentioned, overlap, with each describing differing elements in terms of outcome incentives. Cooperative and collaborative learning situations can overlap with competitive learning to a degree. McConnell, for example, points out that some of the strategies designed for implementing cooperative learning actually are competitive (1994, p. 14). He points out that in the "Team Assisted Individualization" (TAI) method teams compete against each other for team awards, that in the "Jigsaw" method students take individual quizzes and that in the "Learning Together" method groups receive rewards based on the group product. That is, an element of competition remains as incentives in many so called cooperative learning situations. Also, given the above definition of collaborative learning it seems clear that this process may also allow competition between groups in achieving the group goal. A real life example would be companies competing against each other to win a contract. Other motives possible for explaining joint activity are those created directly by the activity itself. These can be termed means, or social goals (Urdan & Maehr, 1995). These describe the rewards that come from the activity itself, such as listening to music or watching a movie. It is the activity rather than any outcome that forms the incentive. As Turner explained further:

> Being a member of a group can enable a person to arrive at a much better solution to a problem than he would have achieved alone, and also to learn more effectively. The superiority of group problem solving might be thought to be merely the result of a group representing the pooled expertise of the individual members. However, it is likely that there are other dynamic factors at work particularly in terms of affect (1977, p. 138).

Clark and Wilkes-Gibbs call this pooling process the principle of least collaborative effort, which hints at the lower individual stress as well as the increased

motivation that apparently occurs with interactive group learning (1986, p. 26). Social facilitation theory, as already mentioned, adds the view that groups lead to greater "arousal" in the subjects (Zajonc, 1965). Another way of explaining this has been the concept of cohesion. Highly cohesive groups[1] reflect low interpersonal conflict and are more harmonious yet are perhaps not as productive as fragmented groups (Pheysey, 1993, pp. 122-132).

Motivational theorists, in general, tend to try to isolate the various goals that exist in any one situation and comment on contexts that, from their point of view, make sense. This approach tends to be skeptical of alternative perspectives upon group learning, in particular, cognitive perspectives (See Slavin, 1996). While constraining a neo-Vygotskian perspective in this manner, however, motivational perspectives are able to explain quite easily some of the more negative outcomes and experiences that occur via an analysis of goals. Some negative effects of group work directly result from the interdependence created within a group task, when individuals do not participate fully.

Salomon and Globerson discuss a number of these termed, "the free rider, the sucker, the status differential, and the ganging up effects" (1989, p. 89). They point out that these are quite natural, but can build up to the extent of being "debilitating" and also vary according to the size of the group, the age level, gender, and the role of the teacher. The "social loafing" or "free rider" effect, for example, is a phenomenon that is explained by a motivational perspective as a clear lack of individual accountability towards the group objective by an individual, or subgroup (Salomon and Globerson, 1989, p. 89).

Jackson and Williams point out, however, that while people generally exert less effort, or "loaf" in a group when it is working on a relatively simple task, they can be quite productive on a more difficult task (1985, p. 937). There are, therefore, differences in opinion on the impact of social loafing. Latane, Williams and Harkins, for example, offer the extreme view that "social loafing can be regarded as a kind of social disease" (1979, p. 831). But because social loafing means less stress and possibly greater performance, it is not, therefore, always a bad thing (Jackson and Williams, 1985, p. 941). The "sucker" effect is explained similarly from the

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[1] Golembiewski (1969) termed groups with high and low cohesiveness HICO and LOCO respectively.

motivational perspective, but in this case one person, or subgroup is coerced into completing the bulk of the work while the others contribute minimally.

Conformity effects can also clearly influence individuals working within groups and perhaps are central influences on the "ganging up" and "sucker" effects listed above. In general however, conformity effects are harder to explain in terms of individual motives and goals, but clearly relate to peer pressure and power issues within a social system (Turner, 1977). The extent to which such influences guide joint activity is a matter of degree, with some groups experiencing little effect and others being driven by these social forces.

To overcome these effects, motivationalists suggest that greater task related interdependencies among group members should be encouraged and offer the cooperative learning methods as the 'ideal' model for group learning (Johnson & Johnson, 1984; Slavin, 1996). One important aspect of joint activity clearly is motivational, and the cooperative learning model is based on these concerns. However, this approach is also, as mentioned, constrained to a limited view of group activity in terms of these factors and, for the same reason, has a relatively narrow view on the effectiveness of group work.

4.1.3 The effectiveness of group work

There is a huge amount of research that has employed a variety of methods to explore the effectiveness of interactive group learning. Slavin suggests that this genre "is one of the greatest success stories in the history of educational research" (1996, p. 43). A large body of knowledge spanning age levels and time illustrates the effectiveness of learning cooperatively in groups under different circumstances which have led proponents such as Abrami et al to state that it is "generally superior" (1992, p. 201) Johnson, Johnson and Holubec proclaim further:

> Cooperative learning helps you accomplish a number of important goals simultaneously. First it helps you raise the achievement of all students, including those who are gifted or academically handicapped. Second, it helps you build positive relationships among students, which is the heart of creating a learning community that values diversity. Third, it gives students the experiences they need for healthy social, psychological, and cognitive

development. Cooperative learning's ability to work on these three fronts at the same time places it above all other instructional methods (1994, p. v).

A key issue for this study for methodological reasons is in finding out just how effectiveness is defined in the literature. Most studies seem concerned with the outputs, either of the group or of the individuals. It can be argued that the effectiveness of cooperative learning, in any case, should be measured by individual outcomes, as by definition, this is a major goal of the enterprise. Similarly, the success of competitive groups and, therefore, effectiveness, can be directly related to whether the team or group 'won' and there are countless everyday examples of successful competitive groups. There is a field of knowledge related to 'team building' that discusses methods to ensure team success (see, for example, Clutterbuck, 1996). It appears that much of the research on group learning simply extrapolates the research on cooperative learning to collaborative learning without looking at the process (Crook, 1994, p. 146; Smagorinsky & Fly, 1993, p. 160). As a result of these research limitations, it appears that "little has been done to understand the mechanisms of group work", that is, the processes (Roth & Roychoudhury, 1993, p. 514). So, while cooperative learning enthusiasts, such as Slavin, acknowledge that "well implemented, project-based learning can be more effective than traditional instruction" (1996, p. 63) and recommends further research in areas that are effective apparently without reward, most studies that look at effectiveness have focused primarily on outcomes rather than processes.

In general, debates over issues such as the value of goals, or incentives and outcomes, I think, highlight what Leo and Galloway refer to as the "elusive" nature of motivation, and of the limited "usefulness" of the concept (1996, p. 350). They call for a move away from focusing on outcomes towards consideration of process and contextual factors. The important emphasis in collaborative learning, for example, is in the collaboration, or as what Crook refers to as, "socially shared cognitions" (1994, p. 147). Questions regarding effectiveness of collaborative groups therefore should differ by a concern with the activities and interactions that take place within the group as well as the outcomes. This concern points back towards supporting many of the neo-Vygotksian concerns voiced previously. Specifically it suggests that an alternative, broader perspective on the effectiveness of group pedagogies should be considered. Webb and Palincsar's Input-Process-Outcome (IPO) model is presented

below as an example of such a theoretical framework that attempts to understand the numerous factors influencing groups participating in joint activity including many neo-Vygotksian concerns:

Figure 4.2: The Input-Process-Outcome model of group processes (Webb & Palincsar, 1996, p. 851).

INPUT CHARACTERISTICS
Reward Structures
Group
Individual
Group Composition
Ability
Ethnic background, race, socio economic status
Sex
Group Size
Preparation for Group Work
Prosocial norms
Helping behavior and explanation
Structuring Group Interaction
Role specialization
Reciprocal questioning
Explanation prompts
Controversy
Discussion of Group Functioning
Structuring Teacher's Role
Scaffolding
Co-constructing

GROUP PROCESSES		INTERNAL MEDIATING PROCESSES
Conflict and controversy		Sociocognitive conflict
Co-construction of ideas	◄----	Internalization of social processes
Giving and receiving help		Goal structures and motivation
Socioemotional processes		

OUTCOMES
Achievement and conceptual development
Socioemotional variables

The broader perspective depicted by the IPO model takes into account socio-cultural and individual processes as well as the cognitive learning perspectives discussed in the previous section. Neo-Vygtoskian concepts such as co-construction are included as are other expected influencing factors such as group size and norms, which stem from varying other perspectives of group work. Webb and Palincsar

clearly wished to include information from a wide span of literature and research and, as such, presented a comprehensive model.

There are other models and perspectives upon group work that are relevant to the present context as well as others that are not. Consider, for example, the 'communicative' approach, which emphasizes interpersonal factors that influence groups, such as the forces of conformity, the importance of group norms, and also team building approaches in general (see, for example, Cragan & Wright, 1999; McGrath, 1984). Tuckman's (1965) model describing the stages of forming, storming, norming, and performing is a well known 'classic' approach within this general genre, for example, which helps explain the 'stages' through which a group typically travels in working together towards a group goal. However, while this theory may raise interesting views on the process, it does not add much to this study of group projects from a neo-Vygotskian perspective, which is more concerned with the social construction of meaning during such stages, rather than an analysis of the stages themselves. It is within an analysis of the negotiation itself that the presence or non-presence of such entities will evolve. A similar comment can be made about group dynamics; that is, these forces are encapsulated within a neo-Vygotskian account of joint negotiation of meaning.

The context of the present study is one in which undergraduate students work together over the space of four months towards the completion of an interdisciplinary project using various resources, including computer technology. This scenario seems perfectly suited to that of a collaborative approach, based on the above discussion; that is, with the presence of a group goal and an ill-structured task and much freedom on how to work towards it independently. However, there are points of difference, with some measures designed to address individual accountability being included. In this sense the group projects could also be said to contain cooperative aspects, although, in essence, they are collaborative as the projects are based around a complex problem with virtually no teacher intervention and with a reward structure based predominantly on group performance rather than individual attainment.

Other aspects that differentiate the projects of concern from others and that, therefore, warrant further discussion, are concerned with the presentation of an ill-structured task, or problem to the group in the form of a project, the interdisciplinary aspect woven into this, and issues regarding the required use of computer technology. I believe that these aspects help create what Draper terms a pedagogical niche (1998).

The remainder of this chapter will therefore discuss each of these key aspects in detail in order to help understand joint project activity with computers from a neo-Vygotskian perspective, which is the purpose of this thesis.

4.2   Perspectives on the problem based aspect of group projects

Learning which incorporates realistic, ill-defined problems has been termed problem-based learning (PBL) by Stepien, Gallagher, and Workman (1993). These authors believe that "problem based learning is apprenticeship for real-life problem solving" and contrast it with traditional programs which, they comment, "present students with sterile heuristics; very frequently that heuristic takes the front seat and is considered more important than the problem the heuristic is meant to help solve" (1993, p. 342). Although this comment was primarily aimed at individualized college courses, it is relevant also to collaborative learning situations due to their unstructured nature as discussed in the previous section. In these situations, after all, the prime purpose of the joint activity is that directed towards a group goal, typically contained within a problem.

The central concern of a problem-based approach is, by definition, the centering of learning around problem solving rather than a more traditional didactic model. A key issue is, naturally, defining and clarifying the optimal type of problem for the situation. Clayden points out that the more authentic the task or problem, the more suitable it is for generalizing any knowledge, or skills gained in the exercise (1994). Qin, Johnson and Johnson (1995) distinguish between ill-defined and well-defined problems in their discussion of the effect of task type on cooperative group work. As they say:

> well defined problems have a clearly specified goal and representation. Ill defined problems are those for which there is uncertainty concerning the operational procedures and the goals of the problem. Virtually all real-life problems are ill defined (1995, p. 130).

Problem based learning can involve minor short term problems as well as larger project size problems (see Boud & Feletti, 1997). Group work typically involves more complex problems and this is where the concept of a project is

relevant. Projects in a group situation demand more collaborative activity than do highly specific tasks. Chernick (1990), for example, reported findings that higher level cognitive tasks led to greater group performance than did lower level tasks. This effect has been explained by Jackson and Williams (1985) in terms of effort. They point out that "people exert less effort in a variety of relatively simple tasks when they work collectively" and hypothesize, therefore, that, "on difficult tasks, working collectively would result in improved performance" (1985, p. 937). Slavin agrees that one effective type of group work is one that involves "group projects without a single right answer, and solving complex problems such as non-routine problems in mathematics or finding the main idea of paragraphs" (1996, p. 52). General perspectives on the benefits of presenting ill-structured, authentic problems to learners overlap with those supporting project-based learning. Dirckinck-Holmfeld comment that,

> Project pedagogy is based on the principles of experiential learning. Learning is viewed as a social construction process in which students through reflection on action, collaboration, and experiential work transform experiences and gain new knowledge" (1995, p. 183).

Projects, from this perspective, when incorporated into collaborative learning situations potentially provide a powerful pedagogical technique. Such techniques reflect neo-Vygotskian, social-constructivist beliefs concerning the benefits of activity-based learning. This approach also has links back to Dewey's work (1956) as well as situated, authentic learning models (Brown, Collins and Duguid, 1989; Clayden, 1994; Dewey, 1956; Kourilsky & Carlson, 1996). Peters, for example, believes that project based learning marks a change to earlier, more authentic learning techniques. As he says:

> Arguably, project work was the norm before the industrial revolution. Most activities took place in small, independent shops, and craft and craftsmen were the economy's centerpiece. The industrial revolution changed all that. Skills and tasks were narrowed. And narrowed again. Thousands of people went to work under the same roof. Now, thanks to new competitive pressures, new

distributive information technologies and the like, we are, arguably, returning to the craft tradition. The essence of craft is the project (1992, p. 222).

This cultural-historical perspective upon learning highlights the importance of choosing not only an authentic ill-defined problem for collaborative learning situations, but also one that is sufficiently demanding to challenge the additional social and intellectual resources of a group. The choice of an appropriate problem is critical.

A good example of this type of approach has been provided by the Edutech Institute based in Atlanta, Georgia (see Guzdial, 1998). The Edutech model uses an approach to learning that combines group projects and authentic learning in a similar fashion to the present context. These authentic projects have been successfully implemented at middle school, high school, and at college levels, and are structured around the concept of a project life cycle model. That is, they are planned around a series of distinct phases. Guzdial points out that this type of structure is needed for purely practical reasons as:

A teacher has an enormous challenge in managing 30 students engaged in authentic project based learning. The classroom management techniques designed to help structure classrooms working with project-based learning are not easy for teachers to learn and use. And, even when the orchestration works well, students still may not learn from a project (1998, p. 48).

The Edutech approach prescribes a structure in which students work collaboratively through an initial review, decomposition and composition, debugging, and a final review. Guzdial emphasizes that the process is not linear, but iterative in that students may return to various stages in the process repeatedly until they are satisfied with the result. He suggests that tools provided to assist with activities should follow three levels normally observed in an apprenticeship system: leading by example, tutoring, and then feedback. In terms of collaboration, Guzdial introduces the term "anchored collaboration" to indicate that for collaboration to work effectively, students must have some shared common object, or topic to collaborate over (1998, p. 59). A concrete example of such an approach involving an undergraduate engineering class, is described by Guzdial as follows:

Students work in teams of four to six, (seven to ten teams per class), with all teams working on a common task. One class, for example, had to create a vehicle to climb a vertical length of pipe and then pop balloons attached to the top of the pipe. The tasks are too complex to solve in a single quarter (10 weeks), but simple enough for a team to complete (1998, p. 61).

A number of features of group project work are well illustrated by the Edutech example, I believe. The approach supports the use of collaboration intertwined with an authentic activity, consideration of task complexity and of group composition, and the presence of a group goal. Although little information was given about the evaluation of this activity, much emphasis was placed upon process rather than outcomes as illustrated by the concept of anchored collaboration. The authors commented that "this research is changing the way we think about effective learning process and about tasks and processes that individuals actually use in their daily lives" (1998, p. 69). Clearly they think that this approach is a success.

The Edutech approach has been discussed at length specifically because of its similarity with the present context and because of observations about cognitive processes that match similar neo-Vygotskian concerns upon collective mediation in the present context. It provides a number of useful points for the present study in terms of setting up the group activity. In general, methods supporting the presentation of ill-structured problems in the form of a project have been supported by the Edutech example, aspects which have also been supported by the PBL approach. One other definitive aspect of the group projects in the present context that warrants further grounding, is their interdisciplinary aspect, a topic I will discuss next.

4.3   Issues of interdisciplinarity

Interdisciplinary approaches to learning are controversial and yet receive enthusiastic support from a number of perspectives. Consider, for example, the following well-known description of interdisciplinary studies by Klein and Newell:

Interdisciplinary studies (IDS) may be defined as a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession...IDS draws on

different disciplinary perspectives and integrates their insights through

construction of a more comprehensive perspective (1997, pp. 393-394).

The support for using an interdisciplinary approach at tertiary level in education is based on the view that most authentic problems cross discipline boundaries. As Seabury points out, "effectively addressing issues such as world hunger or AIDS demands that people bring insights from multiple disciplines as well as wide-ranging skills of engagement, thinking and values clarification" (1999, p. 6). Interdisciplinary, or 'integrated' learning, as it is termed in the context of the present study, can be viewed as appropriate, therefore, for addressing authentic problems. By challenging the constraints of traditional disciplines, this approach supports active learning strategies, often using teams or groups. Some accounts of the interdisciplinary approach support this view and point to its success. Edwards, for example, documents some of the IDS programs throughout the world and reports that they "are not only alive and well, but are also growing and evolving in new and exciting directions" (1996, pp. xi-xii). Edwards, however, did not provide any evidence based on formal evaluations to support this view.

Integrated learning, that is, the application of an interdisciplinary approach in education, offers a flexible approach to teaching and learning which can encompass a wide number of academic fields. There are no set pedagogies that make up integrated learning but, as Klein points out, "innovative approaches that promote dialogue and community, higher order critical thinking, and problem solving are common; they also tend to be student centered" (1999, p. 17).

Not surprisingly, the interdisciplinary approach has its critics. In 1982, Benson offered five arguments against IDS that have been debated over, almost continually, since. His first argument was that that the interdisciplinary approach rests on "serious conceptual confusion", and that "integrative studies is a fool's project, propounding equations where all the terms are unknown" (1982, p. 39, underline in original). The second argument was that a student should be grounded in the disciplines before he or she can be truly interdisciplinary. As Benson says, "Having no firm hold on any of the associated disciplinary traditions, the student in an interdisciplinary studies course or curriculum can be little more than a spectator to the marshalling of arguments, methods, and insights from the diverse contributing disciplines" (1982, p. 41). The third criticism was that an interdisciplinary education will actually "impede a

student's development of an essential disciplinary competence" (1982, p. 43). The fourth was simply that, "<u>integrative courses are characteristically shallow, trading intellectual rigor for topical excitement</u>" (1982, p. 45, underline in original). And the last criticism was that they simply cost too much.

At the time, these charges were taken seriously and threatened to undermine the interdisciplinary approach but, as mentioned, have been argued against extensively, and now are largely ignored by the proponents of interdisciplinarity who now prefer to document numerous cases of successful practice in diverse fields (Nicholson, 1987; Newell, 1987, 1998). They proclaim that "knowledge is increasingly interdisciplinary" (Klein, 1996, p. 1) and observe that IDS contributes to the "solution of real-world problems" (Newell, 1998, p. 540). Newell, for example, has pointed to claims of more sensitivity to ethical issues, ability to synthesize or integrate, enlarged perspectives, more creative thinking, more humility or listening skills, and sensitivity to bias with an interdisciplinary approach (1990, pp. 70-71). While keeping in mind the challenges raised by Benson, I think that the interdisciplinary approach supports authentic approaches to learning as envisaged by Clayden et al (1994), and the development of complex, ill-structured, and meaningful projects, particularly for groups working independently at undergraduate level.

One interdisciplinary requirement incorporated into the projects that is of interest in the present study is the consideration of information technology, both as a content area and for use in constructing the projects. Computers, as tools in this specific context, play a central mediational role and given the goal of this research, to understand such mediation from a neo-Vygotskian perspective, warrant much further discussion - aspects that I will, therefore, address next.

4.4   Computers and educational practice

The so called "computer revolution" (Green & Gilbert, 1995, p. 19) has had a huge impact upon society and on educational practices, with Postman(1993), for example, describing our present culture as a "Technopoly" highlighting the extent to which these machines have come to influence our present culture. Regarding education, Underwood & Underwood suggest that, "technology can shift the goals of education" (1999, p. 11). Indeed, educational institutions have generally followed the trend and have adopted computers for teaching and administrative purposes, although

at a slower pace, according to Cuban, because of the unique "cultural" underpinnings of educational practice (1993, p. 185). Perhaps this is because, as Nye explains, "Technologies are contested terrains… Technologies are part of a dialogue between human beings about their differing perceptions" (1997, p. 3). They are value laden artificial devices (see, for example, Shenk, 1999, p. 142). Subsequently there are important issues related to their insertion into educational practices such as the present context. Learning is largely a social enterprise whereas computers are not, hence the tension or "reciprocal relationship" (Salomon, 1998, p. 4) between the two.

It is the culturally negotiated interface between new technologies, in the form of computers, and the socially based pedagogical practice of using learning groups that is of specific concern in this research. The goal is to examine computers as mediational tools, in the physical and material senses of the word, from a neo-Vygotskian perspective. This section will, first, explore some of the dialogue related to the general use of computers for learning and then will focus upon their use within collectives of learners, such as collaborative groups. Such practices are widespread yet controversial, with both advocates and critics debating over the relative benefits of the technology. There is the view, for instance, as Johnson pointed out some time ago, that, "society expects educators to integrate technology into the classroom" (1984, p. 2). Yet, as Dede has pointed out more recently, there is also the need to be critical and view "technology as a means not an end in itself" (1998, p. v, see also Oppenheimer, 1997; McMahon, 1990). Peters similarly observed once that:

Those carried away by the promise of information technology in the last 50 years are members of an enormous club. On the one hand, it's fair to say that it is highly dangerous not to be carried away. On the other, it is equally dangerous to be carried away (1992, p. 125).

Exploring the dynamic between a computer and an individual involved in learning is a complex task, not only because of the wide range of educational possibilities and configurations for the machines, but because of different views upon how individuals learn, and because of the rapidity of change in information technologies. Crook (1994) and Sullivan (1994) both use similar metaphors for describing the use of computers within learning environment that provide a framework for thinking about these contexts. The computer can be implemented as a

teacher surrogate, or tutor, for example, when students are asked to follow a tutorial program such as Reader Rabbit (The Learning Company, http://www.riverdeep.net/learningcompany/) or Math Blaster (Davidson and Associates, http://www.davd.com). The student can alternatively be envisaged as an instructor in cases of computer programming, employing languages such as Logo or Java, situations in which the computer is envisaged as a 'dumb machine' following instructions exactly. Much of Papert's early work pointed to the justification of such pedagogies from a constructivist perspective, as discussed in the previous chapter (Papert, 1980). A third metaphor, encouraged particularly by a neo-Vygotskian perspective, views the computer as a mediational tool, for use by individuals in creating, or constructing meaning. Saljo comments that, from this socio-cultural perspective:

> The mastery of mediational means is thus an essential aspect of the process of learning. By means of variations in the psychological and practical tools, different features of a problem become visible for the learner. But what, then, are the potentials of information technologies to provide learning experiences that may transform people and provide them with skills and insights that expand their capabilities? ... this is an issue about which opinions diverge widely; some argue that schools will be closed down in the near future, others see no profound impact on schooling of information technologies (Saljo, 1999, p. 152).

It is difficult, therefore, given this choice of views, together with the wide range of possible configurations of computers, to form generalizations concerning their value. Yet there are many ready with answers and opinions surrounding the issue. As Crook once observed, many educators believe that "whatever evaluation research shows, they can simply see the computer doing good" (1994, p. 9), a naïve, or "overly simple view of technology", as Haas also observes (1999, p. 210). Eisenberg and Johnson, for example, proponents of the well known "big six skills approach" to teaching information technology, insist that students need to be "computer literate", but then comment paradoxically that, "there only seems to be a vague notion of what computer literacy really means" (1996, p. 1, see also Oppenheimer, 1997, and Wenglinsky, 1998).

There are methodological issues, therefore surrounding the study of computers and learning that need to be clarified before conducting a study. Assessing the effectiveness of computers is, as Bork pointed out at one stage, dependent upon how 'effectiveness' is perceived (1991). There are a number of broad approaches to this question in the literature that appear to support this claim. Meta-analyses of learning outcomes, studies of other, more affective aspects of individuals, such as motivation and attitudes, ethnographical studies, and studies of the negative impact of computer technology upon learning, all address this question from differing perspectives.

In terms of student behaviour, computers appear to be generally very effective in keeping students occupied, as Oppenheimer noted (1997). Students are easily engaged by computer software, which takes the focus off the teacher and results in a quietly engaged class. This observation led McMahon at one point to wonder whether "teachers' assessments of the value of particular items of educational software is based more in its capacity to keep pupils busily and quietly occupied than on the learning gains it might promote" (1990, pp. 157-8). From this perspective, students are seen as being motivated because they are occupied, perhaps a subtle, but alarming difference.

One example of just how motivating computers can be has been illustrated in a study by Hasselbring, Goin, Taylor, Bottge, & Daley (1997). These authors compared traditional literacy programs to a computer based one. In the traditional setting they observed problems with weaker student's self-concepts, motivation and, as a consequence, attendance. They observed that,

> The inability to read and write resulted in embarrassment, defiance, truancy - and failure. For these learners, common classroom activities simply compounded feelings of shame (1997, p. 30).

Computers solved the problem precisely by dislocating the students from the social setting of a regular classroom to a self-paced, individualistic one. In this case it seemed to work. Computer based activity motivated the students to learn by removing them from the usual context of a classroom, together with its social dynamics. I see this reasoning as flawed, as the authors applaud the socially isolating aspects of computers while using them for teaching communication skills. Critics highlight the misuses of technology, such as the above, as misguided attempts to simply entertain,

or occupy, students. As mentioned previously, this has been referred to as the 'filmstrip' approach (Oppenheimer, 1997; McMahon, 1990). Such critics compare the introduction of computer technology to other technology introduced into schools over the years such as Overhead Projectors and VCR's and question whether the effect will be similar. That is, they wonder whether computers are effective in education at all (see Bork, 1991).

However, in terms of measuring general learning outcomes there are a number of meta-analyses that have attempted to illustrate the general effectiveness of computer-aided instruction (Christmann, Badgett & Lucking, 1997; Kulik & Kulik, 1991; Liao, 1992; Ryan, 1991). While it is tempting to make generalizations concerning the general effectiveness of learning with computers based on these results (and the authors of these studies do), I think that we need to be careful interpreting the results. Bork (1991) criticizes these meta-analyses, commenting that they are based on an amalgamation of small scale and often, weak studies. They consist, as he once commented, of "mixing 50 poor meals in a pot, and sprinkling in statistics, with the hope of getting a good meal" (p. 10). He adds that:

> The strategy seems to me to be a tactic of desperation, one that admits the inadequacy of current studies and tries to cover it up with elaborate statistics. I do not find results of meta-analysis to be useful in understanding what is happening with technology and education, or in other areas of education. Rather, it is another example of the misuse of statistics (1991, pp. 10-11).

All these studies are now fairly dated and are, therefore, of questionable relevance to a study interested in understanding how computers mediate group projects. The meta-analyses considered only simple input-output research designs and involved much data reduction and information loss through averaging out. For example, in Liao's study the variation of effect sizes was large, the highest being 3.3 and the lowest -0.6, yet this variation was not discussed in the final analysis (Liao, 1992). Much of the debate about the effectiveness of using computers in education then centres around how hard it is to answer this question, with some critics and researchers commenting on the pointlessness of trying to prove the general effectiveness of computers in education (Bork, 1991; Crook, 1994; McMahon, 1990; Oppenheimer, 1997; Wenglinsky, 1998). Considering the vast variety of ways in

which computers can be used and the speed of change in the field, against the strict methodological requirements of evaluative research, perhaps it is not possible, or even sensible, to ask for a global answer concerning the effectiveness of computers in education. Crook comments that,

> It is surely fanciful to suppose singular generalizations will be found that can make sense of such diverse educational activities. We must be wary of sweeping rulings on the success (or failure) of new technology (1994, p. 8).

Oppenheimer (1997) points out that many of the studies that do exist are flawed and tend to focus on anecdotal studies or evaluations of exemplary programs. However, this may be the only possible approach. Perhaps, in terms of studying the effectiveness of computers for learning, there is a need to situate the activity clearly in context and, therefore, consider what Bork once referred to as "compelling examples" (1991, p. 12). This finding is of direct interest to this thesis in which a specific context involving computers is being considered for study. Draper similarly proposes that:

> There are no generalizations about the goodness of CAL[2] (any more than about the goodness of books in education) that refer to technical features of the CAL as opposed to features of the situation. There are some substantial successes, but these come from a fit between the design of a piece of CAL and a particular educational niche. There is no general recipe for making CAL good independent of the educational problem; CAL is not a panacea ... computers are a very general tool (1998, p. 5).

Computer assisted learning, therefore, is situated in terms of both technical specification and pedagogical context, an aspect that is important to understand when planning research. To guide practice, however, there are many compelling examples of methodological approaches and positive educational findings concerning the use of computers. Examples include the Apple classrooms of Tomorrow (ACOT) project (Dwyer, 1994) or Wenglinsky's study with middle school students (1998). These were large-scale studies concerned primarily with outcomes. Other approaches

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[2] Computer Assisted Learning

include ethnographical studies of instances of computer use in learning activities (see, for example, Littleton & Light, 1999). In these studies, process rather than outcomes are of prime interest based on the premise, as Crook once observed, "if we wish to conduct evaluations of what is learned in computer-based contexts, we must go beyond the input-output designs that characterize much research in the area" (1994, p. 9). This fits in with the concern of the present thesis to examine the mediational role of computers within groups from a neo-Vygotskian perspective. Much of Webb's similar work on analyzing the process of elaboration, as discussed in the previous chapter, for example, took place around a computer-based task (1989), and, although dated, Anderson and O'Hagan, for example, once argued that:

> An approach involving the videotaping of pupils' interactions around the computer, microanalysing the resulting dialogue, and relating the results from the dialogue analysis to learning outcomes is a potentially very powerful method for evaluating the educational efficacy of CAL software (1989, p. 114).

Ethnographical techniques, however, differ widely in implementation. Some microanalyze every utterance, others take a longer-term view. Riley and Brown's study (1997), for example, typifies this approach and studied the use of the programming language Logo with gifted students using observational data of key instances of computer use. In general, ethnographical techniques are useful for witnessing the dynamics of the relationship between the individual user of the machine and the machine itself rather than finding out the outcomes of the experience. They are an alternative approach to understanding the learning process with computers that is of interest in planning research activities such as the present context.

Another approach that is of interest to the present context is the study of negative aspects of educational computer use. Postman comments, "What we need to know about the computer has nothing to do with its efficiency as a teaching tool. We need to know in what ways it is altering our conception of learning, and how it undermines the old idea of school" (1993, p. 19). Negative effects include changes in the wider culture resulting from the introduction of computers into the learning process as well as potentially harmful impacts upon individuals. These negative influences may then be able to be recognized and tracked within the group projects.

Studies of the social impact of computers has highlighted numerous issues concerned with privacy, socialization, employment, health and human cognition. Sylvester, for example, cautions that, "excessive childhood involvement with electronic media that limits social interaction could hinder the development of a brain's social system" (1997, p. 20-21). Some of the health issues resulting from the overuse of computers include repetitive strain injuries, eye problems, posture and fitness issues due to inactivity, and a wealth of psychological issues including phobias and addictions, attention disorders and stresses through information overload (Meier, 1985, Saddy & Watson, 1996, Shenk, 1997; Turkle, 1997). It is simply not a natural activity for humans to be seated and staring at a computer monitor for considerable lengths of time in physical isolation. Shenk, for example, lists the following effects that can result from computer overuse (1997, pp. 37-38):

- Increased cardiovascular stress
- Weakened vision
- Confusion
- Frustration
- Impaired judgement
- Decreased benevolence
- Overconfidence

Of interest is the extent to which these effects may appear within a specific practice of learning with groups of students and computers. The indications are that technology has changed traditional understandings of learning on both an individual and a cultural level, which is relevant to a neo-Vygotskian perspective. Bereiter argues, for instance, that the changes mean that we need to move beyond the traditional metaphors of knowledge acquisition to more social-constructivist accounts (2002, p. 20). Learning is, for the large part, a social activity and the introduction of computers can be seen to be a transforming influence. However, the problem is that, as Crook comments, "the study of social processes in relation to computers has been too narrowly pursued" (1999b, p. 103). The dynamic between the individualistic nature of computer use and the social aspects of learning is of specific concern in this thesis. The next section will investigate these processes in greater depth.

4.5   The tension between computers and joint learning activity

Understanding the tensions between computers and joint learning activities is of central interest to this thesis because of the concern for understanding such activities in a specific context from a neo-Vygotskian perspective. This is the focus in this research. Postman once questioned, "will the widespread use of computers in the classroom defeat once and for all the claims of communal speech? Will the computer raise egocentricism to the status of a virtue?" (1993, p. 51). This concern reflects a common argument that computers are "socially isolating" (Crook, 1994, p. 121, see also Bloomfield, 1987; Roth et al, 1996; Underwood & Underwood, 1999) – something that I discussed in chapter one as an impetud for conducting this research.

Although personal computers (PCs) are very versatile in terms of what they can be programmed to do and how they can be networked to other broader systems, as the name indicates, they were not designed to be physically shared. They are a personal device; designed for a single user, whereas learning, as the neo-Vygotskian perspectives in the last chapter illustrated, is generally a social enterprise. This creates tension in a collective educational context as I, and others have noticed consistently. Roth et al, for example, concluded following a study of the use of computers with collaborative groups, that the machine is sometimes "unready to hand" and added that, "while computer environments have some potential as learning tools, they also limit interactions in significant ways" (1996, p. 995). There is a huge amount of research and it is the selected exploration of this aspect from a neo-Vygoskian perpective that is of key interest in this thesis.

One perspective that appears to overlap with a socio-cultural approach, termed the socio-technical approach, specifically addresses this tension between computers, as technical systems, and groups, as social systems within a wider organization, or community of practice. This perspective, which involves a "search for optimal solutions for social and technical systems" (Nurinmen & Tuomisto, 2000, pp. 208-9), was first developed in the 1940s by the Tavistock Institute in London and is based on two principles; the importance of social systems, such as work groups, and the "dissimilarity" between these systems and the technical systems, such as computers. The dissimilarity, or tension, between the social system and the computer system, from this perspective, requires that the two be clearly separated in terms of development and specification within a group project environment. The autonomy of

the group, for example, is seen as crucial in order "to increase commitment and to humanize the workplace" (Fielden, 2000, p. 106). Other design specifications include the need to manage clear boundaries in order to minimise intergroup relations and also to assign minimal critical specifications concerning "what" needs to be achieved but not "how" (Nurinmen & Tuomisto, 2000, pp. 210). That is, the socio-technical approach stresses the importance of giving ownership of group projects to the participants and letting them decide how to use technology. The participants are seen as being multifunctionary for the purposes of the project with the group being responsible for, so called variations, or sudden changes, in the process. The fluid social and cultural environment is seen, therefore, as the primary driving force within the groups rather than the technical features of the technology itself.

An example of this approach is provided by Feilden (2000), who discusses group projects carried out by IT students at Massey University in Albany, a setting similar in many ways to the present research although the topic was different, in this case, the development of new information systems. In a qualitative analysis of these projects over a ten-year period of time, Feilden points to the "live" and sometimes chaotic learning process that evolved out of these projects and highlighted the importance of the autonomy given to the groups. She adds that:

> The ability to cope with multiple realities in complex systems develops. Serious illness, domestic problems, and accidents are treated as group issues and solved accordingly. In this way the students learn to value each other as agents of change and technology as the tool. They learn that people are the most important resource in an organisation especially in an Information Technology business world (2000, p. 110).

Not only is this study relevant because of similarity with the context of the present study (i.e.: undergraduate second year group projects in an NZ University), but because of the recognition of the tension between the technology and the social fabric of the group and the description of environmental factors that influence this dynamic. Feilden, for instance, points to the importance of students "learning to balance at the edge of chaos" and that gaining "sensitivity to the client needs, values, and culture is essential" (Feilden, 2000, p. 112). The Massey study provides valuable

pointers to some of the features and challenges involved in the present context, issues that can be envisaged also from a socio-cultural perspective as resulting from the unique practices and challenges inherent in a specific community of practice.

To provide a framework for discussing further issues surrounding the sharing of computer resources in a collective sense, I will refer to the work of Crook again. He observes that joint activity with computers can be thought of in terms of physical activity *at*, or *around* a computer, activity *through* a computer, and activity *in relation* to a computer (Crook, 1999b, p. 110, see also Cazden, 2001, p. 123). Both joint activity at and around computers can be envisaged as the sharing of computer resources amongst learners in a single location, either in a lab, a classroom, or another learning environment. This traditional view reflects common practice particularly in the recent past when there were "resource constraints" due to a lack of funding, or other issues (Light & Littleton, 1999, p. 2). A second category, interaction through computers, is however, a relatively new phenomena and refers to instances of communication across networks typically dislocated in space, and perhaps time. These types of interaction are commonly referred to as 'virtual', and relate closely to an approach termed "computer supported collaborative learning" (CSCL) (see, for example, McConnell, 1994; Steeples & Mayes, 1998).

Interaction in relation to a computer, the last of Crook's categories, reflects discourse concerning shared experiences regarding the machines and not necessarily 'hands-on' activity as such. In this study, I am not so interested in this latter scenario because of the nature of the present context in which students are required to use computers to create a project, although this aspect may be reflected in methods for the collection of data. I will, therefore, review issues concerning the two scenarios most possible in the present context: face-to-face activity surrounding computers and virtual group work involving communication via computer networks. As Saljo points out, it is the "interactivity" that is of prime interest, not just between the user and the machine, but between users or participants in a collective sense (1999, p. 153).

4.5.1   Joint activity around computers

Ever since computers were first used in schools there have been studies of joint activity at and around computers, which has resulted in much research on different aspects of pair and small group work surrounding computers (see, for

example, Underwood & Underwood, 1999). Reflecting the different methodological approaches discussed earlier in this chapter, this research has tended to either focus on outcomes as measured in the experimental tradition, primarily concerned with effectiveness as measured by pre and post tests, or naturalistic studies more concerned with the processes of interaction between the participants (Light & Littleton, 1999, pp. 6-7). These two views tend to "crudely categorise" the literature (Mercer & Wegerif, 1999, p. 81).

One large three year study by Hoyles, Healy and Pozzi (1994a) is worth mentioning as it combined both qualitative and quantitative measures into a study of processes and outcomes for pair work at computers involving a mathematics task. Indeed, the project may have been too ambitious as the authors struggled with this aspect of the project, describing and revising methodological approaches throughout the research (see Pozzi et al, 1992). They comment that, "our story of computers, groups and learning mathematics illustrates the necessity of having at one's disposal a rich and diverse data set to use at every phase of analysis" (Hoyles et al, 1994b, p. 479). Yet they then point out on the next page that "other forms of assessment (e.g. one to one interview) would simply have been too time consuming given the numbers involved" (1994b, p. 480), which points to the difficulties inherent in collecting a rich data set. Despite methodological issues, these authors found that "across all case studies, the outcomes of the settings varied widely in terms of productivity and effectiveness and no obvious relationship could be discovered between the two outcome measures" (1994a, p. 207). The results were disappointing, which led them to summarize that:

> Group settings are only successful in terms of both group outcome and learning, if the group structures their activity in particular and identifiable ways. These organisational styles and patterns of interaction themselves are conditional on interpersonal and social characteristics of the group and class (1994a, p. 202).

This study is relevant to the present context because it provides an insight into the dynamics and challenges facing individuals sharing computers. At one point in the study, for example, Hoyles et al address issues surrounding the value of computers by distinguishing clearly between group outcome, which they termed "productivity", and

individual learning, termed "effectiveness" (1994b). This reflects a concern with the underlying motives of the joint activity. Yet the only contributing factor to both of these measures of success was, what Hoyles et al termed, "style of organisation" (1994a, p. 211); that is, the strategy that each group chose, or co-constructed to address the joint concern. This highlights the social-constructivist aspects of the joint activity observed in this study. As Healy, Pozzi, and Hoyles reflected later:

> Learning … seemed most likely to be supported when students worked in an integrated style within which interactions were either mediated or navigated, or, to put it another way, where a synergy of interdependence and autonomy was achieved through active participation in constructions at the computer contributing (either actively or passively) to wider group discussion (1995, p. 519, parentheses in original).

This finding is particularly interesting given that most of the measures in the study conducted by Hoyles et al were related to the outcomes rather than processes, yet their findings underscore the importance of process related and contextual factors in general, rather than technical aspects of the machine. This was revealed by information that the same software and task were used in similar ways at a multitude of sites yet the program led to vastly different outcomes. The findings, therefore, can be seen to reflect perspectives on the situated and socially constructed nature of learning rather than anything about the particular software or hardware. The authors concluded that this indicates that the level of negotiation and co-construction, that is "successfully mobilised" by interaction around a computer, is a prime factor in determining how well groups work towards a shared goal (Crook, 1999b, p. 105).

Mobilization, in this sense, is similar to the concept of elaboration as discussed earlier by Webb (1989, 1991) and highlights the importance of the social climate created by the group. Underwood and Underwood, however, caution that, "too much talking is thought to get in the way of learning" (1999, p. 13). That is, it is not talk per se that is vital, but rather the negotiations, conflicts and elaborations pertaining to the shared task and getting the group organized within the particular context. Light and Littleton (1999) make similar comments on a broader socio-cultural view of joint learning activities with computers. They mention that while simple self-contained experimental research is plentiful, including their own, "collaborative experiences are

typically more than just brief localized sessions of joint activity" (1999, p. 7). Wider social and cultural experiences with computers clearly impinge upon learning jointly around computers, which adds to the 'mix' revealed by smaller studies of factors related to the individuals, the group, the computer and the task. This view tends also to support broad spanning models of influence such as the IPO model presented earlier (see page 104).

In general, while studies tend to support a neo-Vygotskian perpectives on the importance of sharing of information around computers and the social richness added to an otherwise individually isolated activity, they also are cautious about making generalizations. Middleton, Flores, Knaupp, for example, point out the fallacy of "one student-one machine" thinking, arguing instead that "Pairs, trios, and even larger groups of students can use a computer effectively if the staff develops the activity properly" (1997, p. 21). It is the 'if' that creates pedagogical niches in the use of educational technology, as Draper pointed out (1998). Blaye, Light and Rubstov (1992) also support the introduction of social interaction into learning activities with computers and encourage a similar situated, naturalistic view of shared computer activities. They once commented that:

> On a theoretical plane, the diversity of learning outcomes and of dynamics of interactions described in the different studies should draw our attention to the vanity of trying to build 'a theory' of interactive learning situations at the computer. The common medium is by no means a sufficient reason to unify this field of research, despite common aspects (1992, p. 264).

This viewpoint highlights the multitude and wide variation of factors that impinge upon groups of individuals around computers, complex systems, as referred to by Fielden earlier (2000). This mixture of factors is further complicated by more recent perspectives upon joint activity through, rather than around, computers.

4.5.2   Joint activity through computers

The use of technology as a communication channel, or medium, for learning uncovers another set of issues pertaining not only to the meaning and language between participants, as much of the research on elaboration does, but also on what is

missing from the communication. As Pea commented on this aspect of electronic communications:

> Conversations and interactions in everyday life take place in a rich referential field. The dense texture of human bodily orientation, gesture, and facial expression are known to communicate and continually transform on a moment-to-moment basis affective, cognitive, and social dimensions of relationships. Just as profoundly, there is a material environment to which attention can be directed by gaze, pointing, and other means, in this conversation space. It, too, is transformed on a moment-to-moment basis…. The consequences of the social and material embeddedness of meaning-making in human interaction are deep ones for conceptualizing CSCL and have not been sufficiently attended to, either in theory or in design of systems for supporting such activities (1994, p. 286).

In a direct illustration of the importance of these contextual non-verbal factors, Tiberghein and de Vries (1997) compared side-by-side student learning at a computer with distance collaboration via a network and found fundamental differences in the way the students communicated. They commented that, "in side by side cases attention can be directed not only to human bodily orientation, gesture and facial expression, but also to the material environment" (p. 166). There is a richness within face-to-face discourse that is clearly missing in electronic communications and yet this mode for communicating has mushroomed in the field of education, particularly at tertiary level (see English & Yasdani, 1999; Murray, 2000).

From divergent perspectives, the loss of certain visual and kinesthetic communicative cues from electronic communications offers both advantages, in terms of equitable access, and disadvantages, in terms of possible misunderstandings related to the absence of these factors (Light & Light, 1999; Vincent, 2000). Research and opinion on computer mediated communication (CMC), as the field is termed[3], concerns itself with these issues, both the particular constraints, as well as the affordances provided by communicating electronically through computer networks (Murray, 2000, p. 398). Herring commented, for example, that:

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[3] There is some debate on the definition. See Murray, 1997

The phenomenal growth of CMC has captured both popular and scholarly imaginations. Cultural theorists and technophiles have been quick to envision sweeping changes in the social order as a result of the democratic and anarchic possibilities inherent in widespread use of a networked medium which allows anyone with access to speak out more or less anonymously, and which is not as yet subject to any centralized authority or control. Utopian visions of class- and gender-free virtual societies have arisen alongside of dystopic visions involving information overload, e-mail addiction, uninhibited aggression, and the eventual breakdown of peoples' ability to engage one another face-to-face (1996, p. 1).

There are fundamental differences between face-to-face and virtual discourse; as Herring discusses above. One is the loss of spatial and time constraints. Communication via electronic means can either take place instantaneously in 'real time', or the messages can be passed backwards and forwards at the convenience of the sender, dislocated in time, as in the common use of electronic mail. These modes of communication are usually termed synchronous and asynchronous respectively (Gurak, 1995). The widespread use of email in education, as an asynchronous means of communicating, for example, has received some attention in the literature as an effective, transforming means of discussion (see Coogan, 1995; English and Yazdani, 1999; Trushell, Reymond, & Burrell, 1998). So has the implementation of groupware through shared real time environments afforded by networks such as the Internet (see for example, Alvarez-Torres, 2001; Light & Light, 1999; Vincent, 2000).

Murray (2000) conceptualizes the introduction of various electronic means of communicating, such as these, in terms of the establishment of speech communities. Reporting on students learning English as a second language (ESL), he reports that students often change methods for communicating based on preferences. For example, they may move from synchronous on-line chatting to asynchronous email because they wish to think further about what they wish to say and also when they want to keep a record of the transaction. Similarly, they may switch from the computer to using a telephone, or to meeting face-to-face because of the preferred immediacy, or preferences for verbal rather than written communication, a vast difference as Yates comments (1996). This phenomenon reflects contexts in which students are also able to make choices like these, which is not always the case, especially in cases of

necessarily constrained research studies. The established speech communities may then use a multitude of modalities depending upon function. Similarly, following a comparative study of five possible modalities including face-to-face and electronic means, Michaildos & Rada commented that, "each mode serves a function in supporting communication" (1997, p. 469). This view has been supported further by Baker and Lund (1997), who point out that CSCL systems can be deliberately engineered to afford differences in desired communications. They add that:

> In the case of CSCL environments, there is the possibility of controlling or structuring the computer-mediated interaction itself, in the attempt to favour the incidence of certain forms of communicative acts rather than others (1997, p. 176).

Chang and Chen, agree, and argue further that, in the case of learning,

> If generic network tools are to be used for learning, the teacher should participate in the discussion and assign roles, notify students, enforce schedules, guide students to what he/ she should do, and accumulate information to understand the performance of students (1997, p. 3).

The purposeful design of systems for communicating through computers is therefore essential. An example of this approach is that of electronic conferencing, a technology that allows participant discussion in real time, usually via a text interface. However, the results from various studies about this approach are generally disappointing for a number of reasons (see, for example, Baker & Lund, 1997; Benson & Wright, 1999; Davis & Ralph, 2001; Rimmershaw, 1999; Salmon, 2000; Vincent, 2000). Salmon, for example, cites technical, learning and moderating issues related to conferencing technology, with induction and training taking too much time, despite much reported enthusiasm (2000, p. 498-9). In this case the design was cumbersome for participants to learn, a problem also reported by Rimmershaw (1999). Lack of participation was reported by other studies, with Davis and Ralph commenting, for example, that, "quite simply, students can choose not to participate and their absence can absolve them of any responsibility to the community" (2001, p. 221). Vincent made similar comments (2000, p. 382), and English and Yazdani, in

reflecting student feedback, report a common complaint that being online was "not useful" because the material was already available (1997, p. 8). In this latter study, however, the students also attended real classes, which is not the case in other studies of 'virtual' learning communities. The findings suggest the importance, as Chang and Chen (1997) pointed out, of designing on-line systems to support and require, rather than invite, participation.

The cultural and communal aspects of online learning reinforce socio-cultural perspectives of learning electronically (see Murray, 2000). These aspects also rest on neo-Vygotskian concepts of mediated learning, the focus in this thesis. Without the establishment of a collaborative community of practice, to use Lave and Wenger's terminology (1991), participants would see little benefit in participation electronically. Joint ownership of virtual activity depends on the ability of electronic means to support the construction of a community. This determines the success of computer mediated communication. As both Berge (1995) and Saljo point out (1999), it is, therefore, the mediational aspects of technology as a physical tool, that is of primary importance in assisting participants in joint learning activities to co-construct knowledge. Saljo concluded similarly about the communicative abilities of computer technology that:

> The interactive character of modern technology can support reasoning by amplifying the nature and boundaries of scientific models of objects and events. But the full realization of the potentials of such experiences will still rely on students' access to conversation partners who carry on discussions in which these models and concepts are validated. The creation of knowledge is essentially a matter of learning to argue, and no technology will ever replace the need for learners to participate in ongoing conversations with partners sharing interests and commitments. Technology should not be seen as replacing such communication but rather as providing a resource for supporting it (1999, p. 159).

This statement supports a neo-Vygoskian view of the computer as a tool within a social environment, rather than as an entity at the centre of learning activity. The type of assistance, or mediation, provided by a computer is clearly much different from that provided by other people (Cazden, 2001, p. 109). This is consistent with a

socio-technical perspective and also clarifies the neo-Vygotskian conception of appropriated mediational means described earlier.

4.6   Summary

The last three chapters have given an overview of numerous theoretical concepts and opinions that impinge upon the present study. A neo-Vygotskian perspective of undergraduate interdisciplinary group projects involving the use of computer technology has necessitated the review of a broad and eclectic range of material. Vygotsky's views upon the mediated, yet active nature of learning has led to a number of evolving viewpoints which I have grouped largely within socio-cultural and constructivist viewpoints. Vygotsky's emphasis upon the primacy of language and, therefore, of meaning as a unit of analysis has been balanced against alternative views of activity. Modern reconceptualizations and interpretations of Vygotsky's notions of mediated internalization and of ZPD into the concepts of transformation and of community have led to a discussion of factors underlying joint learning contexts, and contexts embedding interdisciplinary projects and computers into pedagogical practice. Within this discussion, an underlying support for the use of such a pedagogical approach from a neo-Vygotskian perspective, as I have termed it, has been revealed.

The use of collaboration, in which the participants negotiate meaning, and collectively struggle to assemble an authentic, ill-structured project using modern computer-based methods, reflects many of the concerns of the theory just discussed. The computer, within this discussion has been envisaged as a collective tool, or mediational means, that enables, rather than drives, the co-construction of meaning and the co-building of projects. In the next chapter I will build a neo-Vygotskian model for this particular pedagogical niche based on the views just discussed.

Chapter Five: A neo-Vygotskian model for collective mediation

> Theoretical knowledge should not be mixed or seen as identical with abstract
> knowledge but is a kind of knowledge that combines the general core aspect of
> a subject-matter with a variety of concrete examples (Hedegaard, 2002, p. 12).

Developing a new model that combines a neo-Vygotskian perspective with the
literature on groups and computers provides a number of challenges. The first step is
to choose Vygotskian principles, which, as discussed earlier, was founded upon the
developmental study of children in a psychologically individual sense. The second is
to apply these principles to a collective context, specifically undergraduate group
projects at Auckland University of Technology (AUT). The literature on collaborative
learning, as reviewed in the last chapter, is comprehensive, and generally in support of
group projects, but just how neo-Vygotskian principles can be applied to understand
group work with computers as mediators is the primary concern of the new model.
The key is an approach centered around Vygotsky's concept of mediation.

The literature review just presented outlined and critiqued not just Vygotsky's
theory of human functioning but various appropriations of his theory of mind, as well
as aspects of the type of projects this study is concerned with. This review has led me
to consider what aspects of Vygotsky's theorising are applicable to the present context
and what aspects are problematic. To summarize, the concepts of scaffolding,
internalisation, and of activity as a unit of analysis, have been criticised extensively
and the ZPD has been illustrated as a theoretical and ideal model rather than as a
pedagogical technique that can be easily implemented. These aspects of theorising
have been shown to be lacking and have been supplemented by more encompassing
terms provided by authors such as Wertsch, Rogoff, and Lave and Wenger, who
prefer to use the terms participation, enculturation, communities of practice,
intersubjectivity and co-construction, respectively, to explain the process by which
individuals make sense of the world within the joint activities of their societies. The
unit of analysis is now broader, and needs to encompass both the intersubjective and
interactive aspects of human functioning.

Tools and other mediators including people, however, remain central to a
model of how humans interact with the world. Tools, in the form of technologies that
are introduced into human activity, have been continuously evolving and, indeed, can

be envisaged as part of our socio-historically determined cultures. As Saljo points out, "Throughout history there has been a continuous creation of devices and technologies that have changed the mode in which we communicate and use our intellectual resources" (1999, p. 146). For Vygotsky, the existence of such mediators in the form of tools and signs helps define us as a species.

In attempting to incorporate features of Vygotskian theory such as the role of peer elaboration as well as other mediators in a group setting, a model of collective mediation is, therefore, described in the next section. Along with this model, I introduce a protocol as a theoretical framework for viewing and describing any negotiation concerning a collective mediator that would be made apparent during the life of the activity. The details of this protocol will be elaborated upon after the model is presented.

5.1   Collective Mediation

Collective mediation, the concept introduced and proposed in this research, extends Vygotsky's concept of mediation beyond the individual to a social context or activity. Collective mediators are mediators in the Vygotskian sense in that they are shared by the participants of the activity. A collective mediator, therefore, requires some negotiation by the group. Some common meaning or understanding of what exactly the collective mediator consists of would first need to be established by the group before they interact with it.

A collective mediator can take numerous forms in keeping with the neo-Vygotskian socio-cultural understanding of tool-mediated activity. It can, as mentioned, be reflected in the form of social interaction afforded by others, or it can be reflected in the use of a collective tool or shared mediational resource such as a computer. I view a collective mediator as transforming activity and understanding on both a group and individual level, which leads to the appropriation, or transformation of a collective process into an individual one. In other words, the collective mediator, in keeping with a neo-Vygotskian model, is seen as a dynamic entity, one that interrelates continuously with understanding and action on differing levels of analysis.

To capture this process, what I envisage for groups in this study is a "joint problem space" as Teasley and Rochelle termed it (1993), or "puzzle area" to use Allwright's term (1993, p. 132). This area, or space is seen as a shared environment or

community that exists just for the group project within which these collective mediators reside. This area is depicted in Figure 5.1 presented below. This space, which could take many forms, is thus situated within an environment or community and consists of the intermediate ground created by the project that stands between the wider external context, project contexts and the individual space of each individual. Each participant involved in the process is represented by a circle in the figure, with arrows depicting their individual relationship with the problem, or puzzle area.

Figure 5.1: The concept of a collective mediator within joint activity.
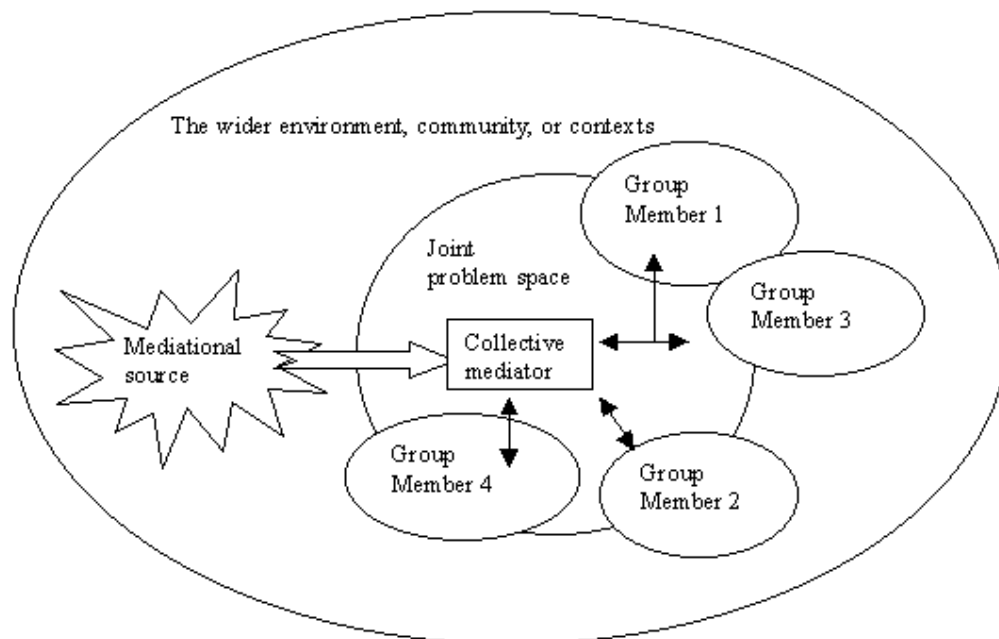
The proposed joint problem space contains aspects of Guzdial's notion of anchored collaboration, that is the idea that the group's collaborative activity must be anchored in a shared object, or tool, represented in the above diagram by the collective mediator embedded within the shared space (Guzdial, 1998). This space also encapsulates Newman, Griffin, and Cole's metaphor of a construction zone, which they describe as "a magic place where minds meet, where things are not the same to all who see them, where meanings are fluid" (Newman, Griffin & Cole, 1989, p. ix), and Cole's metaphor of a "garden", an area which is "embedded" in a "larger ecological system", (Cole, 1989, p. 1967). That is, the model attempts to illustrate the social constructivist aspects of the group's activities.

The collective mediator is depicted above as being introduced into the collective problem space at some point in the group process. I envisage this as a flexible arrangement within the model. The introduction of the mediator could take many forms and could occur at any point within the time afforded by the joint activity. It could, for example, take place simultaneously with the introduction of the problem; that is, it could be an integral part of the puzzle, or it could be introduced separately for a variety of reasons. The key aspect of this mediational entity that I wish to highlight is that it is a tool for solving the problem rather than part of the problem itself. This aspect reflects some of the concerns raised by activity theorists and their depiction of the triad discussed earlier in chapter three, in which the three entities of a subject (the group), the object (problem) and the tools at the apex were listed separately. The tool-based view of the collective mediator also reflects Vygotsky's Marxist roots in attempting to understand man's tool-mediated activity.

Other elements of this model come from both Kaptelinin's and Matusov's models of joint activity also presented in chapter three. A collective mediator is seen as embedded within the overall group puzzle area which may or may not contain other group resources. The overall activity itself is situated in a community, a wider context without which it would not exist. More increasingly generalised contexts may lie outside this but were not depicted in Figure 5.1, for reasons of clarity. As Cole illustrated earlier in chapter three (see page 73), I envisage the group context as being created, or constituted by the wider environment within which it takes place. This embedding is reflected in the use of concentric circles for increasing levels of contextual entity and, in this sense, reflects a socio-cultural perspective.

There are a number of other points about the model illustrated in Figure 5.1 that I wish to clarify. As depicted, the source of a collective mediator is from somewhere in the wider context of the group's activity. That is, a mediator's source is within the social and cultural environment in which the group activity takes place. Once introduced to the group, this mediator then becomes a shared or collective mediator that may influence and transform the group's joint activity. The arrows represent the influence of this mediator as it is introduced into the joint space created by the group and then onto the individuals themselves. That these secondary arrows between the individual and the collective mediator are two-way represents the interactivity between the individuals and the collective mediator.

Other details depicted in the model reflect other concerns. The circles representing each individual and the arrows representing the flow of influence have deliberately been drawn in an inconsistent fashion. This inconsistency represents individual differences in how individuals relate to the group and to each other, as well as to what extent they appropriate the collective mediator. In addition, the entities depicted represent psychological as well as physical boundaries. For example, the collective mediator could be a physical device, such as a machine of some type, or it could be entirely conceptual, such as a theory or model. Similarly, the separation between the members of the group could be physical, or virtual, as could the existence of the joint space in which the group's collaborative efforts towards some shared goal take place.

Deliberately left out of Figure 5.1 are a number of other aspects of group activity including the object, or task itself inside the problem space, the interrelationships between the individuals, and the motives for the activity. These can, of course, be easily inserted within the joint space afforded by the task and the group, but were left out in the original diagram because the prime concern in this study is with tracking the influence of the collective mediator through understanding the protocol rather than any outcomes, or incentives involved. In this sense, I believe that any model being constructed is necessarily constrained by the questions of interest.

I envisage that a study of the relationships that the collective mediator has with the individuals that make up the group within this space should give us an insight into the process of internalisation, appropriation, or transformation via joint understanding and by activity surrounding the collective mediator. This relationship can be discovered by analysing talk for signs of intersubjectivity concerning the mediator, as well as viewing the interactivity that results from this. In applying this concept to the collective mediator, I wish to 'track' the influence that such mediators have on individuals throughout the process of a group activity. That is, I wish to observe how, in the Vygotskian sense, the collective mediator transforms and alters individual meaning of both the activity and the task, or object. This collective and negotiated set of meanings helps establish what I refer to as the 'protocol' which reflects what Valsiner refers to as the "functioning", rather than "functional structures"; ones that illustrate the dynamic rather than the static nature of joint activity (1996, p. 47). This protocol will be the primary tool of analysis, or framework for the research presented in this thesis that will be discussed later in this chapter..

Clearly group activity, that is the focus in this study, is a dynamic process. In an attempt to describe this aspect, I present in Figure 5.2 below a series of snapshots of one example of the formation of a group space, or problem, the introduction of the collective mediator, and the resultant relationships that develop with this entity by the group members. As mentioned, not depicted are the various other possible relationships, such as the relationship among the individual group members, nor any exposure to the mediational source before the group project, nor motivational aspects of the joint activity. These snapshots are not intended to depict static or fixed stages as such in the process, but more the organic, evolving nature of the group work dynamic.

Figure 5.2: Snapshots of a collectively mediated group project.

Snapshot A. Pre-Project

The wider environment, community, and contexts

Group Member 2

Group Member 1

Group Member 3

Mediational source

Group Member 4
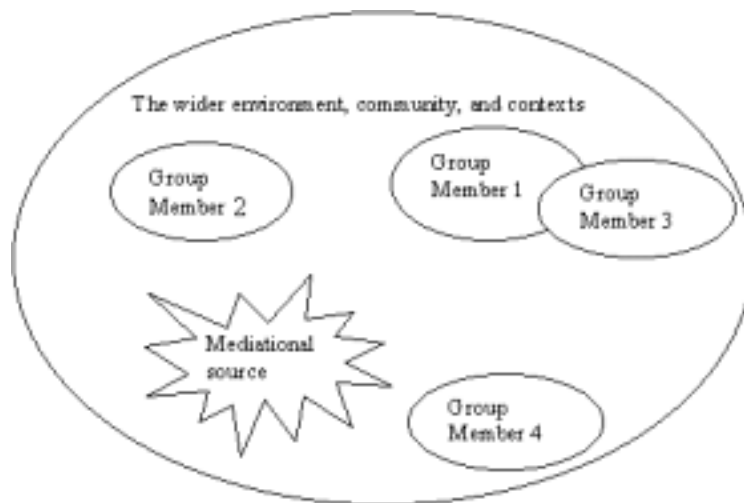
Snapshot B. Project formation

The wider environment, community, and contexts

Mediational source

Group Member 1

Joint problem space

Group Member 3

Group Member 4

Group Member 2
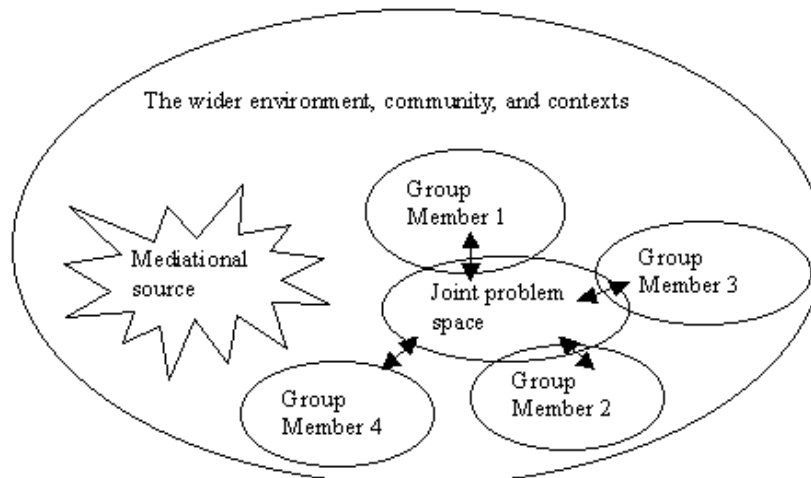
Snapshot C. Introduction of the collective mediator
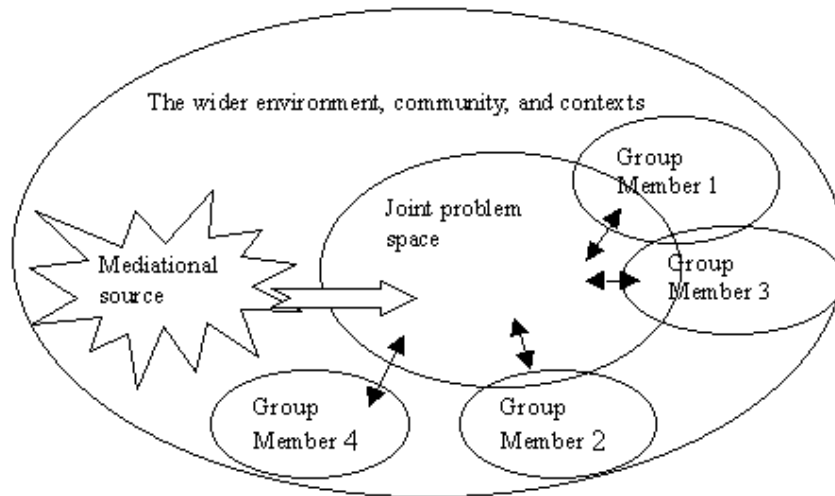
Snapshot D. Collective joint activity
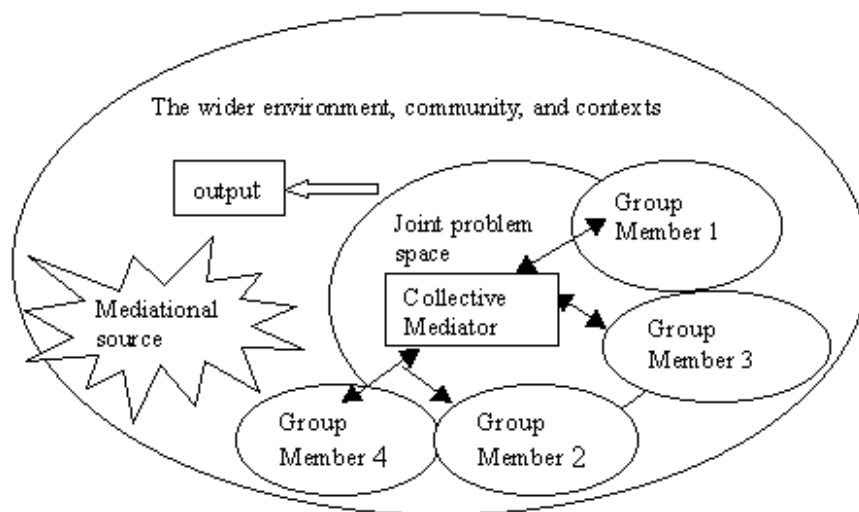
Snapshot E. Post-Project
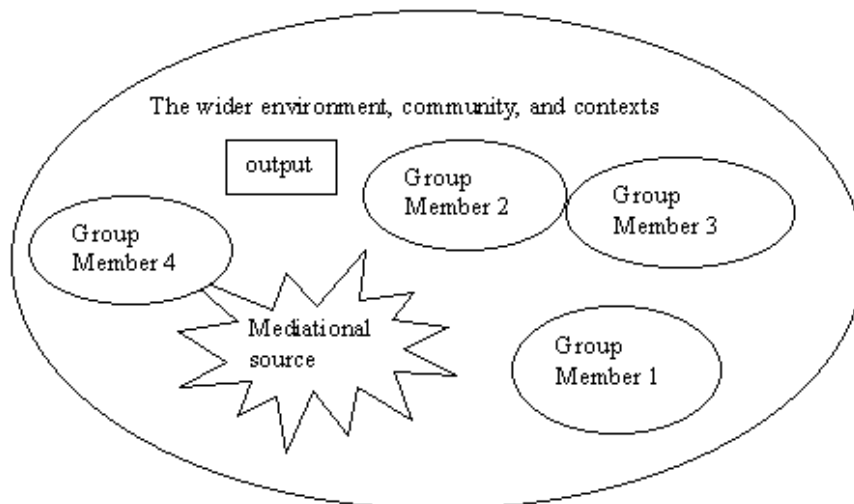
My challenge in this research project is to track a specific collective mediator within the bounds of a group project and to see whether the process conforms with the model and snapshots presented. I expect that the perceptions of a collective mediator will differ for each individual based on his/her own social and cultural influences but there should be points in common within the group that will be revealed through the use of the research protocol. An important point is to consider these differences between individuals within the same group with the same mediator.

The transitions between the snapshots relate to changes in the collective process of the group with the first and last snapshots, for instance, relating to the state of joint activity before and after the members of the group interact. That is, when the members are not part of the collaborative effort towards a specific joint task. Snapshot B is taken at the point of group formation, that is, when the individuals involved first come together as a group to collaborate on a joint problem or task. Snapshot C reflects the introduction of the collective mediator, that is, the point at which the members begin to negotiate the meaning and use of a specific shared, or collective, mediator. Snapshot D reflects the group's co-construction of an output, or solution, for the problem, or task, they share, using the specific collective mediator and any other resources available including, perhaps, other collective mediators.

The choice of a collective mediator in any particular context is, therefore, a crucial element of any study. Within incidences of joint activity, some collective mediators may have pre-established meanings and protocols in which case re-negotiation of meaning may not be necessary or apparent during the task. Language would be a prime example of a pre-established collective mediator, assuming fluency in the language of choice by all participants and prior knowledge of appropriate language for use in a group context. Because of its history, language would be a difficult collective mediator to separate out and study in a particular group context as little change of English usage would be evident amongst fluent speakers of a particular language, English in the present context, even though there may be re-negotiation of meaning. I argue that the participants would have sufficient prior knowledge of the language and that re-negotiation of its use would not be substantive and, therefore, would be a difficult collective mediator to study as such, as any changes in usage would be subtle.

The choice of a collective mediator for analysis therefore, needs to be made carefully. It would need to be sufficiently complex and controversial to allow for

negotiation within a group regarding how it could collectively be employed. Yet it also needs to be easily identifiable within the context of the group project for research purposes. In this study the computer has been chosen for study as is meets these basic requirements. The different aspects of collective mediation that need to be studied within a neo-Vygotskian approach will be addressed by the concept of a protocol.

5.2   The protocol for a collective mediator

Andrews defines protocol as "a set of rules and standards that any two entities use for communication" (2000, p. 15). Although this quote is from a computer textbook and therefore refers to computer entities and such things as error detection and transmission speed (Jesty, 1985), the term protocol is also widely used to describe communication in a human sense, typically in the diplomatic and business fields. Nelson, for example, uses it to explain correct etiquette and procedures when working with different cultures. He cites culture as the "roots of protocol" (1998, p. 24). In this sense, protocol refers to such things as dressing and behaving correctly, and using socially and culturally acceptable forms of greetings and gestures.

I have chosen protocol as a term to analyse and describe communications and negotiations amongst participants in joint activities because it is these key communicative aspects which I believe underscore intersubjectivity and interactivity, the two key elements revealed in the literature review for analysis by a neo-Vygotskian perspective. The protocol provides a framework, or rubric, for understanding these aspects of an essentially communicative process. In other words, I am using the term 'protocol' to describe a theory that I propose for "interpreting the phenomenon that is studied" (Thomas & Brubaker, 2000, p. 245). I present this framework, or scheme for understanding collective mediation in the following table:

Table 5.1: A protocol for understanding collective mediation.

		Collective	Aspects
		Intersubjectivity	Interactivity
Mediator	Form		
Aspects	Meaning		
	Use		

As depicted, there are two dimensions to the protocol, named appropriately the collective and mediator aspects. The horizontal, or collective, dimension is concerned with the importance of viewing the interactivities and the intersubjectivities surrounding the collective mediator, both of which can be thought of as collective but discrete categories. The second vertical dimension of the protocol specifies what aspects of the mediator these agreements concerning meaning and activity should be about. I envisage these three categories as being not discrete, but overlapping.

Vygotsky was concerned with word meaning as the primary unit of analysis, as discussed in chapter two, and the notion of intersubjectivity has been used widely to extend this notion to a collective context (see for example, Crook, 1994; Bruner, 1999). This phenomenon is included in the protocol. In this sense the protocol is concerned with common, negotiated understandings being reached by participants of the group and indicates that group performance is contingent upon this factor. Without negotiated understanding on key aspects of the collective mediator, the joint activity will suffer. This dimension of the protocol requires the analysis of discourse between the group members pertaining to the collective mediator and the negotiated meaning that is reflected in these discussions.

The second collective aspect of the protocol is concerned with the actual physical activity that occurs within the group context and the extent to which this reflects the intersubjective understandings mentioned above. I have termed this category 'interactivity'. This part of the protocol is concerned with the level of agreement concerning the actions of the group concerning aspects of the mediator. This view reflects not only those extensions of Vygotsky's theory offered by Leont'ev and Engestrom discussed earlier, but also the general socio-cultural perspective's preference regarding observable mediated activity rather than unobservable, internal events (see Wertsch, 1995, 1998). This is a second aspect of the joint activity that I wished to retain in the study.

What, then, is the intersubjectivity and interactivity directed towards, or concerned about? To address this issue, which comprises the second dimension of the protocol, I propose the three overlapping categories of Form, Use, and Meaning, concerning the different levels of possible communication about a collective mediator. This idea comes from the field of linguistics. It is concerned with understanding how a collective mediator is perceived, and acted upon, by individuals within joint activity. Because the emphasis in joint activity is on communication

regarding a collective mediator, it is appropriate, I think, to refer to some linguistic models pertaining to the ability of an individual to communicate about some object, sometimes referred to as "communicative competence" (Hymes, 1972).

I have chosen Larsen-Freeman's (1991) model of Form, Meaning, and Use, because as Gunn points out, it appropriately describes the "challenges" of teaching these aspects of communication directed towards an object (1997, p. 52). Other linguistic models such as Chomsky's (1965) focus on grammatical structure, Hymes' (1972) inclusion of social and cultural factors, and Canale and Swain's (1980, 1983) division of communicative competence into four rigid areas, do not address the communicative aspects of describing an object of interest, such as a collective mediator, as well. Larsen-Freeman's model addresses the dynamic, inter-related aspects of directed communication. To illustrate the fluid nature of the three dimensions and their effect on one another, Larsen-Freeman used a pie chart as shown below:

Figure 5.3: Larsen-Freeman's pie chart (from Larsen-Freeman, 1991, p. 280).
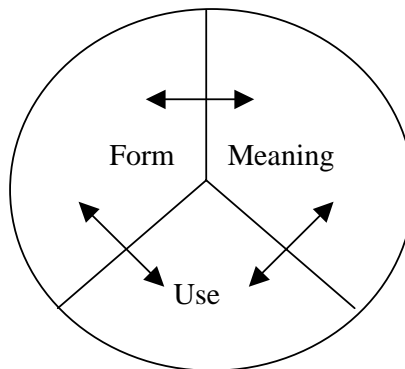
Larsen-Freeman and Celce-Murcia state that "all languages consist of three interacting dimensions: form/structure, meaning/semantics and function/pragmatics, or the use of language in a context" (1988, p. 6). The model emphasises three aspects of communication that are not hierarchical, static categories as depicted in other models, but flexible and interactive. As Larsen-Freeman comments, " the arrows connecting one wedge of the pie with another illustrate the interconnectedness of the three dimensions" (1991, p. 280). It is a flexible model that captures the dynamics of negotiation concerning an object and, therefore, is appropriate for the present context.

I think that in applying Larsen-Freeman's model to the concept of protocol presented here, key aspects of the collective mediator are revealed. The form of a

particular collective mediator refers to the participants' understandings of, and activities towards, the physical and logical nature of the mediator. This would include agreement about which model or specific form of the particular mediator should be used in the context of the problem, for example. The form of the collective mediator refers to its physical attributes and the locations where it will be used. The use refers to participants' understanding of how to utilise the mediator effectively to help with the problem. Group negotiations, decisions, and actions concerning how the collective mediator will be used to help achieve the group goal, or primary purpose of the activity, will reflect this aspect of the protocol. The meaning of the collective mediator refers to how the participants' view the purpose of the mediator in the particular context. That is, why they need the particular collective mediator to achieve the task. This aspect, then, reflects upon the group and the individuals' goals. If there is a high level of intersubjectivity and interactivity regarding all these three areas, then things should go well in the joint activity.

The collective mediation model presented in this chapter is intended to explain and describe joint activity with a collective mediator. The protocol, also presented in this chapter, will be used as the framework for viewing the different aspects of collective mediation. It will guide how data collected about collective mediation is organised and discussed in this research. How I collect this data in the present context, based on these concepts, is the next consideration. Before I build and present a method for the present study, I will first discuss the methods that Vygotsky himself used to study his ideas, then some more recent neo-Vygotskian approaches that may also ground my approach. This will guide the study towards appropriate data collection methods for the present context that suit the requirements of the protocol.

Chapter Six: Methodological concerns

In studying any new area, it is necessary to begin by seeking and developing a method. In the form of a general position, we might say that every basically new approach to scientific problems inevitably leads to new methods and ways of research (Vygotsky, 1997, p. 27).

In this chapter I will review the methods of research that Vygotsky and his followers have used over the years since his theory of mind was first formulated. As illustrated in the quote above, Vygotsky believed that there was a synergy between methodology and theory. That is, he believed that methodology was not just guided by but, to an extent, helped define new theory or, in other words, that the two worked together. As Moll once commented, "Vygotsky set out to develop a general method of study that would be faithful to his theory" (1990, p. 4). In this sense, Vygotsky's views on methodology have an impact on psychology just as much as his theorizing.

The purpose of this chapter is to consider the various methodological approaches to the study of Vygotsky's ideas before building and presenting specific methods for the present study. However, while summarizing the methods that Vygotsky used is fairly straightforward as they are constrained within his writing within a certain time period, reviewing and understanding the methodological approaches that others have taken towards Vygotsky's ideas is more difficult due to the wide application of his ideas into numerous domains. This chapter will, therefore, focus attention on studies that address similar situations to the present context from a neo-Vygotskian perspective. That is, it will discuss methodological issues that may impact upon the protocol, or framework presented in the last chapter.

6.1   Vygotsky's methodological perspective

Critically discussing method and methodological issues within the field of psychology was one of Vygotsky's greatest contributions to the academic world (Moll, 2000). Indeed, there is controversy over whether Vygotsky was primarily a methodologist or psychologist (see, for example, Davydov and Radzikhovski, 1999). Newman and Holzman believe that the two are, in fact, inseparable, within a Marxist context (1993, chapter 1). That is, method and theory are one and the same.

Regardless of this argument, Vygotsky, in approaching 'the crisis' in psychology, re-evaluated research methods employed by the two opposing schools of thought and called for a new methodological approach, to replace both positivist/reductionist and subjective/introspective approaches to psychology and science (Blanck, 1990, p. 51). His position was initiated from criticisms of existing methodological perspectives, as well as the principles underlying them, in the belief that "the material and method of research are closely related" (Vygotsky, 1997, p. 21). He commented, for example, that:

> Two psychologies, which we have characterized above as the psychology of pure spiritualism on the one hand and the psychology of pure naturalism on the other, resulted in the construction of two completely independent methods of psychological research which in time assumed definitive forms and which become fully subject to a major review the moment their philosophical basis itself is subjected to criticism (1999, p. 57).

In reviewing these approaches, Vygotsky had much to criticize. Of the introspective and subjective methods that spiritualism employed (in the form of psychoanalytical views, for example), Vygotsky stated that "phenomenological or descriptive analysis takes a given phenomena as it is in its external manifestation and proceeds from the naïve assumption that there is a coincidence between the external appearance or manifestation of matter and the real, actual, causal-dynamic connection that underlies it" (1997, p. 69). Vygotsky argued that this "phenotypic" view, while useful for describing outward manifestations of phenomena, misses entirely the internal aspect and, quoting Marx, would indeed render scientific research "superfluous" if this were all there was to it (1997, p. 70). Instead, Vygotsky insisted that deeper analysis and "genetic" consideration of internal processes are required to reveal, or disclose, the "real causal-dynamic relations" of a phenomenon (1997, p. 71). In Vygotsky's view, a deeper analysis of the process underlying a phenomenon is required, rather than a study of the phenomenon, or thing itself, one that extends beyond surface level, a descriptive analysis afforded by what he refers to as the "old psychology". He also discussed what he termed "solidified" processes and argued that these were not able to be studied adequately because they were no longer active

(1997, p. 71). Vygotsky, therefore, believed that dynamic aspects should be primarily studied rather than the final resting state of any particular behavioural entity.

Similarly, Vygotsky attacked at length the dominant methodological practice of the time, that of the stimulus-response approach, employed by reflexologists and behaviourists (Vygotsky, 1987, chapter one; 1997b, chapter two; 1999, chapter five). Indeed this attack was the basis of his initial speech in 1924, the one that launched his career in the psychological world (Vygotsky, 1994; Minick, 1987). While Vygotsky suggested that the S-R approach was a useful method for describing lower level processes in humans, he argued that this approach "becomes completely impotent, however, when the basic problem is the study of those means and devices that the subject used to organize his behavior" (1999, p. 59). Vygotsky's major criticism was that this approach reduced behaviour into smaller units, elementary, biologically based functions, which then could not adequately explain higher level functioning (Vygotsky, 1997b, p. 65). In addition, as Vygotsky explained, "The S-R pattern and the naturalistic approach to human psychology hidden behind it assume that a passive character of human behavior is its basic feature" (1997b, p. 38). Vygotsky argued that this is not true of humans who create higher mental functions, which then cannot be adequately studied from an S-R point of view. As Vygotsky stated:

> The naturalistic approach to behavior as a whole, including the approach toward higher mental functions, that was formed during the historical period of the development of behavior does not take into account the qualitative difference between the history of man and the history of animals (1997b, p. 38).

In essence, Vygotsky believed that the unique human system of thinking required, as he saw it, a unique methodological approach, one that could capture and explain the "active role" of humans in process, rather than a reduction of behaviour to a system of stimuli and reflexes, and also to one that moves beyond description of external forms of behaviour (Vygotsky, 1997b, p. 49). In constructing a methodological approach, Vygotsky then considered the Gestalt holistic approach as an alternative to reductionism or "atomism" as he termed it (Vygotsky, 1997b, p. 67). He said of the study of speech, for example, that "a psychology that decomposes verbal thinking into its elements in an attempt to explain its characteristics will search

in vain for the unity that is characteristic of the whole" (1987, p. 45). However, while supporting holistic approaches and rejecting reduction of activity into elements, or psychological abstractions, Vygotsky also cautioned that these could lead back to a purely descriptive account, a point that led Vygotsky to propose three requirements for a research method, which I have placed into the list below:

1. analysis of process, not thing

2. an explanatory, not a descriptive analysis

3. genetic analysis, which turns to the initial point

(from Vygotsky, 1997b, p. 72).

In Vygotsky's view, the solution to problems surrounding methodology was centred upon consideration of the basic requirements listed above, as well as the mediated nature of higher mental functioning. What was needed in his view were methods that would provide the opportunity to observe the active process that humans perform when making sense of the world through the use of signs or tools. The solution, Vygotsky decided, was to recreate artificially such situations in the form of experiments, observe the subsequent behaviour, and extrapolate that information into speculation about underlying processes. He argued that:

> Experimentation is the only path by which we can delve into the patterns of higher processes in sufficient depth; specifically in an experiment, we can elicit in a single artificially created process the most complex changes separated in time, frequently with years passing latently, which are never accessible to observation in all their real totality in the natural genesis of the child and cannot be comprehended directly in a single glance and correlated with each other (1999, p. 45).

Vygotsky's solution, which, as he said, "helps us out of the collision into which psychology was brought by its encounter with spiritualistic and mechanistic conceptions" (1999, p. 60), was based around the concept of the instrumental act, that is the existence of mediators between the external and the internal, the 'X' in Figure

2.1 (see page 27). He extended this concept, which was discussed at length in chapter two, into a methodological approach. Essentially Vygotsky studied situations in which a potential mediator (the 'X') was artificially introduced between an 'S' and an 'R', an entity that spawned new behaviour towards an object in its formation (genesis) rather than in its final (fossilized) form. This general approach was encapsulated within what Vygotsky termed the "functional method of double stimulation", which he then deemed "to be most suitable for our task" (1999, p. 59). This technique, which I shall elaborate upon shortly, was employed widely throughout Vygotsky's work in various guises to understand and explain internal higher mental functioning, and thus became a vital part of his theorizing.

In addition, Vygotsky widely applied the concept afforded by the functional method of double stimulation to understanding the work of others. Throughout his writing he observed and reinterpreted research from a wide variety of fields, either sponsored by him through his laboratory and carried out by colleagues and students such as Luria, Leont'ev, or Levina, or independent works such as those of Kohler, Piaget and Freud. That is, he relied on the work of others as well as referring to his own research. In chapter one of his work entitled Tool and Sign in the Development of the Child, for example, he supports his arguments by referring to the research findings of no less than 14 different authors (1999).

The way in which Vygotsky used research findings also evolved throughout his writing. Wertsch (1991) observes that, although Vygotsky "relied heavily on the generic method", the way in which he employed this approach varied throughout his career, moving from analyses of simple mediated tasks towards more complex phenomena (1991, p. 32). Minick (1987) similarly identifies three distinct phases in Vygotsky's methodological approach, the first being on simple tasks in experimental settings, the second concentrating on word meaning as a unit of analysis, and the third on studying individuals within specific social systems such as a ZPD. Thus, in Vygotsky's work, although changes in focus occur, his general methodology remained consistent.

The functional method of double stimulation, the technique chosen by Vygotsky as the basis for much of his theorizing, was not new. Vygotsky borrowed and adapted techniques from the psychiatric works of Pierre Janet, the combined motor method of Luria, the comparative research of Kohler, and the search method of Ach to create the functional method of double stimulation (see Sakharov, 1994, p. 91;

Valsiner, 1988, p. 134; Wertsch, 1991, p. 32). Presented as a "general method" for studying the process of mediated activity (Vygotsky, 1987, p. 127), the technique is a simple and general one, yet meets the requirements of Vygotsky that any technique must capture the dynamic and historical aspects of activity. Vygotsky explains the logic of this method as follows:

> In using this method, we study the development and activity of the higher mental functions with the aid of two sets of stimuli. These two sets of stimuli fulfill different roles *vis-à-vis* the subject's behavior. One set of stimuli fulfills the function of the object on which the subject's activity is directed. The second function as signs that facilitate the organisation of this activity (1987, p. 127, italics in original).

The essence of this method was that the experimenter sets up a relatively difficult situation, or task, for a subject and then introduces a second, unrelated stimulus, which then can be used by the subject to mediate the activity. Asking children to use their hands and fingers to remember key objects was one example he gave (1997b, p.78). Vygotsky adapted this basic concept to an experimental technique, which he used to explain the dynamics of mediated thinking in a wide variety of fields, based purely upon interpretations of his observations of behaviour in such situations.

In addition, as mentioned, he viewed work carried out by other researchers through the lens of the method. A prime example of this is Vygotsky's consideration of comparative studies of apes carried out by Kohler and Buhler, work that underlay much of his theorizing on the differences between humans and lower species, and specifically on his formulation of the existence of higher mental functions (see Vygotsky, 1987, chapter four; Vygotsky and Luria, 1992). In this work, assisted by Luria, Vygotsky reviewed experimental studies of apes carried out by Kohler on the island of Tenerife between 1912 and 1920. The apes demonstrated that they were able to use, in a limited way according to Vygotsky, auxiliary tools including boxes as shown in the picture below, to solve problems such as obtaining food:

Figure 6.1: Tool using Ape (from Vygotsky, 1992, p. 10).
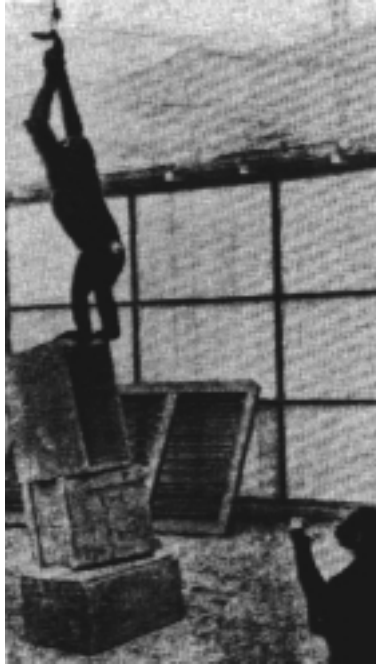
Based on his review of such problem solving tasks, which closely match the method of double stimulation in that auxiliary objects were deliberately introduced into the experimental situation, Vygotsky deduced that apes were qualitatively different from humans in their use of such objects as tools. He commented that, "although the ape manifests the ability to invent and use tools, which is the premise of all human cultural development, nonetheless actual work based on that ability has not yet been developed in apes even to the slightest degree" (1992, p. 32). The role of Vygotsky's methodological perspective is reflected clearly in his interpretation of these studies. More than a method, Vygotsky's methodological perspective provided an explanatory framework.

Another well-known study that Vygotsky's colleague Leont'ev apparently conducted was the "forbidden colours" experiment, which involved a memorization task (Vygotsky, 1999, p. 48). This experiment marked Vygotsky's early work in which he was establishing the existence of mediated higher mental functions, memorization in this case. In this experiment coloured cards were introduced to subjects ranging from 5 to 27 years of age, to help them with the task of answering questions related to colours in which they were forbidden to use the names of key

colours. Vygotsky used this experiment to track the development of higher mental functions and commented that:

> Observations of the development of mediated remembering … point to an extremely unusual fact: if mediated operations occur at first exclusively through external signs, then at later stages of development, external mediation stops being the only operation used by higher psychological mechanisms to resolve the problems that confront them. Experiment shows that not just the forms of using signs change in this case, but the very structure of the operation changes in a radical way. Most essentially, we can express this change by saying that from the externally mediated, it becomes internally mediated (1999, p. 53).

In this instance, Vygotsky used the results of an experiment based on the method of double stimulation to support his conceptions of internalization and revolution, key aspects of his theory as discussed in chapter two. Another example is his discussion of Sakhorov's use of this method in Thinking and Speech (1987, pp. 127-130). In this example, 300 subjects of various ages and psychological disorders were asked to complete another memorization task with the help of wooden blocks. Vygotsky used this study to specifically demonstrate his theory of concept formation. Many other implementations of this method were employed by Vygotsky to highlight the mediated nature of activity in a number of different contexts with a variety of objects. Examples include discussions of Levina's observations of a four and half year old child using a stick to get candy from a shelf, in which the stick mediates the goal directed activity, or work with Luria and Leont'ev on patients with Parkinson's disease, using pieces of paper on the floor to guide them (Vygotsky, 1978, p. 25; Wertsch, 1991, p. 32). In these studies, Vygotsky used the method to demonstrate, not only the development of a new mediational tool from the second stimulus, but also to show how this genetic process transformed the activity in a meaningful way. He was adamant that his interpretations were valid. He said for example at one point that:

> As is apparent from our experiments, the actual process of development occurs in a different form. Our reports show that even at the earliest stages of the

child's development, the factor that moves his activity from one level to another is neither repetition nor discovery. The source of development of activity lies in the social environment of the child and is concretely expressed in those specific relations with the experimenter that permeate the whole situation that requires the practical use of tools and that introduce a social aspect into it (1999, p. 20).

Thus Vygotsky's experiments in the analysis above led to a discussion away from tool mediation towards social mediation through speech acts, a trend which marked his later discussions of development and led to the proposed Zone of Proximal Development (Vygotsky, 1987, p. 210). Moll (1990) argues that the zone is an important extension of Vygotsky's functional method of double stimulation, an educational application of his theory that can be seen to mark the final phase of Vygotsky's work. The ZPD can be seen to be an application of the concept of mediated cognition with the 'adult or more capable peer' becoming the auxiliary mediator in these contexts. However, Vygotsky evidently had little opportunity to test this idea directly. It has, however, been researched thoroughly more recently, as will be reviewed in the next section.

Wertsch, Hagstrom and Kikas point out that Vygotsky did little research on socio-cultural contexts generally, tending to concentrate more on smaller experimental studies (1995, p. 277). That is, although Vygotsky presented much conjecture based on observations of mostly experimental settings, he seldom researched socio-cultural contexts directly, which is ironic considering the socio-historical basis of his theorizing. However, one exception to this was Luria's expedition to central Asia, a study sponsored by Vygotsky to research the thinking of more 'primitive' cultures, a controversial study at the time. From a methodological perspective, this study marked a radical departure in scale from Vygotsky's usual approach; a foray into a wider application of his principles of mediation, this time on a cultural-historical level. There is evidence that this study got him into trouble with the government at the time and perhaps it is for this reason that he avoided further studies of a similar type (Kozulin, 1996).

In summary, the underlying themes of Vygotsky's methodological approach include his insistence on studying behaviour in genesis; that is, in studying the development of thoughts and activity in process rather than in any final stable state.

He was interested in the dynamics of the process rather than the outcomes. Another key facet was his emphasis upon studying behaviour holistically rather than segmenting it into components, an activity for which he strongly criticized the S-R approach. The use of word meaning was representative of this approach, as was his tendency to form broad generalizations about activity rather than dissect it into fragments. A third theme was his desire to move beyond surface descriptions to the underlying cause of behaviour; an intention cross-linked with the previous theme, and based on his criticisms of spiritualistic studies. A fourth theme was his strong belief and emphasis upon studying the mediational aspects of human development. His method of double stimulation was designed deliberately to focus upon this dynamic and his observation of others' research was viewed through the lens of this method. After all, it was the social and dynamic formation of these mediators that interacted between the internal and external world of the individual that formed the essence of Vygotsky's theory of mind.

However, as indicated above, much of Vygotsky's theorizing was based on observations and interpretations of experimental data and results from other researchers. He seldom presented the results in his writing, perhaps because he thought the details were eclipsed by his interpretations. I agree with Scribner (1985) that Vygotsky generally tended to be obscure concerning the specifics of empirical evidence throughout his writing, which probably reflects his methodological biases away from reductionist accounts and towards more holistic analyses based on his background and reading of Gestalt literature, and also perhaps his lack of time. As mentioned before, he was in a great hurry due to the illness that killed him in 1934. Rather than being 'careless', however, Scribner argued that Vygotsky's analysis was, in fact, deliberately subtle, weaving in two lines of development - that of ontogenesis, as well as an historical account (1985, p. 13). Vygotsky himself commented on the difficulty of operationalizing his concepts when he said:

> The greatest difficulty in genetic analysis consists precisely in using experimentally elicited and artificially organized processes of behavior to penetrate into how the real, natural process of development occurs. In other words, the enormous problem of transferring the experimental outline to real life always opens up before genetic research. If the experiment discloses for us a sequence of patterns of any specific type, we can never be limited by this

and must ask ourselves how the process being studied occurs under conditions of actual real life, what replaces the hand of the experimenter who deliberately evoked the process in the laboratory … In true research, it is still necessary to trace the path along which the cultural forms of behavior develop (1997b, p. 94).

This demonstrates to me that Vygotsky realized some of the constraints of his methodological approach, specifically that observing behaviour in isolated experimental situations was limited, and that to understand human functioning fully, research must address its dynamics in context, that is, that behaviour can only be understood in its social and cultural setting. Vygotsky's general approach, for example, towards understanding the relationship between speech and thought was to look for overriding cultural explanations of human activity rather than "atomistic" accounts (Vygotsky, 1987, chapter 1; Luria, 1979, p. 38). Davydov and Radzikhovskii point out additionally that Vygotksy's insistence upon meaning as a unit of analysis led to methodological inconsistencies and "contradictions" in his approach (1999, p. 117). Bruner observes that a key point of Vygotsky's theory was that "processes go inwards, and they are therefore made amenable to interaction with other processes" (1987, p. 15). Vygotsky's methodological intentions, or challenges, were then to access these inner processes through observation of experimental activities. Vygotsky attempted to explain these internal processes by staging and observing mediated behaviour and through analyzing the underlying meaning holistically. That is, he attributed the observed behaviour to underlying psychological functioning based purely on his own interpretation of events. From this perspective, Vygotsky's methodology was tailor-made for his task but there are issues surrounding his explanatory framework.

Placing Vygotsky's methodology within recent frameworks of inquiry (see, for example, Denzin & Lincoln, 2000) is problematic due to his use of both analytical and subjective accounts. Within the scope of modern methodological practice, Vygotsky's approach is constructivist and qualitative in nature because he tended to avoid tightly constrained statistical approaches and preferred to observe and explain socially constructed human processes rather than outcomes (see Denzin & Lincoln, 1998, p. 212). Most of his experiments using the method of double stimulation were small scale and exploratory in nature. However, almost paradoxically Vygotsky

avoided descriptive phenomenological approaches, arguing against the value of subjective, surface-level accounts and highlighting the controlled nature of his experiments in keeping with positivist traditions. That is, his methods present an anomaly within present methodological practice (see Davydov & Radzikhovskii, 1999, p. 117). It is perhaps for this reason that recent studies of Vygotsky's theory have tended to avoid implementing directly his method of double stimulation, preferring instead traditional quantitative, as well as naturalistic approaches, although some, as Lloyd and Fernyhough proclaim, "try to realize his dream of a new methodology for conducting research into mind" (1999, Volume four, p. xi). To what extent will be illustrated in the next section.

6.2   Neo-Vygotskian studies of groups

As expected, Vygotsky's work has generated a large amount of research within a breadth of academic fields, too large to be enumerated and reviewed within the scope of this section (see for example, Lloyd & Fernyhough, 1999; Lee & Smagorinsky, 2000). Instead, as mentioned at the beginning of this chapter, I intend to focus my review of more recent methodological approaches to the study of his concepts within the context of the present study, therefore, constraining it to accounts of how researchers have investigated the educational implications of his work, particularly with respect to the use of collaborative groups and with computer technology.

An underlying theme of Vygotskian thinking, as reviewed, was the socially derived nature of human activity including learning, and it is this aspect of his theory that intersects clearly with the study of collaborative groups. As Lee and Smagorinsky comment, "Modern refinements have helped make Vygotskian principles relevant to the framing of diverse social problems not apparent through Vygotsky's primarily laboratory experiments" (2000, p. 3). In the field of education, numerous studies have pondered over the social and dynamic nature of learning, which has helped lead a movement away from the traditional individualistic theories of learning towards more socially orientated contexts, including group work (Bruner, 1987).

The concept of the ZPD is perhaps Vygotsky's most famous illustration of the processes that can occur within instances of joint learning activity (Moll, 1990). It is

no surprise that there has been much research in the educational field on the concept of social mediation within a ZPD (see for example, Chaiklin & Lave, 1996; Guerrero & Villamil, 2000; Lantolf & Appel, 1994; Lee & Smagorinsky, 2000; Lloyd & Fernyhough, volume three, 1999; Moll 1990; Rogoff & Wertsch, 1984; Wertsch, 1985). The large majority of studies appear to concentrate on the discourse between participants, whilst others (see, for example, McNaughton & Leyland, 1999; Saljo & Wyndham, 1996; Tudge, 1999), take positivist approaches using pre-tests and post-tests of different conditions in order to understand the differing effects of interaction. Overall, I think that the numerous observations and experiments on the concept of a ZPD highlight, from a methodological perspective, the complexity, or 'richness' of learning within a social arena and the wealth of factors that can be accounted for within such zones of learning. Hogan and Tudge comment on research on the ZPD, for example, that:

> The findings suggest that benefits may depend on a complex set of factors. Such factors may include the particular age and ability level of the children and of their partner, the children's motivation to collaborate, and the extent to which they are exposed to more sophisticated reasoning by a partner and are willing to accept and use that reasoning independently. The nature of the task will also have an influence, as the situations and activities will pose challenges to the ways in which children had previously used certain cognitive operations. The institutional and cultural supports for collaboration will also interact with other factors (1999, p. 46).

Such an account of the factors involved in establishing or proving the benefits of the ZPD are naturally of interest to educators who are interested in understanding effective pedagogical practice. However, such approaches move away from Vygotsky's interest in studying the process of mediated learning rather than the outcomes. Most studies, therefore, study process by analyzing discourse between participants involved in joint learning activity and the subsequent intersubjectivity that occurs (Moll, 2000).

The study of the neo-Vygotskian notion of intersubjectivity is, however, problematic, typically involving studies of how participants "read others minds" (Bruner, 1999, p. 13), a process fraught with difficulty. Tudge, for example, based on

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his largely quantitative research of different treatment groups, pointed out that, "the intersubjective understanding attained in the course of discussion was as likely to be in a regressive as in a progressive direction" (1999, p. 217). In this case Tudge studied intersubjectivity by measuring the number of instances in which partners accepted the other partner's "reasoning" and compared this with post-test results. Wertsch, on the other hand, presented the concept as "a kind of metric for understanding intermental functioning between adults and young children", citing studies with infants and their parents (1998, p. 23). On an operational level, the concept of intersubjectivity seems vague, being associated mainly with instances of agreement as measured by observations of joint activity, which, as Bruner observes, "tolerates an unacceptable degree of relativity in what is taken as knowledge" (1999, p. 14). Agreement is clearly not equal to intersubjectivity for, as discussed in the previous chapter, conflict can also play a key role in social learning situations and to the development of negotiated meaning (Matusov, 1996). Intersubjectivity is also not equal to knowledge, which must be justified and verified further (Bruner, 1999, p. 15). Intersubjectivity is, then, best explained from this perspective as a result of negotiation, rather than as a dynamic part of joint activity within a ZPD. It is the joint understanding resulting from negotiation that distinguishes intersubjectivity. This is how it will be defined for the purposes of this research: negotiation and discourse between individuals that leads to some understanding of meaning.

Many authors have extrapolated Vygotsky's concept of a ZPD and his emphasis on the social and cultural bases of learning into a view of learning environments as 'communities' and the subsequent need to study these from an ethnographical perspective (Cole, 1999; Moll, 2000; Rogoff, 1990; Wells, 2000). Moll, for example, justifies this approach by commenting that, "we must study those lived experiences dynamically, so we have also borrowed our methods of study from anthropology" (2000, p. 258). It is this aspect of neo-Vygotskian thinking that also intersects clearly with support for collaborative learning contexts, as Webb and Palincsar (1996) and others have pointed out (see, for example, Crook; 1999a). These ethnographical approaches generally lend themselves more towards study of process similar to Vygotsky's own observational work, as discussed in chapter four. This neo-Vygotkian view supports the creation of socially, culturally and resource rich learning environments within which learners are encouraged to co-construct knowledge.

However, one area of methodological tension is differences in perspective concerning an appropriate unit of analysis for studying such interaction. While Vygotsky firmly believed that word meaning should be the unit of analysis, many neo-Vygotskian accounts, following the suggestions of activity theory, prefer activity as the primary unit (Davydov & Rhodzikhovskii, 1999). Activity as a unit of analysis, however, may have broad interpretations. As Wertsch points out, "action may be internal as well as external, and it may be carried out by groups, both small and large, or by individuals" (1998, p. 23). Wertsch prefers the modified notion of mediated activity, an encompassing term, which includes entities such as speech, and physical activity, for example, a notion, which he says "provides a kind of natural link between action, including mental action, and the cultural, institutional and historical contexts within which such action occurs" (1998, p. 24). From a methodological perspective, Wertsch's perspective highlights the need to address the effects of mediation from observing and measuring a range of behaviour from both aspects, that is, verbal and physical. A neo-Vygotskian study of groups should therefore encompass data about both intersubjectivity and interactivity, which conforms with the protocol presented earlier.

6.3   The Neo-Vygotskian study of computers and groups

This section is specifically concerned with discussing methodological issues concerning the study of computers and groups from a neo-Vygotskian perspective. This is in anticipation of choosing specific methods for the present context. In chapter four I discussed numerous studies involving computers and groups, some of which could be said to approach the research from a neo-Vygotskian perspective. However, in terms of choosing a suitable methodology for these scenarios, Parr comments:

> There are problems with investigating technology in educational settings. A major issue is the complexity of the interaction among computer use, the social system of the classroom and instructional activities, and pedagogical goals promoted by teachers (1999, p. 365).

As was discussed in chapter four, various perspectives can be taken of joint activity with computers. There are many variances involved in terms of, for example,

the nature of the interaction (physical or virtual), the role of the computer (as a tutor, student, or tool), how to assess the effectiveness of such joint activity (outcomes or processes), and group variances in terms of participation, motivation, and autonomy. Generally as was seen, the interface between the computer and the social aspects of joint learning activities was seen as problematic and fraught with tension. This research is concerned with one such instance, or niche, in which the joint activity around computers needs to be viewed in relation to the theories discussed in the literature review and to the model and protocol presented in the last chapter.

A neo-Vygotskian account of learning approaches such contexts by viewing computer technology as part of a cultural 'toolkit' of mediational means (Bruner, 1999; Lee & Smagorinsky, 2000; Saljo, 1999; Wertsch, 1998). Within this perspective, computers are viewed as cultural tools that are not necessarily verbally mediated and that are embedded in a community no different from a plethora of other potential mediators although, as Feilden (2000) pointed out, there are large differences between computers, as mediators, and social processes such as other people. That is, the technical tool and the community are clearly separated in function, which relates to Vygotsky's differentiation between signs and tools (see also Crook, 2000; Wells, 2000). In terms of method, although there are other methods, studies surrounding the use of such technology within collaborative groups from this perspective tend to be ethnographical and, therefore, concentrate on the talk and interaction that occurs concerning computers (see Light & Littleton, 1999, p. 6).

An representative example is a study conducted by Schertz and Stremmel (1994), which analyzed talk between teachers and pairs of young students working at a computer task, a study that is, therefore, of specific interest here. These authors taped, transcribed, and then categorized this discourse, using Miles and Huberman's approach (1984). Schertz and Stremmel used these transcripts to illustrate the critical role of the teacher, in scaffolding the students' learning in front of the computer. While this study was concerned with early childhood classes, other similar studies (see, for example, Crook, 1994; Sutherland, 1993; Webb, 1989) indicate the importance of this scaffolding, or elaboration amongst pairs of older students working at computer tasks. Gallimore and Tharp (1999), for example, have proceeded as far as speculating about the differing types of such assistance based on their extensive research of similar collaborative discourse. However, such research has its limits particularly in the study of such entities as computers. As Crook comments:

There undoubtedly is a growing enthusiasm for studying the quality of pupil talk in situations where computers are used collaboratively. However, studies of peer dialogue during learning may only go part of the way towards identifying how a computer experience is working. There remains a need for a strong theory of how that dialogue functions to support the learning process (1999a, p. 425).

Light and Littleton similarly argue that methodologies are needed which focus on the broader negotiation of meaning surrounding the computer rather than descriptions of talk (1999). There seem to be two reasons for this. Whilst videotaping, computer logs and transcripts are commonly used methods for collecting data concerning interaction at computers, Light and Littleton argue that research needs to go beyond overt observable interactions, for a strict analysis of speech may miss the non-verbal understandings that surround a physical tool in the form of a computer (1999, pp. 5-6). In addition to this problem of "observability", Crook comments that studies of computer use in isolated incidences ignore the wider cultural influences upon such activity and he, therefore, "encourages looking beyond the circumscribed sessions of joint computer activity that the interest of most research on this topic" (1999b, pp.111). A strict ethnographical analysis of discourse may miss wider socio-cultural influences. Littleton, for example, comments that:

> The notion that there is co-functionality, whereby the mediational means form part of actions in situated practice, has considerable implications for the ways in which we study computer-supported collaborative learning. The computer is an artefact which is not only capable of supporting collaborative endeavour, but has the potential uniquely to transform the way in which collaborative activity is organized. It can reorganize the social processes of learners' joint problem solving (1999, p. 186).

From a neo-Vygotskian perspective research, therefore, needs to go beyond a microscopic analysis of the interactions between the learners, teachers, and the computer screen and should consider wider environmental, or socio-cultural influences, which then comments on the meaning of such activity. As an example,

DeVillar and Faltis have noticed that, "the use of technology poses a threat to group socio-academic success only insofar as educational policy relegates its use towards divisive rather than integrative means or ends" (1991, p. 130). That is, educational policy, which represents top-down influence within a community of practice, can directly effect the quality of collaborative group work with computers. This reflects a neo-Vygotskian perspective of the socially and culturally mediated co-construction of meaning (see also Littleton, 1999, p. 192). As a tool to be researched, there are a multitude of levels on which computers can mediate joint activity (see Saljo, 1999).

From a Neo-Vygotskian perspective, the numerous methodological approaches to the study of Vygotsky's theory of socially derived, dynamically mediated human activity have a number of commonalities that impact upon the construction of a method for understanding undergraduate group projects that involve the use of computer technology to co-construct a solution to an authentic task. These commonalities include an emphasis upon process rather than outcomes, understanding dialogue as well as physical activity, moving beyond description to explanation, and viewing the group and individual practice as an interactive, flowing history within a wider socio-cultural community. The role of the computer is seen also as embedded within the joint activity and should, therefore, be viewed as potentially transforming its meaning. As indicated by the protocol developed in chapter five, it is the negotiation and activity surrounding this tool that is of interest in the present study rather than technical features of the machine itself or the outcomes of the activity.

These features need to be taken into account when choosing data collection methods to suit the neo-Vygotskian approach taken in this thesis and the protocol presented in chapter five to support this perspective. The next chapter will discuss these specific methods as well as the context within which I want to employ these tools of neo-Vygotskian methodology.

Chapter Seven: Research method and context

Choosing a research paradigm, or "worldview" (Guba and Lincoln, 1998, p. 200) that conforms with the neo-Vygotskian protocol presented in chapter five, has been largely directed by Vygotsky's holistic approach, as illustrated in the previous chapter. However, it is worth noting that Vygotsky's methodological stance on understanding the dynamic, meaning-making aspect of social activity also intersects with those of other paradigms. Consider, for example, the following:

> First, human beings act towards things on the basis of the meanings they have for them. Humans inhabit two different worlds, the 'natural' world wherein they are organisms of drives and instincts and where the external world exists independently of them, and the social world where the existence of symbols, like language, enables them to give meaning to objects. This attribution of meanings, this interpreting, is what makes them distinctly human and social (Cohen & Manion, 1994, p. 33).

This description, termed the symbolic interactionist perspective (Blumer, 1969), reflects many of the concerns of Vygotsky concerning the mediated nature of human functioning. Indeed, the approach directly supports Vygotsky's division of lower and higher mental functioning, the uniqueness of human thinking and the importance of symbols as mediators. Similarly, the constructivist paradigm, itself constructed by Guba and Lincoln (1998), mirrors many of Vygotsky's concerns about the culturally and socially constructed nature of development, learning and thinking. Within this view, these authors say that,

> The aim of inquiry is *understanding and reconstruction* of the constructions that people (including the inquirer) initially hold, aiming towards consensus but still open to new interpretations as information and sophistication improve (Guba & Lincoln, 1998, p. 211, parentheses and italics in original).

This perspective also intersects with a socio-cultural perspective in which the individual's constructions "occur via a process of argumentation within a community" (Larochelle & Bednarz, 1998, p. 72). These views, which are encapsulated within the

neo-Vygotskian perspective taken in this thesis, highlight many of Vygotsky's methodological concerns in a contemporary arena by highlighting concerns for understanding the mediated and dynamic processes of interaction, the situatedness of such research, and relativist nature of knowledge that is constructed from this interaction.

These beliefs, however, also seem to conflict with Vygotsky's reliance on experimental techniques which, after all, tend to rest on positivist notions of knowledge (Guba & Lincoln, 1998). A recent replication of the "forbidden colors" experiment, for example, which did not support the findings regarding the notion of internalization, raises questions regarding his general methodological approach (Van der Veer & Van IJzendoorn, 1994). Luria also noticed some drawbacks surrounding Vygotsky's early experimental approach once commenting that:

> The individual studies that we carried out at the time, of which I have mentioned a few, must be considered banal in and of themselves. Today we would consider them nothing more than student projects. And this is exactly what they were. Nevertheless, the general conception that organized these pilot studies laid the general foundation for Vygotsky's general theory and provided a set of experimental techniques (1979, p. 51).

Vygotsky's general worldview, or paradigm, is commonly perceived now as being consistent with a social constructivist, or co-constructionist approach (see for example, Stetsenko & Arievitch, 1994, Guba & Lincoln, 1998). This paradigm typically uses qualitative research principles and methods to capture the construction of meaning within a social and cultural environment. However, the quantitative/qualitative distinction is not all that useful in the context of this study.

Indeed, the widely adopted differentiation between the two views may be unnecessarily confusing. Sarantakos points out, for instance, that the distinction between qualitative and quantitative perspectives can be viewed in at least three ways (1998, pp. 53-4). It can be viewed as non-intersecting and opposing dichotomies, reflecting different worldviews, that of hard science and objectivity, and that of soft research, and subjectivity (see Newman & Benz, 1998). The two can also be viewed as marking extremes of a continuum with numerous blending of points of view in between (see Pirie, 1998). Finally, Sarantakos illustrates that within the history of our

culture, quantitative methods can be viewed as tools of research within a broader qualitative understanding of the world. That is, quantitative methods can be viewed as a "simplification" of a broader language used to describe any particular "reality" (Sarantakos, 1998, p. 54; see also Thomas & Brubaker, 2000, p. 141). For this reason, Guba and Lincoln (1998), for example, observe that qualitative approaches may include a multitude of methods, such as quantitative measures, and similarly, as Morrison points out, many qualitative approaches end up using quantitative methods, for example, to decide on which categories to drop, or keep, based on frequency or some such other measure (1998, p. 160). That is, the two approaches can overlap. I tend to agree with Guba and Lincoln, therefore, that the dichotomy is useful for distinguishing between methods, or tools for collecting numerical data and non-numerical, and in addition that:

> Both qualitative and quantitative methods may be used appropriately with any research paradigm. Questions of method are secondary to questions of paradigm, which we define as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways (Guba & Lincoln, 1998, p. 195).

For this study a social constructivist paradigm matches the neo-Vygotskian concern with how individuals co-construct knowledge in cultural settings. In this particular case, the context comprises individuals working in groups with a collective mediator, in the form of computer technology to produce projects in a specific academic setting, or culture. The model presented in chapter five is concerned with the mediational aspects of this activity with the protocol providing a framework for presenting and discussing the data from a neo-Vygotskian perspective.

The next step, as Guba and Lincoln point out above, is to choose a specific research strategy, or "tradition of inquiry" (Creswell, 1998, p. 21). This research strategy helps choose specific methods for collecting data about the participants' activities within the context of the study. As a starting point for this activity, I agree with Vaughan that "always, the researcher carves up social reality in order to study it, but it is the research problem that dictates how the carving is done" (1992, p. 171). As Seidman similarly observes (1998, p. 5), it is the research question that drives the choice of research methods rather than the other way around.

7.1 The research question

As discussed, this research is concerned with groups of undergraduate students utilizing and perceiving of the computer as a collective mediator, in the neo-Vygotskian sense of this term. That is, the study is interested in how the computer, as a mediational means, is co-opted by both individuals and groups in a particular academic setting which, essentially then, reflects learning. Stated more concisely and formally the research question is:

> *How does computer technology, as used by the groups to co-construct the project, reflect the concept of collective mediation?*

This question can be divided into two interrelated components that reflect a basic concern with the collective mediation afforded by the use of computer technology in the group projects. These two components, or sub-questions can be expressed as: how does the group construct the project collectively using computer technology? and how does this joint activity reflect a neo-Vygotskian perspective of collective mediation as proposed in chapter five? The goal of this research, based on the primary research question plus these corollaries is, therefore, to conduct a study using the protocol, also presented in chapter five, as a framework for understanding how computers were employed by the groups. There are many methodological challenges in attempting to do this. Some immediate practical issues arise regarding how exactly the relative influences of a collective mediator within a group can be assessed and how the influence that such a mediator has on the group can be 'tracked' as a whole, and on individuals, in an acceptable fashion. Both these questions are related to the protocol, which directs the specification of a methodological strategy and, therefore, appropriate methods that will provide the type of data required to address the research question.

7.2 A case study

Overall, this research can be envisaged as a case study. It is centred upon a set of group projects carried out within a particular programme of study within a specific time period, which is consistent with a case study approach. This is supported by Yin's statement that a case study is best used when:

- a "how" or "why" question is being asked about a contemporary set of events over which the investigator has little or no control (1994, p. 9, bullet in original).

The present study meets these basic requirements. The study is centred upon a "how" question; it is interested in a contemporary, dynamic set of events rather than something historical and, being part of an existing academic programme, it did not allow, or warrant, intervention. Additionally, the context represents a "bounded system" and so can be defined as a case (Creswell, 1998, p. 37). Another aspect of a case study approach that may be of benefit to research concerning a new model is that, within such an approach, theory is not necessarily reached inductively, in a grounded theorising sense, nor deductively, in a positivist sense (see Strauss and Corbin, 1998). Rather, in a case study, theory is located somewhere in the middle of the process, that is, it is negotiated as the study progresses, which allows some flexibility in developing and revisiting the model (Creswell, 1998, p. 85).

In this study, I start out with a neo-Vygotskian view of the computer as a collective mediator and then examine this relationship through a theoretical framework termed a protocol. The study then reflects an effort to conform with Wertsch's view that "The essence of examining agent and cultural tools in mediated action is to examine them as they interact" (1998, p. 25). In this sense this research extends a case study approach into a microgenetic one, that is, one that tracks the developing use of the computers by the groups as the projects progress. This research is more than a study of one static case, or context. It is the study of a phenomenon in motion over a four month long period of time within four separate groups. Specifically the study is concerned with how the group participants collectively perceive of and utilize a collective mediator, in the form of computer technology, for the purposes of a single task, in the form of a project.

As Yin points out, the case study approach has generally been marginalized within general research practice, with many authors paying it little attention (Yin, 1994). The reasons for this, many of which overlap with criticisms of qualitative methods with which it is often confused (Yin, 1994, p. 14), usually relate to perceptions of a 'soft' approach to science (see also Denzin & Lincoln, 1998). A feature of case studies, however, is that they are multi-method and can employ a mixture of both qualitative and quantitative methods. Their strength lies in their

ability to describe, illustrate, and explore a complex phenomenon that cannot be reduced to a set of variables, according to Yin (1994, p. 15). One of the requirements of case study research, therefore, is to use "multiple sources of information in data collection" (Creswell, 1998, p. 37), and to achieve this, Yin illustrated a range of events that typically make up a case study as follows:

Figure 7.1: Case Study Method (from Yin, 1994, p. 49).
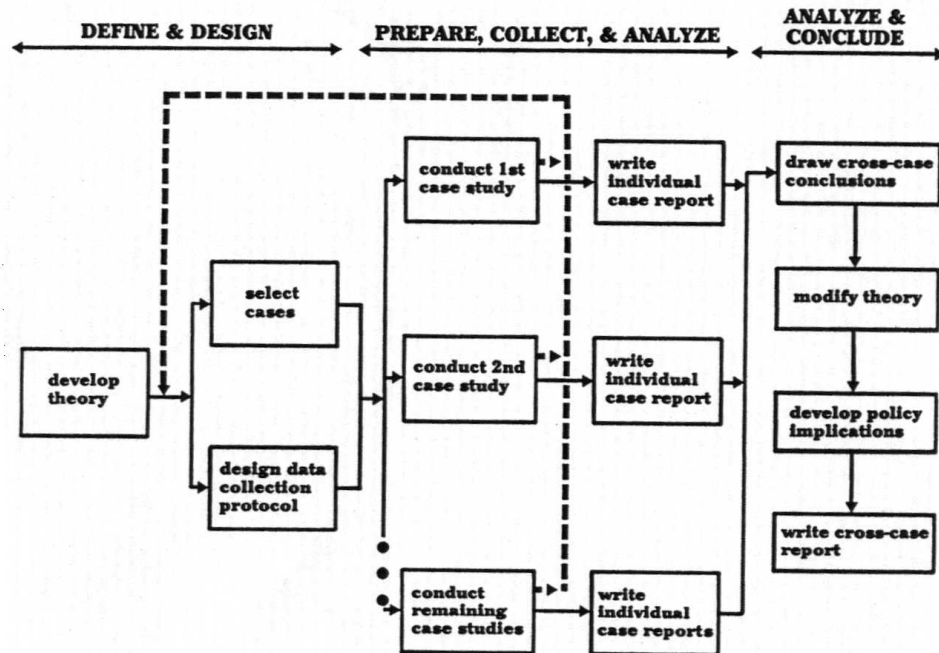
This sequence of events intersects with Creswell's general view of inquiry of human and social issues as one in which "The researcher builds a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting" (1998, p. 15). Yin's model, which features multiple cases, starts with the researcher proposing some type of model or theory to be studied with the information from the cases, then commenting on the theory. In this sense, case studies, as Creswell (1998) pointed out earlier, view the development of theory as part of the process rather than being sectioned off before or afterwards. In the present context, the different groups were seen as being "embedded" within a single instance of a programme, that is they were cases within a case. This means that while comparisons can and will be made between the groups, the data from all the groups can be pooled together and viewed "holistically" as representing one case in terms of the sequence of events depicted in Figure 7.1 (see also,Yin, 1994, p. 39). Further

interpretation of this model, in relation to the present context and the protocol developed to view this context, produces the following list of events, which also largely maps out the remainder of this thesis:

- Choosing an appropriate context, or case in which computers are used by groups.
- Choosing methods as guided by the protocol for collecting data about the use of computers within the projects in that context.
- Collecting the information.
- Interpreting the data via the protocol.
- Addressing the research question.

The study is concerned with an interpretation of data collected in an authentic learning context based around the protocol and a neo-Vygotskian model presented in chapter five. The approach is interested in constructing a complex holistic picture of how computers mediated group work in an academic setting and therefore requires, as Denzin suggests, "an enormous commitment to methods and procedures that will increase a text's credibility, transferability, dependability, and confirmability" (1998, p. 331). Indeed, while the list above separates a discussion of context and data collection tools, these were closely related in the study, as Yin suggested in Figure 7.1. The following section will describe the context of the study. After this the data collection methods chosen to meet the requirements of the protocol will be specified.

7.3   Describing the context of the study

The actual data collection was carried out with four groups of students enrolled in the third module of the Integrated Business Studies programme (IM3) at the Auckland University of Technology during semester one, 2001. This module comprised the first section of the Bachelor of Business degree (B.Bus) being offered at AUT at the time and, like the two preceding modules, included a major group project, in this case entitled the Business Development Plan.

The history of the degree programme, and particularly the integrated modules, within which the group projects were incorporated, is not without controversy. Trenwith (1998), in a discussion of the history and background of the degree

programme, reflected that the formation of the degree occurred in the late 1980s and early 1990s when the neo-liberal labour government of the day opened up tertiary education to market forces which allowed polytechnic institutions to offer degree programmes in direct competition with universities (see Blake et al, 1998, or Butterworth et al, 1998). It was a tough market apparently and Trenwith observed that the success of the B.Bus came to "depend upon constructing a degree that would first satisfy NZQA[1] validation and accreditation requirements, second be sufficiently innovative to create a differential between the ATI[2] and the traditional university equivalent, and third have broad appeal to both the labour market and the professional bodies" (1998, p. 569). The differential, as Catherine Vile (2000), the current programme leader, points out, lies in the integrated modules of the degree and, particularly, within the integrated group projects, aspects designed to "transform" the students' "skills and capabilities" in business related areas.

Recent changes to the B.Bus curriculum, which include shortening it by a year to compete with similar business degree programmes in other universities, have retained the integrated modules and the group projects that are encapsulated within them. In a sense these changes reflect, as Trenwith commented, a programme with a "curriculum being driven almost solely from a consumer perspective" (1998, p. 559). In this changing market, the B.Bus has been promoted as an "applied degree" with the emphasis being placed on the development of skills rather than the attainment of academic knowledge, a concept that has apparently been successful (Trenwith, 1998, p. 561).

The reason that I chose this context has been outlined in chapter one. I had taught previously in the programme as a lecturer at AUT, and had also carried out a pilot study on two IM3 groups in 1999 (Raven, 2001). I, therefore, had some previous experience with the projects and believed that they offered a good example of a pedagogical practice that attempts to embed group work and computer technology into an integrated project. My pilot study of two groups, which was also used to develop some of the data collection techniques, uncovered numerous examples of tension between the use of computers and group work within a project environment and raised critical questions as to their purpose (Raven, 2001). The students in the pilot study tended to specialize and seldom worked together due to the constraints of

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[1] New Zealand Qualifications Authority: A government accrediting organization.

the technology used. Another motive stemmed from the sheer lack of research on these projects at AUT. At the time I was told by the programme leader that no formal research had ever been conducted on the group projects since the programme was introduced in the early 1990s. I, therefore, had access and motive.

7.3.1   The group task/project

The Business Development Plan, the group project that was the subject of this study, was a major assessment outcome of the IM3 curriculum being worth 45% of the students' final grade for the semester. This mark was allocated to several key stages involved in the project as the following table from the semester one, 2001 IM3 Student Handbook guide indicates:

Table 7.1: Business Plan Outline (Appendix I, p. 495)

		Marks	*Weighting*	*Type*	*Date*
Stage 1	Registration of Interest		0%	Individual / Compulsory	Team Session 2 Week 2 Friday 2 May
Stage 2	Preliminary report for establishing a business.	100	5%	Group	Monday 26 March 12:00 noon
Stage 3	Written business development plan.	100	30%	Group	Tuesday 5 June, 12:00noon
Stage 4	Presentation	100	10%	Group / Individual	Monday 11, Tuesday 12 & Wednesday 13 June
Stage 5	Contribution to Syndicate	15	+/- 10% of Business Plan	Individual / Group	Wednesday 13 June, 5:00pm

The project progressed in key stages over a period of more than four months from group formation (registration) to the completion of the project (written report plus presentation). The problem, or task, was based around a real life scenario that

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[2] AUT was previously known as the Auckland Technical Institute (ATI).

was described to the participants in the student assessment handbook (Appendix I, p. 495) as follows:

You are a syndicate of between four and seven Bachelor of Business graduates who wish to establish a new business. By combining each syndicate member's personal savings, your syndicate is able to contribute *between $50,000 and $300,000* (this may be increased upon negotiation with your accounting tutor) to the project. In addition, your syndicate must make use of external finance in establishing this new business. External finance is available through the Auckland Enterprise Bank (a venture capital bank). Details of their loan criteria are provided in Stage 4 of this section.

This business development plan is a major project and comprises several separate stages. It is important for you to understand that **each stage requires a different approach in terms of purpose, content and style.**

There were three stages to the project: a Preliminary Plan, in which the groups presented initial ideas they had developed together for a new business, the Business Plan itself, a written report typically in excess of 100 pages, and a presentation based on that written plan. As the research question is concerned with how computers were used by the groups, this research focused on just the construction of the written report by the groups using computers, once the preliminary plan had been approved, and prior to the final presentation.

The students were given fairly specific expectations about the written report from a variety of sources including the student handbook illustrated in Appendix I. There were, for example, clinics given in various content classes on the project, and many students had access to examples given in previous semesters. The assessment task had a history based on nine years of being issued to students although, of course, the exact requirements varied from semester to semester. Nevertheless, there was a certain degree of folklore and legend surrounding the task that passed down from one semester to another.

Essentially the groups, comprising typically from four to six students, were asked to carry out the necessary research and request funding for a new business venture that would be viable within the New Zealand business environment, or culture. The task, as indicated, was designed to be authentic and ill-structured, leaving the students much freedom in choice of topic and layout of report. The project was

also designed to be interdisciplinary with weightings given as follows to each discipline (Appendix I, p. 500):

SUMMATIVE ASSESSMENT

The business development plan will be marked by lecturers from all disciplines. Each discipline will carry the following weighting:

Management	25%
Law	20%
Accounting	25%
Marketing	20%
Business Economics	10%
	_____
TOTAL	100%

IT marks are <u>included</u> within discipline marks. IT carries a weighting of approx. 10% overall.

MARKING CRITERIA

Your plan must comply with the presentation criteria in the Bachelor of Business Programme Handbook. Good proof-reading is essential! A clinic will be held in Week 6 to discuss a suggested format for the business development plan.

As seen, the students were given specific content weightings that guided the priority given to each discipline area within the report. This constrained the extent to which the groups could deviate from cultural/ academic expectations of the markers to be creative and original. Within each discipline area, guidance was given as to what was appropriate for the report. Additional information about formatting requirements and content were made available through other channels including online resources. The participants had a wealth of information presented to them, but were also given the independence to construct the report how they wished based around these guidelines. The groups, therefore, can be envisaged as operating together within a community of practice with well-established expectations, resources and norms.

In addition to these requirements, the students were able to weight one another's efforts on the group project once it was completed, a stage called "contribution to syndicate". This was carried out confidentially and individually using instructions and a form depicted in Appendix I (p. 503). These were then discussed and negotiated openly with the group supervisor in a final group meeting called the

"exit interview" (see Table 7.1). In some extreme cases, members were able to expel individuals from the group. Historically, unless there were problems, members tended to 'zero weight' each other, that is, share the project grade equally. There are numerous issues in the use of peer assessments such as these (see Lejk, Wyvill, Farrow, 1996), and in this context it was no different. While the process enables the participants to discriminate against a member who is not seen as contributing his or her share, other issues such as how to weight such actions are raised.

7.3.2 The Participants

Four groups, each comprised of six undergraduate students took part in this study. This was the number that volunteered in one semester, who gave consent, and who had the time to participate. Indeed, one of the biggest challenges in this research was in negotiating face-to-face meetings with the groups who themselves, in many cases, were struggling with time constraints and looming deadlines. Before describing key features of the individual participants regarding previous experience and perceptions, I wish first to describe how the groups were formed.

The selection of students for each Business Development Plan group was overseen by the group supervisors of each IM3 stream, classes of up to 30 students who followed the same class schedules. The students in this study were drawn from two of these streams with groups one and two coming from one stream and groups three and four coming from another. As the supervisor of groups one and two told me, "The key difference between IM2 and 3 is in allowing self selection" (personal email dated 19/10/2001). In IM3 the groups were encouraged to self-select based on information they had presented to the class. This means that the students form their own groups within the stream and then advised the supervisor. Groups one, three, and four in this study were formed in this fashion. Regarding students whom were unable to find a group themselves, the supervisor of groups three and four explained to me:

> However, if students cannot get themselves into a group or one or two people
> cannot get into a group then the group supervisor has the power to change the
> groups so that all students are in a group. From my perspective I ask students
> to consider both task and process. Several exercises are done to help students
> understand how they operate in groups. I suggest they consider skills, location,

aspirations (A or just pass) and a mix of ways of working - generate constructive discussion From my point of view the students' preference was the dominant criteria (especially who they did not want to work with) (personal email dated 18/10/2001).

Group two was formed in this fashion, that is, they were not self-selected. This group was constructed by the stream, or class Supervisor and was essentially made up of students who did not fit into other groups in this particular stream. That is, in contrast to the other three groups, the members of group two did not choose to be together but were placed. Comparing the groups on other factors, such as previous academic experience and gender, also revealed other differences, as summarized in the following table:

Table 7.2: Group composition

Group	Number of students coming from the previous semester of the B.Bus (IM2)	Number of Students from courses external to the B.Bus	Gender
One	All six from the same IM2 stream but from different BRR groups.	None	Two females and four males
Two	Three from different IM2 streams.	One from the Sport and Recreation degree at AUT. One from the Diploma of Business at AUT. One from a Property degree at Auckland University	Three males and three females
Three	Four in same IM2 stream sharing the same BRR project.	Two from the AUT Sport and Recreation degree.	All female
Four	All six from the same IM2 stream with three having shared the same BRR project.	None	Three males and three females

As illustrated, the profile of all four groups was distinctly different in terms of previous group work that they had experienced as part of their studies at tertiary level.

This provides useful background information for inter-group comparisons. With groups one and four, for example, all of the students had completed IM2 the previous semester, and some had participated in the same Business Research Report (BRR) group project. This assessment was similar in many respects to the Business Development Plan in that an integrated report on a business was constructed and presented by a group but differed significantly in that in the BRR, an existing case study of a business was provided for analysis, whereas with the present project the students had to create a plan for a new business enterprise. Five students in the study had not come through IM2 and had been admitted into the third semester of the degree directly from other courses.

To summarize some other aspects of the groups: all of the participants were in the same age grouping (18-20 years old) and all were native New Zealand English speakers. There were 14 female participants and 10 males. All the participants volunteered to take part in the study with no incentives. I was purely a researcher and had no influence, or role, in delivering or assessing their coursework.

7.3.3   Previous group experience and perceptions of computer use

To further describe the social/ historical features of the study, in my initial interview with the groups I asked the students to discuss their previous experiences with, and perceptions of, group projects at tertiary level in which computers had been used. It was found that some of the students had apparently chosen to be with each other in groups because of their previous working relationships, while some others had deliberately chosen to be in different groups due to a past bad experience. Cameron, for example, from group four commented in interview two the following, regarding this (Appendix D, p. 400):

119	Cameron[3]	Overall, I would say it was positive, but there was a few negative aspects to it. But those negatives I would say solely related to members of the group.
120	Researcher	So, not the project itself but, more the…
121	Cameron	(interrupts) more the interaction, all that kind of thing. I was working with Jay and that was the saving grace. There was more, I can't say much for various reasons.

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[3] I use pseudonyms for all the participants in this research.

Cameron did not appear to want to expand on his point regarding intra-group conflict any further perhaps because of the possible friction it would create within his new group. He was clearly happy to be working with Jay again but not with others whom he did not wish to elaborate upon, probably Neil as will be seen soon. In this group the members knew each other well from previous courses and had established working relationships that were quite difficult to unravel at times. For example, from the second interview with this group, the students discussed earlier work that they had shared (Appendix D, pp. 394-5):

6.	Researcher	Um, most of you were in shared groups either in IM1 or IM2, and Neil, Jay and Cameron did the same Business Research Report?
7.	Jay, Chris	Yep.
8.	Researcher	And the rest were together in IM1, is that right?
9.	Troy, Chris	No.
10.	Jay	It was just Neil, Cameron and I that have been together the whole time.
11.	Researcher	So, the rest of you weren't doing a, did you do a group project together in IM1? Or were you just in the same stream?
12.	Natasha	Just in the same stream, Virginia's stream.
13.	Chris	And I wasn't in the same class with any of them.
14.	Troy	We did the same globalization together, the presentation of that.
15.	Researcher	Oh, ok, so you did a presentation but not a group project?
16.	Troy	No, not a project.

Many of the students, as can be seen, had had much experience working with each other and many expectations, perceptions of each other and rapport from previous shared group experience spilled over to the present project. In the case of Cameron above, these tended to constrain to what extent he could discuss other students he had worked with before, even though he was no longer working with them. Another example of relationships that had developed prior to the present project was given by group three, four of whose members had worked on the BRR together in the previous semester. They were very light hearted and at ease with each other at the beginning of the study when I asked about their previous project, as illustrated in the following exchange (Appendix C, pp. 361-2):

5.	Researcher	And that worked pretty smoothly?
6.	Alistair	Umm...
7.	All	Laughter.
8.	Alistair	It worked alright – just a couple of times when a lack of patience and, I don't know…
9.	Sandra	(interrupts) I don't think the computer was at fault – no it wasn't the computer.
10.	Alistair	We all like to blame computers – basically in IM2 we had lectures and stuff as well and so that's basically all I've had – no problems – not that I know of.
11.	Researcher	I was interested that you said you like to blame computers – I guess that that happens a lot in group projects?
12.	Alistair	Oh, yes.
13.	Sandra	Yes, yes.
14.	Alistair	We are working on them – It's not our fault.
15.	Researcher	Who else was in the group?
16.	Monica	Three? Sandra?
17.	Researcher	Ok, Sandra?
18.	Sandra	It was at my house, my computer
19.	Alistair	(interrupts) It was your fault.
20.	All	Laughter.

Four members of group three evidently had a well established relationship based on previous group work together, predominantly led by Alistair, that prevailed throughout their meetings even with the presence of two new members, as is illustrated in the rest of the transcript in Appendix C. Regarding perceptions of the use of computers, these participants, as indicated, seemed ambivalent, or even negative towards them. This was also the case in discussions I had with some of the other participants. In group one, for example, five of the six students reported negative attitudes, as the following excerpts from the first meeting with this group indicates (see Appendix A, pp. 306-8):

2.	Sam	My experience with computers and groups hasn't been all that good because it tends to slow the group down a bit. Because you've got only one person on the input side of things and everybody else is left to either their own devices or to actually read something for someone else to type, or something like that, or the computer stuff is left to be typed up, or any formatting done, and sort of left till last or until when the groups

gone. So the group gets together and sorts out what has to happen like anything - if everyone's input does have to go into any wording or anything like that then its usually the group that's around or lazes around on the lounge furniture and someone sets the key words.

8.   Kurt   With our group, I would just like to say some aspects were a bit negative. Like sitting there typing most of the work sort of while everyone doing something else.

10.   Rob   Yeah, I do agree with what Sam said although I do like using computers with group work, I just think the whole presentation thing and the, just the ease of organising all the information – you've got it all in one place. I hate working on paper.

15.   Suzy   Last semester I had quite a bad experience in the group. We basically only had three of us in the group to do the whole report – which was a pain and Melissa and I sort of ran it and the other girl came , sort of minimal, like two nights in a row just doing the formatting. Its just like, as Rob said, we think its not a big part and it just takes one evening to do and then everything goes wrong. So, yeah that's just the pits – the part that I think people overlook too easily – the time that it takes to format. I did IM2 so we did IT last year. I didn't really like that too much. I didn't like the computers too much because everything seemed to go wrong on it.

23.   Tarah   First of all I was in Kurt's group and we found it was all right. It was quite good. We got email and drafts and stuff done, we also used disk. But, also what Sam said, like one of the girls in our group put it altogether and stuff. So, yeah.

These individual comments were part of the same conversation but, for brevity, I have removed some in between remarks. As illustrated, the participants mentioned numerous problems with the use of computers in previous group projects that essentially could be summarised as a viewpoint of unfairness, or inequity, with regard to leaving the final editing and formatting of the report to one member, or to a small subgroup. However, many students in the study mentioned that this was the only practical way that they could see for collating individual work into one large, consistently formatted report. Many expressed frustration and anger with this process while others accepted it and looked for ways to minimize this by using more computers or by employing other solutions. For example, the following comment from Bryan of group two indicates his simple acceptance of this constraint (Appendix B, p. 324):

2.   Bryan   I was in IM2 last semester. I didn't really have any problem with the group work with computers. Either you did it by yourself at home, and then put it together, or just had turns with it.

Members of group four, on the other hand, went into some detail about the technical difficulties they had with creating a common document in the previous semester in the first meeting. Here is an excerpt from that discussion (Appendix D, pp. 390-1):

4.	Jay	Yeah, we had the BRR last semester. Sort of the whole- emailing between each other and we often would go to either my place or Matthew Smith's place or had one computer and another group member had a laptop. So that, sort of with our group, cut the tasks in two. Its quite hard to have six people huddling around a computer so it was quite good being able to split it up in that way. The problems we did have was when the files do get quite big and we had to have Excel and a few other quite heavy documents. It was quite a huge project and trying to email to each other and to make sure everyone had a copy to proof it individually. And in the end when we had to try and get it printed we had to send it to someone's printer. So the computer didn't get it printed and we just had all sorts of problems because it loses its…
5.	Researcher	(prompts).Formatting?
6.	Jay	Yeah, so lost a few files and people were sending things all over the place so it sort of didn't quite have the gear to, appropriate gear, I think, for something that size.
7.	Researcher	Andrew? Sorry, Chris?
8.	Chris	The BRR probably was our main project. We had to use the computer a great deal more. Internet wise or email wise my group we didn't actually use it a lot – at all. That may have been because so many group members didn't actually have Internet access at home or didn't really achieve that sort of usage system. But what we remember of it was bringing disks everywhere and trying as we went away and worked on different disciplines. We don't have to do that now. One major problem we did have was transferring all the stuff into one file, press the save button to go onto disk and we didn't have the disk in the machine, we had the wrong disk in the machine, we kept swapping and changing. I watched it do it, and the whole thing just crashed. Ended up with this big coded thing on the screen. That really ruined the whole thing so that took us quite a while
9.	Researcher	Because it kept swapping the disks?
10.	Chris	Kept swapping the disks in and out without closing that file. Computer thought that disk was still in the machine and we would chuck a different disk in and it wouldn't register and then we would have major problems. That was quite a frustrating experience in itself. How to remedy that? Obviously it would be better if we were working closer as a group and hadn't gone to the same file at one stage rather than trying to collate the whole thing – or maybe used an email system so that you just have it straight into your file. It was not such a good experience but with this group we've already started to communicate with email.

As well as illustrating some of the practical difficulties, the above example gives some idea of the level of computer related skills that the students brought with them to the projects. The students that had completed IM2 had had significant course work related to the basic use of personal productivity software including MS Office 97 as well as some specialisation into business related software. All of the students were familiar, for example, with the use of MS Excel for creating financial statements and pivot tables and with the automatic generation of tables in MS Word. They had all had some exposure to specialist packages such as MYOB, Minitab, and MS Project. In addition, many of the students were familiar with software such as Adobe Photoshop and PageMaker. All of the students reported familiarity with using the Internet for email and browsing the web for research purposes. Not one of the students was a novice with computers, although some, particularly the new students, reported reluctance about using the computers as indicated earlier. Some openly disliked using computers. Take, for example, the following comments from two students in group three (Appendix C, p. 362):

21.   Sandra   Yeah, we met at my house and my computer is very slow at home. It was taking a lot of information at the same time. But I come from IM2, obviously, and I did some computer studies at school, but I'm really bad at surfing the net and it doesn't help that it's really slow so I try and encourage myself not to use it…

29.   Monica   Yes, I've had quite a bit of experience with computers. I've got one at home. I've done a lot of work, basically I don't surf the net for personal use or anything most of the time apart from using emails and that kind of stuff. Mostly, I use it for research like Word, Excel all that kind of thing, just to do my projects. So basically I've just got my computer to do my school work and I'll try and keep off it at all other times because it drives me crazy.

Despite their apparent dislike of the machines, both these students illustrated familiarity with, and knowledge of, computers. This could be said in general of all the groups that I observed. The primary issue surrounding the use of computers in previous group projects was not related to the participants' ability with the technology.

The membership of groups two and three was distinctly different from the other two groups in that they both had new members who had not come through IM2, and so had not had the same experience with the BRR group project. These newcomers, although they did not have the same shared experience with the BRR as

the others and tended to be treated as 'outsiders' by the students, reported other similar group work experience that, they reported, did influence their thoughts on the process. Group two, for example, was evenly split between three students who had come through the previous semester and had completed the BRR and three who were new. These three new students mentioned the following over the course of the first two interviews (Appendix B, pp. 324-5):

6.	Karen	I didn't do IM2. I am from the sport and rec. course. We did group assignments, last year. Like share – usually we just duplicated stuff to do – for one person to just put it all together.
7.	Researcher	How long were the reports in the sport and rec. projects?
8.	Karen	Like, one was about 100 pages.
9.	Researcher	About 100 pages – so, similar to what you are doing here?
10.	Karen	Yeah, lengthwise.
11	Researcher	Ok, Kylie?
12.	Kylie	I transferred over from a property degree from Auckland Uni.
13.	Researcher	Ok, so this whole idea of group projects is new?
14.	Kylie	We did group projects in property. So it's not anything new but the way they do it here is different.
15.	Researcher	Ok, so at Auckland how did they do…?
16.	Kylie	We had group projects in valuation and Marketing and, it was pretty much the same, we were given different parts to it, but it was just with the one paper, as opposed to this which is equivalent to, like four papers. But pretty much the same, we just emailed the information that we all did to each other and then on the last week we went around to someone's house and did it all.

One member from this group who was also new to the programme was absent from the first interview and so I asked him about previous experiences at the beginning of the second interview. He commented then as follows (Appendix B, p. 327):

4.	Matt	I did the Diploma of Business last year. We had, in the whole diploma only had two group assignments. So, it's how we baulked[4] at the computers. Like we got "sniff".
5.	All	Laughter.

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[4] Unclear in the tape

6.	Matt	Pretty much I just said to other people, "you do that" and they did that and "you do that part" and we all went away and did it separately. So, we never got our computers together. It was all just individual stuff and, that's basically it. We just did our own thing whatever we wanted to.
7.	Researcher	So, did you ever combine them together, or did you print out separately?
8.	Matt	We gave everything that we had on disk to one person and they printed it all out and formatted it together.

Matt did not make clear exactly what he meant by the "sniff" but gave me the impression in the interview, based upon body language and lateness, that he was relatively casual about the group project. Matt had just moved 'up' from a diploma into a degree course and so perhaps was playing down his previous group experience. I also noticed a similar approach by the two new students in group three, the group discussed above, in which four students had worked together in the previous semester on the same BRR, had elected to stay together, and had invited two new members into the group. The four 'old timers' tended to dominate the meetings and it was only through prompting that I could obtain information from the two 'newcomers'. This was also perhaps due to the social banter noted earlier. In the first meeting, for example, they were quite reticent about previous experience, as captured in the following dialogue (Appendix C, p. 363):

34.	Researcher	Cool, and the two outsiders, did you come from IM2?
35.	Bryce and Rachel	No, Sport and Rec.
36.	Bryce	I don't really use computers that much. Just for assignments and that. I don't like get on, but I like playing around with it. Using programs like Word and Publisher and that. My old man used to be a graphics designer so I just used to use his computers. But the Internet, I just use that just for the research.
37.	Researcher	Cool, and Rachel?
38.	Rachel	Yes, we've got computers at home and my dad likes computers so he does quite a bit of shopping and whatever. And I've always used them for school so, since I was quite small, and I've done courses through school and we use them at work heaps. That's about it.

These two students were further prompted in the second interview about their group experiences and were a little more specific, as illustrated in the following exchange (Appendix C, p. 369):

99.	Researcher	So, that's that project. Before we get onto this project, the two newcomers, right. I've got down here both from Sport and Rec., both with some experience with group work and computers. From that course, but we didn't really discover whether it was the same as the Business Research Report or how it was different.
100.	Becky	It was done to a smaller degree, like we had…
101.	Bryce	(interrupts) We didn't do any research.
102.	Becky	We did, we had like research labs for physiology. Where we had a lab and we had to hand in a group project the next week.
103.	Bryce	They were tiny.
104.	Becky	So, everyone had sort of like, well like our group we had three of us and we split up, we split our questions up. And then two days before we handed it in we would all come with our disks and paste it all together. That was our major group work
105.	Researcher	So, you would all do your work on disk. Did you have the same problems as these guys are talking about?
106.	Becky	Yes, we did have some problems, yeah but…
107.	Sandra	(interrupts) But our report was huge.
108.	Becky	These ones are huge. These ones were like three pages long.[5]
109.	Bryce	The same happened.

Unlike the 'old timers' the new students seemed, in my opinion, to be feeling their way into an established social arena and so were quiet in the initial meetings and tended to let the more experienced students lead. I noticed that many of the ex-IM2 students held strong views and opinions regarding group projects and many had established relationships and rapport from shared experience in the previous group projects. These dynamics clearly affected how they were going to approach this new project.

Other tensions and conflict reported from previous group experience related to gender. The following excerpt, for example, is taken from the second interview with group three just after I had commented that a subgroup (who happened to be all

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[5] Using hand signals and gestures, this student indicated that the first sentence referred to the present project and the second to the ones that she had completed in the previous semester.

female) appeared to have been responsible for the collation of, or in my words, the 'holding together' of the final report in the previous semester (Appendix C, pp. 364-6):

19.	Researcher	But, by holding together I meant that you were…
20.	Alistair	(interrupts) Too lazy.
21.	Researcher	Kind of coordinated the presentation and final formatting of the report.
22.	Hannah	I wouldn't say solely.
23.	Monica	Yeah not…, especially because I was sick. That last day I was like…
24.	Alistair	(interrupts) It was a girl thing.
25.	Sandra	There was one, two, who were the other people?
26.	Alistair	That was it, just Michael and Chris. Can you imagine trying to keep track of it? I can't help it.
27..	Hannah	Yes, because he, no shit, no joke.
28.	Alistair	No shit?
29.	Researcher	I just write down the key words.[6]
30.	Hannah	Ok, then go for that one. They did not really do much. They probably did about ten percent, if that.
31.	Researcher	Right.
32.	Monica	If that.
33.	Alistair	You weren't even there, how do you know?
34.	Hannah	Excuse me but she did more than you did and she was sick.
35.	Monica	I was sick and I sat at home on my bed writing out various contracts.
36.	Researcher	Can I ask why it happened that way?
37.	Hannah	Because they…
38.	Sandra	(interrupts) The boys stuck together and liked the home entertainment.
39.	Alistair	Just think, home entertainment…
40.	Bryce	(interrupts) You want to say more Alistair?
41.	Sandra	We are not angry Alistair. We are just saying the facts.
42.	Alistair	Yes, I know, and I was just going to say something. We wanted a more edited project - the guys would have gone, " that's good" and left it, that's all that would have happened,

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[6] I made notes during the meetings to record the speaking order. Alistair seemed concerned that a swear word was used.

		trust me.
43.	Researcher	Say that again.
44.	Alistair	Us guys most likely would have gone "Oh, Ok, sounds good, that will do".
45.	Hannah	"That'll do"?
46.	Alistair	But these people were gonna sit down and go through it, and methodically work everything out. That's the difference between us. Whereas we would just have gone, "sweet as". Because we wanted to go home.
47.	Monica	Sandra, Hannah and I are all very methodical people.
48.	Alistair	We wanted it done and out of there and they wanted to, you know…
49.	Hannah	(interrupts) We couldn't deal with "sweet as". It wasn't, "sweet as" and even when we handed it in it was still a mess.
50.	Monica	We are very much, in a way perfectionists, in that we want everything especially when we are handing it in and its worth so much. We want the presentation of that, is so important.

I have deliberately included a large section of the transcription here because it illustrates the complexity of issues and the depth of feeling that the participants brought with them to the present study, based on previous experiences. In the above excerpt, issues of social loafing, a gender split in the group, and an issue related to differing academic aspirations were all indicated. The collation of the report which Hannah reported later was "hell" gave this group many problems and headaches due, not so much to unfairness of workload as to differences in perception (Appendix C, p. 368). In this exchange there was clearly a split reflected in the group between the "boys" and the "girls" with one group complaining that the other group were too pedantic with the presentation of the report and the other group implying that the others were "lazy" and that they carried them through the final stages of the project. Similar issues also were reported by other students and, in the case of Chris in group four, the gender bias was the other way around. Here is an excerpt from the first interview with him in group four, (Appendix D, p. 392):

27.	Chris	In my group a couple of girls got quite frustrated with computers. Didn't want any help and get on or anything. They didn't want to do anything like type up their section, transfer files or doing additional work like the table of contents and that sort of thing. They wanted to steer clear of it. The statistics side they left most of it.

Evidently the students involved in this research had a variety of opinions and perspectives of previous group projects, both positive and negative, with the issue of work equity being predominant. A common issue that, I believe, was highlighted clearly by students concerning previous group project experiences, was the difficulty of constructing a large document collaboratively using computers designed essentially for single users. In addressing the present activities of the participants in these groups surrounding the Business Plan Project, I was not only aware of these historical artifacts, or perspectives upon the process based on previous experiences, but was interested to see if these issues were carried forward.

As can been seen from the transcripts given above, the subjects comprised a mixture of novices and more expert participants, in terms of similar project experiences, who were brought together into groups to work on a shared academic project within the culture of a particular academic programme. This particular context then comprised a community of practice for the subjects in which they were active participants in Lave and Wenger's sense of the terms (1991). However, within that community, as seen in the transcripts above, the subjects brought with them a wide variety of expectations, perceptions, and competencies.

7.3.4   Group project topics

Another aspect of the projects that needs placing into social/ historical context are the topics that the groups chose and the process involved, as this activity was prerequisite to the co-construction of the written report, that is, the collaboration mediated by computers that is the concern of this research. In deciding upon a topic for the Business Development Plan the groups were asked to submit proposals to their supervisors for comment and approval. These ideas evolved out of group discussions and brainstorming sessions facilitated by the group supervisors, following the process of group formation discussed earlier. The ideas agreed upon by each group were put forward in writing for approval, a formalized process as listed in the assessment guidebook with a grade attached (Appendix I, p. 495). Once the groups had approval, they could start assembling the Business Development Plan. In this study, the first focus group meeting occurred just after the groups had submitted their plans for approval. The groups had been working together for approximately two weeks, had

come up with a joint idea for a new business and were waiting approval. The table below lists the topic area each group chose:

Table 7.3: Project topics

Group	Topic area
One	A website
Two	A bath mat
Three	Mobile fitness training
Four	Food service/ Deli

As listed, the groups chose very different businesses to develop a plan for, with little in common. One topic, group two's, was so unusual that it took some time for me to understand what it was about, as reflected in the following exchange (Appendix B, pp. 325-6):

30.	Researcher	Ok, this semester's project, what's your topic and what's your plan so far?
31.	Andrew	So far it's a bath mat.
32.	Researcher	It's a?
33.	Andrew	A bath mat. Yeah, you put it in the bath and it uses like gel.
34.	Karen	Gel.
35.	Andrew	And it's all slippery.
36.	Kylie	It's a comfort gel mat that you use in the bath.
37.	Researcher	That's an interesting idea.
38.	Kylie	So, you put it on like the back of your neck so it's not right up your back.
39.	Researcher	Up here? (pointing to neck)
40.	Kylie	It goes right down...
41.	Karen	(interrupts) … right down but...
42.	Kylie	(interrupts) …instead of using a flannel.
43.	Researcher	So, you put it underneath and lie on top of it?
44.	Kylie	Yep.
45.	Researcher	What a cool idea.
46.	Kylie	It moulds to your – to the shape of your back

All four groups, following approval of their proposals of varying originality and complexity, then had to work together and choose an approach collectively for working on the idea and creating a computer-generated report. This is the context of the study: an authentic, ill-structured, interdisciplinary, and computer centred collaborative task that required co-construction within a socially, culturally and historically established community of practice. It is the joint activity and the negotiation that occurred within this context that the research question was concerned with, and that needed capturing by suitable data collection techniques as directed by the protocol.

7.4   Applying the protocol

As stated previously, the protocol presented in chapter five provided the theoretical framework, or lens, through which the context of the study was viewed in order to address the research question concerning the influence of a collective mediator from a neo-Vygotskian perpective. In this research, the mediational tool, or cultural artifact, that I was primarily interested in, was computer technology, as enabled within the context of four group projects. The primary goal in choosing methods for data collection, as directed by the protocol, therefore, was to capture information about the Neo-Vygotskian concern with both the intersubjectivity and the interactivity surrounding the computer within the group projects. The research question required data collection methods that reflected the dynamic, interactive nature of computers within a group context and that also were able to focus on the Form, Use and Meaning of these machines as collective mediators. To guide me, I considered Janesick's metaphor of a researcher as a choreographer when she said that, "A good choreographer captures the complexity of the dance/story by using rigorous and tested procedures and in fact refuses to be limited to one approach to choreography" (2000, p. 379). Clearly multiple methods were needed to capture this organic type of data (see also Cresswell, 1998). To help further, I considered the following techniques that Yin suggested are the most appropriate for a case study that he illustrated in the following diagram:

Figure 7.2: Convergence of multiple sources of evidence (single study) (Yin, 1994, p. 93).
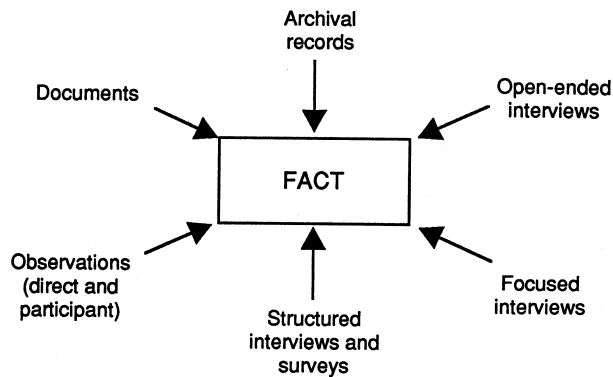
These various types of data collection instruments were investigated for suitability within the affordances and constraints provided by the specific context within which the study was carried out, as well as in terms of the requirements of the protocol to study the Form, Use and Meaning of computer interactivities and intersubjectivities. Three formal methods were employed in the end to meet these requirements: group interviews, or focus groups, two types of written surveys, or questionnaire, and member checking. Focus groups provided an ideal way for capturing the negotiations between the groups' members concerning the computers and, therefore, were used as the main research tool for collecting information about the intersubjectivities present. The written surveys were primarily used for tracking computer usage and interactivities as well as written comments about the participant's perspectives of the computer. The background and development of each of these methods will be explained further in the next few sections in this chapter.

As well as the three methods, I also had substantial access to more informal information sources, including my own written reflections and observations as the researcher, who conducted the focus groups and interacted with the students on almost a daily basis via email, as well as information from the interactions that I had with the groups' supervisors and the participants themselves throughout the project. In addition, the supervisors gave me feedback about the formal assessments of the final projects, which were presented in the form of a written report together with comments on the IT component of the report. The supervisors also provided me with the final academic outcomes and I had limited access to copies of the written business plans

constructed by the groups. While informal, this data allowed me to triangulate much of the data collected by the primary tools. Some important information was obtained via these means, as will be seen in the results chapters.

Although some of the data collected via these techniques were quantitative in nature, such as the log sheet data and the final grades for the reports, which lent themselves to statistical analysis, most of the data were qualitative and descriptive in nature. Utilizing such techniques is, naturally, fraught with problems, the primary ones, according to Schwandt, being problems of criteria, stemming from charges of solipsism and relativism, the lack of a critical purchase, that is the descriptive, surface nature of analysis, and problems of authority, indicating the privileged position of the researcher as interpreter (1998, pp. 246-248). To answer these critiques, which have held back the widespread acceptance of such approaches, Denzin points out that all social research is based upon interpretation in which the results, therefore, rest on the quality of the collected data (1998, p. 313, see also Fay, 1996). Denzin adds that this quality, or trustworthiness, depends upon triangulated empirical materials that meet the requirements of credibility, transferability, dependability, and confirmability, equivalent concepts to those of the positivist notions of internal and external validity, reliability and objectivity (1998, p. 330).

To address these issues, Yin suggests not only the multiple sourcing of data collection techniques as described, but careful design and data analysis incorporating replication, a feature that I have introduced through the use of four groups (1994). This supports Morse's argument that the "soundness" of largely qualitative results afforded by a constructivist paradigm is "more than an issue of methodological protocol" and that it is, therefore, vital that the processes for arriving at conclusions are also carefully documented (1994, pp. 3-4). In discussing each of the main data collection methods, which will make up the bulk of the rest of this chapter, these issues will be addressed in greater detail.

7.4.1   Contextualizing focus groups

Because this research relied on focus groups as a major source of data for addressing the research question, it is necessary to background this method and discuss the issues surrounding its use. The use of focus groups, or the more generic term, group interview that Fontana and Frey prefer (2000, p. 651), is controversial.

Usually identified as a marketing research tool, focus groups have only recently gained popularity as a tool for academic purposes after little use for almost 30 years (Morgan, 1997, p. 2). This is not really surprising given the skepticism surrounding their use, particularly from the more traditional, positivist perspective. They are often criticized as a "soft" and "easy" research technique and there is much scepticism surrounding their validity as a research tool (Krueger, 2000, p. 201; Morgan, 1997, p. 13; Morrison, 1998, p. 225). Kitzinger goes so far as to question indeed whether focus groups are "method or madness" (1994). There are concerns that focus group studies may undermine the quality of academic research in general. Morrison, for example, is worried that "they will become the first and final call of research for many academics trying to get some research under way" (1998, p. 164). He adds:

> Talking to people is hardly novel, but to then surround this basic form of communication with the aura of a named research method is to have pulled off a rather clever intellectual trick, namely, the assumption of expertise (1998, p. 164).

Despite these concerns, the method does have support. Numerous volumes outlining how to do focus group research have been written by authors such as Kreuger (2000), Morgan (1998), and Greenbaum (1998), which all attempt to market the viability of the technique. For example, in defending against the criticism of focus group as soft research, Kreuger points out that "The colloquial language of 'hard research' and 'soft research' is pejorative, simplistic and sometimes inflammatory. These word imply a superior-subordinate relationship" (2000, p. 201). Kreuger, who McQuarrie points out, has much enthusiasm for the technique (1989, p. 372) argues instead that:

> A focus group isn't just getting a bunch of people together to talk. A focus group is a special type of group in terms of purpose, size, composition, and procedures (2000, p. 4).

Given that the technique is controversial and yet is employed extensively in this study, the development of focus groups as a viable research method is worth reviewing in order to ground the research methodologically. Morgan describes three

historical phases in the development and use of focus groups for research purposes (1998, chapter 5). There are a few cases of early social science research employing group interviews. Bogardus, for example used them in the 1920s to test his social distance scale and Malinowski apparently used them in his anthropological research on the Trobriand islands (Fry & Fontana, 2000). Neither of these studies developed or discussed the methodology to any depth however, and both evidently used the method for reasons of convenience and efficiency. Focus groups as a research genre were then established and formalized by Merton and Lazarfeld in the 1940s as part of their contribution to the war effort via studies into the impact of propaganda. This work marks Morgan's first phase of development.

In an often-cited manual written by Merton, Fiske, and Kendall that was based on this early work (1956), a standardized method for carrying out focused interviews on either individuals or groups was described. The purpose of the method was targeted primarily at refining hypotheses for further quantitative study. The focus interview was seen as providing an efficient and more flexible alternative to experimental studies for achieving this. The manual states, for example, that:

> The interview is focused on the subjective experiences of persons exposed to the pre-analyzed situation in an effort to ascertain *their definitions of the situation.* The array of reported responses to the situation helps test hypotheses, and, to the extent that it includes unanticipated responses, gives rise to fresh hypotheses for more systematic and rigorous investigation (1956, pp. 3-4, italics in original).

In this early phase, focus groups were intended as a tool for use within a wider experimental framework. The second phase in their development according to Morgan, consists of their almost exclusive use as a marketing tool from the 1950s to the 80s. Although the focus group technique developed in the 1940s by Lazarfeld and Merton was academic in the sense that it was used as part of an effort to develop communication as a distinct field, it did not develop any further within the academic community. However, as Morrison comments, "This was not the fate of focus groups within the realm of market research, where the technique was embraced with vigour" (1998, p. 123). Focus groups are now widely identified and even equated with

marketing research. That is, they are still not widely recognized as an academic method of research.

Focus groups are also widely categorized as being qualitative within the field of marketing research (Greenbaum, 1998, p. 1), a perspective based on the type of data that results when this method is used in isolation, that is, transcripts of conversations. Yet this sole use of the technique is something that perhaps neither Merton nor Lazarfeld, the developers of the method, would agree with. Merton recently commented, for example, that market researchers have 'abused' the technique that he developed (in Morrison, 1998, p. xiii). Lazarfeld and Merton used focus groups within a traditional, quantitative paradigm, and not as a stand-alone qualitative data collection technique. They were used as just one part of a research process. However, market researchers now make wide use of focus groups on their own for exploring such things as the tastes and preferences of potential customers. Morrison believes "that it is that single practice that has robbed it of its powers of explication" (1998, p. 146). Yet paradoxically, as Morrison also points out, it was perhaps their combined use that originally " robbed the technique of a visibility sufficient to be taken serious notice by the academic community" (1998, p. 146).

It is the present day use of focus groups as a qualitative technique, both for market and academic research that comprises Morgan's third phase. Morgan criticizes Merton's description of focus groups as too limiting (which he believed led to '30 years of neglect'), and instead argues for a more inclusive definition. Such a definition recognizes the technique within academic, as well as applied fields. To achieve this goal, Morgan recently re-defined focus groups as:

> a research technique that collects data through group interaction on a topic determined by the researcher. In essence, it is the researcher's interest that provides the focus, whereas the data themselves come from the group interaction (1997, p. 6).

This definition is comprehensive and purposely non-specific. The contemporary view of focus groups is of a method that is flexible in format and which can vary from highly structured questioning to unstructured brain-storming sessions in which the moderator minimally intervenes. As Stewart and Shamadasani point out, "one of the strengths of focus group research is that it may be adapted to provide the

most desirable level of focus and structure" (1990, p. 11). Apart from allowing the collection of a large amount of data concerning a phenomenon, or issue in a relatively short time, the key feature of focus groups is in their ability to capture dynamic interactive discussion and meaning-making within a group context. Madriz agrees, commenting that, "The singularity of focus groups is that they allow social scientists to observe the most important sociological process – collective human interaction" (2000, p. 836). Focus groups allow the verbal interaction between participants in a group to be recorded. This has the advantage of capturing negotiation between speakers and the subsequent elaboration that may or may not result from this social interaction. Focus groups can encourage participants, who would not normally do so in an interview situation, to speak out, and also enable the presence of social influences such as conformity or ganging up effects. Madriz reflects that the essence of the focus group approach is that it "is a collectivist rather than an individualistic research method that focuses on the multivocality of participants' attitudes, experiences, and beliefs" (2000, p. 836).

The focus in this thesis is on understanding how computers collectively mediated groups' joint activity from a neo-Vygotskian perspective. Therefore, the reason that focus groups were chosen as the key data collection technique is because they are ideally suited to the task of capturing negotiation and intersubjectivity between group members, as required by the protocol. However, there are still many issues surrounding their use as a qualitative method that need to be explicated.

Placed somewhere between individual interviews and participant observation as a technique for collecting qualitative data, focus groups seem neither to represent ethnography despite their 'naturalness', nor to offer the opportunity to control discussion and probe an individual to any depth due to the interference of group dynamics. Morgan refers to focus groups as a "compromise" which allows them to cross the traditional boundaries of the mainstream qualitative methods (1997, p. 16). Stewart and Shamadasani discuss the differences between the various qualitative methods in terms of the emic/etic[7] dichotomy (1990). Instead of a polarisation of methods, they argue that all methods are located at different points along a single continuum with focus groups "closer to the emic side" (1990, p. 13). They add that "neither emic nor etic data are better or worse than the other, they simply

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[7] Emic being information internal and unobservable and etic being external and objective.

differ"(p. 13). This comment is appropriate in this context as it supports a method requiring aspects of both group observation and interview. Of interest is a group dynamic concerning a specific topic and therefore a method that directly observes this joint activity and yet directs conversation towards the topic of interest is needed.

Focus groups are also particularly useful for research in which little is known about the focal issue, that is, exploratory research. An example is provided by Pugsley, who chose focus groups as a method for investigating sex education in high schools, a sensitive subject which, she commented, "may be regarded as a topic which is most openly discussed in the company of friends" (1996, p. 118). Pugsley found focus groups frustrating as a research tool because of the influence of group dynamics within this particular age group. Commenting on the value of focus groups as a method, Pugsley highlights several aspects of its nature as a research tool when she said:

At times this allowed for a conspiracy of silence which proved deafening in its intensity. By way of contrast, when there was full group participation, the method enabled the all too often muted voice of the adolescent to be clearly heard (1996, pp. 127-128).

Illustrated clearly in this example is one of the major challenges facing focus groups as a research method and which, paradoxically, is also perhaps its major strength (Morgan, 1997, p. 13). The influence of the group as well as the researcher/mediator on an individual's responses to a question can be envisioned as a major source of bias in focus group research. However, this influence is also viewed as a strength because, as Morgan says, "what they do best is produce an opportunity to collect data from groups discussing topics of interest to the researcher" (1997, p. 16). Focus groups are clearly of little relevance if the researcher wishes to isolate individual information from the social context within which it was collected. If, on the other hand, the researcher is directly interested in the social context of the focus group itself and the meaning-making dynamically negotiated and constructed by the group members, then focus groups provide relevant and rich data for this purpose. As Kreuger points out, "Focus groups work particularly well to determine the perceptions, feelings, and thinking of people about issues, products, services, or opportunities" (2000, p. 12). It is a socially situated method replete with both

mediator and group dynamics, which provides a one-off snapshot of a context for data collection purposes.

However, the one-off nature of focus groups generates another limitation of the technique, that of generalizability. Kreuger openly admits that any focus group study:

> is not intended to generalize. Our goal is to go in-depth into a topic, and therefore we spend a sizeable amount of time conducting research with a small number of people (2000, p. 203).

What Kreuger suggests as an alternative is the concept of transferability. He defines this as: "when a person wants to use the results, he or she should think about whether the findings can transfer into another context" (2000, p. 203). This places the responsibility on individual readers as to whether the results are relevant to their situation. However this perspective can be seen as forcing readers to give meaning to the results through requiring them to make an assumption as to whether the results are applicable to a larger population even though the author may explicitly state that they are not. That is, the underlying intention of the research is to create results that can be transferred to other similar settings although, in the end, the responsibility for deciding whether the results are applicable to any particular context is left up to the individual reader. Morrison reinforces this view and adds that, "Without this assumption the research makes little sense, or is so trivial as not to be worthy of serious reading" (1998, p. 159). The issue is whether generalizability can simply be replaced with the term, transferability. Morrison argues instead that being able to generalise is a key requirement of any research, whether quantitative or qualitative and suggests that we take an eclectic, yet essentially traditional, view of focus groups as a research tool even though they are typically categorized as being a qualitative technique (1998). He adds:

> The rules – the method – of focus group research although interpretative in nature have a logic which exposes those rules to the rule of quantitative research (1998, p. 158).

Others remain sceptical of this issue (see for example Kreuger, 2000; Morgan, 1997; Stewart & Shamadasani, 1990). An alternative approach, which Fontana and Frey suggest, which diverges from this debate, is to conceptualize focus groups as a phenomenological research genre (2000, p. 651). Fontana and Frey point out that, for phenomenological purposes, focus groups are formal field studies in which researcher questions are usually unstructured or open-ended. By focusing on a key issue or phenomenon, the groups provide a range of perspective and, therefore, a source of data centred on that guided and negotiated discussion. Stewart and Shamadasani agree that focus groups are, "particularly useful for exploratory research where rather little is known about the phenomenon of interest" (1990, p. 15). This phenomenological perspective of the focus group method reflects a tradition founded by Husserl (1931), who was critical of scientific studies which centred on the study of material things, and who became interested in the difference between the objective 'real' and the subjective 'unreal' (or irreal as he termed it). He believed that research should be interested in the latter combined with the former, that is, in people's perceptions of phenomena rather than the just the physical properties of the phenomenon itself, that knowledge was based on both aspects. As Moustakas clarifies:

> The challenge facing the human science researcher is to describe things in themselves, to permit what is before one to enter consciousness and be understood in its meanings and essences in the light of intuition and self-reflection. The process involves a blending of what is really present with what is imagined as present from the vantage point of possible meanings; thus a unity of the real and the ideal (1994, p. 27).

Phenomenological research is, then, centred entirely on understanding human experiences of objects or phenomena rather than the physical facts. Polkinghorne explains further that "The phenomenological map refocusses inquiry, concentrating not on descriptions of worldly objects but on descriptions of experience" (1989, p. 41). In seeking these so called, naïve descriptions, phenomenological research typically employed open-ended interviewing techniques, although self-reflections and written reports have also been utilized (Moustakas, 1994, p. 114; Polkinghorne, 1989, p. 47).

Because phenomenological research seeks data generated from subjects, what is sought is descriptions of experience between, rather than within people. Subjects within the phenomenological perspective are viewed more as co-researchers: they are "the real experts" (Pollio, Henley, & Thompson, 1997, p. 29). It is for this reason that focus groups, based on these descriptions, seem to fit perfectly as a phenomenological technique. They focus on describing a shared phenomena which fits in with the phenomenological goal to "describe as they are lived rather than to give an abstract explanatory account" (Pollio et al, 1997, p. 46). Conceptualizing focus groups from a phenomenological perspective is appropriate given the research question in this study as it justifies the method as a means of accessing negotiated meaning voiced during the meetings. It also allows this study to respond to Morrison's (1998) criticism of focus groups as a stand-alone method by including other data collection techniques in the form of written reports and other sources. The phenomenological research perspective supports the aims of the protocol and it allows further exploration into various issues surrounding the analysis of the data.

The major disadvantage of a phenomenological perspective, as Vygotsky pointed out, is its strictly surface approach to describing data and the avoidance of deeper level analysis, something that a neo-Vygotskian account is primarily interested in (Vygotsky, 1997, p. 69). As Wertsch explains, "The task of a socio-cultural approach is to explicate the relationships between human action, on the one hand, and the cultural, institutional and historical contexts in which this action occurs, on the other" (1998, p. 24). This analysis clearly entails going beyond the surface level description afforded by a phenomenological account. Similarly, from a social constructivist methodology the emphasis is on, "the collective generation of meaning as shaped by conventions of language and other social processes" (Schwandt, 1998, p. 240). To address this co-constructed meaning also necessarily entails going beyond a surface level account. However, as precursor to this deeper level analysis, I believe that phenomenological methods are valid in helping build an initial description of what happened in a given situation regarding a phenomenon. Then it is up to me to construct a deeper level analysis.

7.4.2   Meeting themes and politics

Using focus groups, as mentioned, is controversial, yet provided an ideal method for recording the various shared negotiations and meanings constructed by the members concerning computer usage within each group in this research, that is, the intersubjectivities as well as the logical opposite, what could be termed the countersubjectivities. In this research I utilised Seidman's (1998) structure, based on a phenomenological perspective as discussed, of a "three interview series" for the focus group meetings, which, after all, are a form of interview. He outlined these meetings as follows:

> The first interview establishes the context of the participants' experience. The second allows participants to reconstruct the details of their experience within the context within which it occurs. And the third encourages the participants to reflect on the meaning their experience holds for them (Seidman, 1998, p. 11).

Based on these guidelines I, therefore, scheduled three interviews with each of the four groups using the following themes:

Table 7.4: Interview themes.

Focus group meeting	Time frame	Discussion themes
One	During the first week of the project.	• Discuss background experiences and perspectives of group projects at tertiary level particularly with computers. • Discuss initial concept for the present project. • Introduce log sheets.
Two	Mid way through the project.	• Review Researcher impressions from the first interview (member checking) • Discuss the plan for and the progress on the project. • Discuss any computer related, as well as general issues
Three/Four	One week after completion of the project.	• Review Researcher impressions from the second interview (member checking) • Reflect upon project completion – focus on both general, and computer related issues, as well as the outcomes • Ask for perspectives upon the use of computers within group projects resulting from the project.

The purpose of the first meeting, as indicated, was to introduce the participants to the research and to gauge previous experiences and perspectives of group work with computers. The second interview focused on the present project and the students' strategies for constructing the project with the help of computer technology. A third meeting was planned for after the project had been completed to allow the students to reflect upon the projects and the use of computer technology within them. At this point the questionnaire was also given out and the log sheets collected. Data from these focus group interviews, when supplemented by data collected via other methods, were designed to help create first a description of the computer-mediated joint activity, and then a deeper level analysis based on the protocol presented in chapter five.

A number of deviations from the initial plan concerning these meetings need to be discussed. As mentioned, I believe that social research can be compared with choreography with improvisations being a normal and expected practice. This study was no exception, and, although there was a schedule for the interviews and collection of data from the students, I had to be flexible to accommodate the students' needs. In particular, owing to student absences in the pre-arranged interviews, I met with groups two and four, four times instead of three times, as had been originally planned. Also, while being focused on, or guided by, certain themes listed earlier in table 7.3 (page 193), which centered around the use of computers, I deliberately tried to let the participants take over the discussion wherever possible when I was facilitating the meetings, asking open-ended questions and trying to remain in the background the rest of the time. I tried to keep in mind Simon's suggestion that, within a case study approach, "an interview should be a conversation piece, not an inquisition" (1981, p. 33).

The focus groups worked as a flexible tool for data collection purposes that allowed the student's voices to be heard in a structured setting. While generally successful, I noticed instances in the transcripts when a leading question was asked, or I summed up an opinion incorrectly, for example. This again, I believe, reflects upon the nature and challenge of the focus group method, as discussed earlier. Analyzing the talk that took place in the projects is a lengthy process, necessitating the selection and presentation of transcripts that characterize the group collaboration and negotiations. While doing this, I was aware of issues concerning the selection of text

by a researcher, issues which Roberts refers to as the "politics of transcription" (1997, p. 167). She adds that:

> As transcribers, we need to manage the tension between accuracy, readability, and representation – remembering that we are transcribing people when we transcribe talk (1997, p. 170).

Selecting segments of conversations, which in the case of group interviews are complex social occasions, and presenting that as evidence for research purposes, is clearly a situated, political act based upon the research question and the view of the researcher (Block, 2000; Fontana & Frey, 2000; Green, Franquiz, & Dixon, 1997; Ochs, 1979; Reid, Kamler, Simpson, & Maclean, 1996). I acknowledge this point, and in keeping with Reid et al's call for "researchers to make explicit their underlying interests and agendas" (1996, p. 87), I will focus specifically on those segments of the transcripts that reflect discussion and negotiation about the use of computer technology within the projects based upon the research question. It is a selective account, therefore, and one that I will try to keep as short as possible, while still wishing to retain representative examples of the discourse that occurred.

7.4.3   The questionnaire

Unlike focus groups, which are controversial, questionnaires and surveys are common practice. Sarantakos comments that surveys are such a common method of data collection that "they are quite often taken to be *the* methods of the social sciences" (1994, p. 157, italics in original). He adds that they are quick, relatively stable, and can be structured to take an objective view on an issue and yet also have their limitations in that they do not allow probing, or the collection of additional data, and are prone to partial response (Sarantakos, 1994, p. 159). de Vaus makes similar observations and comments that surveys tend to de-contextualize responses (1995, p. 8). To provide an additional source of information that could be triangulated against other methods, specifically the focus group meetings, written surveys were seen as a valid method for collecting data in this context. Two different written surveys were used to capture different aspects of the projects in this study as required by the research question: a questionnaire and log sheets.

A survey in the form of an individual written questionnaire was used in this research based on an earlier one I had used with success in a previous pilot study of the group projects (Raven, 2001). The questions were designed to probe similar points raised in the focus group sessions about the projects and the use of computers as directed by the research question and the consequent requirements of the protocol. Given deliberately before the third focus group meeting to avoid any influence from the interaction of that meeting, the questionnaire contained a number of open-ended questions regarding the use of computers in the project as well as general questions about the group work itself (see Appendix E).

An open-ended format was chosen deliberately because, as Sarantakos observes, this give the participants the "freedom to express feeling and thoughts, especially when complex issues are being studied; they offer more details than pre-coded questions" (1994, p. 164). In this study the participants' perception of the computer was being sought, not something that I envisaged as being open to categorization. I, therefore, followed Sarantakos's "rules of questionnaire construction" and tested many of the items during the pilot study (1998, pp. 238-242).

The questionnaire contained 15 items (see Appendix E) divided into two types, those that questioned the general construction of the group project and those that addressed the specific use of computer technology for this purpose. As can be seen in Appendix E, the use of primary and secondary questioning was employed extensively (see the pairs of questions: 1-2, 3-4, 5-6, 7-8) and some questions, therefore, are as not as open-ended as others (for example, question three). I designed the questions to give the participants ample opportunity to discuss the use of computers from a number of perspectives, specifically comments related to use, access, sufficiency of resources, issues and opinions related to computer technology. Essentially I attempted, in constructing these questions, to request as much information about the use of the computers as possible that I could then balance against information received from the focus group meetings and the log sheets. I also wished to gain an overview of the participants' views on the project as a whole in order to place their responses concerning computers in context.

7.4.4　The log sheets

The log sheets (see Appendix F), were designed specifically for the purpose of self-reporting individual and collective computer use during the projects, that is, the interactivity as directed by the protocol. Log sheets can be viewed as a type of longitudinal written survey and as such, share many of the same issues as questionnaires. However, because of the demand and responsibility placed on the participants to keep track of activity over time, surveys in the form of log sheets are prone to problems due to issues of motivation and supervision, which can lead to partial reporting (Sarantakos, 1994, p. 159). Also, as Pearson, Ross and Dawes explain, retrospective surveys rely substantially on the participants' memory of events, which can be problematic under particular circumstances depending upon the length of time that has elapsed (Pearson et al, 1992, p. 65). The log sheets nevertheless were seen to be able to provide an approximation of how the computers were used within each group in this study and, in the design phase, my prime concern, therefore, was in keeping the sheets short and simple to use, as Sarantakos suggests (1994, p. 172). The particular log sheets that I developed were tested previously in a pilot study and simply asked the participants to list details of how they used computers individually and collectively for the project. A number of columns, reproduced in the table below, were used to request information about how, when, where, and with whom, the participants used computers (see Appendix F):

Table 7.5: The log sheet columns

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People

The details requested of the participants, as listed above, afforded a limited amount of descriptive statistical analysis, outlined in Appendix G, namely breakdowns of the reported frequency and duration of computer use across various categories.

7.4.5   Issues related to the log sheets

As mentioned, one of the limitations of using written surveys such as log sheets is partial response (Sarantakos, 1994, p. 159), and the present study was no exception. There were individual differences in how well each participant filled out the log sheets. Most of the participants in the study diligently completed columns in tables which tracked exactly when, where, how and with whom they worked using computers throughout the four month long group project. A few gave up filling them in part way through, and a small number failed to comply. All the members of groups three and four, for instance, completed log sheets. One member of group one said that he had forgotten to bring his sheets to the final interview, apologized, but then failed to mail it in later. Group two fared poorly at this task, with only two members fully completing log sheets, two others partially completing them, and two members not handing any in and who could not be reached later. While overall, the completion rate was sufficient to enable an adequate assessment of how the computers were used in the projects, the numbers collected from the log sheets are presented as approximates only. However, the students who did not complete the sheets were a small minority and the sheets were designed to cope with non-compliance through cross-referencing between members' joint activities, which helped to ameliorate any negative effects.

Another issue surrounding the implementation of the log sheets is related to the collation of statistics presented in Appendix G. The two tables presented summarize the responses by page (from Appendix F), participant, group, number co-participating, application used, frequency, and time reported. While enumerating instances, or frequency, of use was a fairly simple task of counting what the participants listed on each page, some of the figures relating to time were more problematic. In some listings where the participants had listed a single time for two programs, for instance, I split this time according to other information. For example, if one of the tasks was emailing then I subtracted time for that application based on other email instances reported and then allocated the rest of the time to the other application. In the case of a Word/ Excel split, as another example, I gave more time to MS Word, given the nature of the task, typically 70/30. This time splitting, therefore, reflects an assumption about the task. In other instances time estimates were made by cross-referencing against other students reports who were involved in the same activity. Estimations, as mentioned, were not needed for data related to

frequency of use, which means that they are a more accurate representation of the responses.

Rather than presenting them as a quantitative 'proof' regarding how computers were used, the log sheets were intended to provide an estimate of how technology was used in conjunction with the data from the questionnaire and the focus group meetings. The sheets were, then, part of an effort to triangulate the data and to give an overview, or picture, of the interactivity that took place around and through computer resources rather than to give precise statistics.

7.4.6   Member checks

I carried out member checks at the beginning of the second and all the subsequent focus group meetings by reviewing my impressions from the previous meeting with the participants. In addition, after the projects were finished, I sent the students an outline of the findings by email in order to obtain their reactions. While not all of the participants replied to the follow up email (see Appendix H), those that did provided useful information in addition to the verbal checks carried out during the focus group meetings for each of the groups. Generally, the member checks tended to confirm the impressions formed from the data about how the groups used computers to build the written report. However, some groups corrected some summary statements that I made during the verbal checks indicating changes in group strategy since the last meeting and reflecting the dynamics of the projects as well as some misunderstandings. A fragment of this process comes from the transcript of the beginning of the third meeting with group three as follows (Appendix C, p.374):

1	Researcher	Last time I spoke to you guys, I found out that the topic was still mobile fitness for the elderly and its called "ABC Fitness". You had not really specified whether it was a product, a service or what. So, I wasn't really sure. You had divided the work up by disciplines and by the Business Plan structure. So, Hannah, for example, was doing Law and analysed the survey...
2	All	(murmur)
3	Researcher	This is from the…
4	Hannah	(interrupts) That's changed.
5	All	(laughter)

| 6 | Researcher | So, please tell me, as this was the last meeting, the state of play at the last meeting. So, Sandra – Marketing, Alistair – Accounting? |
| 7 | Alistair | Changed. |

In cases where there was disagreement following the member checks, the groups then were given the opportunity to correct any misunderstandings, thus adding more to the data set.

7.5 Outlining the results

As expected, a wealth of data was generated from these methods, as reflected in the appendices at the end of this thesis and reviewed in the next two results chapters. In chapter eight I will discuss data that explains how the projects progressed, that is, the interactivity, and in chapter nine, I will discuss the negotiations and elaboration that took place amongst the group members about the projects, that is, the intersubjectivity. This division conforms with the neo-Vygotskian protocol presented in chapter five. As also directed by the protocol, both of the two results chapters will follow a similar format containing sections related to the Form of the collective mediation, which in this case refers to information regarding the location and configuration of the technology used, the Use, which refers to how the computers were used collectively toward the group goal, and the Meaning, which refers to the purpose of using the technology. Both of these chapters, in line with the purpose of this research and the research question, will primarily focus on these aspects with respect to computer technology, although other pertinent aspects that influence this dynamic will be discussed.

Chapter Eight: Understanding the interactivity

> Mediated action may be preliminarily defined as human action carried out by an individual, or group, that employs a 'cultural tool' or 'mediational means' (two terms I shall use interchangeably). The importance of cultural tools in mediated action is fundamental in this view, something which grows out of the writings of several of the progenitors of contemporary socio-cultural research. For example, it was so important for Vygotsky that near the end of his life he asserted that "the central fact about our psychology is the fact of mediation" (Wertsch, 1999, p. 152, parentheses in original).

In the next two chapters I have deliberately separated the results pertaining to the mediated action, or inter-activity, and the intersubjectivity evident in the group projects between two chapters. This separation is dictated by the protocol that was developed from a neo-Vygotskian perspective of collective mediation, the focus in this research. The interest in activity and interactivity presented in this chapter stems from socio-cultural concerns with tracking the mediation present within instances of joint activity rather than the meaning associated with this, as reflected in the quote above about mediated "action". As outlined in the literature review, this interest in the physical manifestations of human behaviour arose from Leont'ev's criticisms of Vygotsky's subjective focus upon meaning, and the subsequent development of activity theory.

To understand the interactivity between participants concerning computers, consideration was given to both the interactivity around and through computers, as outlined in chapter four based on Crook's observations (1994). In this particular setting, therefore, both virtual and real interactions were addressed within the study. In addition, activity that was not directed towards the group task, and non-computer related activity, was also recorded as it may comment on some of the negative, as well as the positive, aspects of group work, as discussed in chapter four.

Information about the participants' interactivity was collected in this study using the techniques outlined in the previous chapter and is viewed via the protocol proposed in chapter five. For understanding interactivity, I use data from the log sheets, as described in the previous chapter, to estimate the actual activity that had been performed in this context in relation to computer technology. Data from the

questionnaire and selected excerpts from the final interviews was also reviewed to help describe the computer-related activity and interactivity that occurred in the projects. In the last interviews, for instance, I asked the groups to reflect upon how well their strategies for the project had worked. For the purpose of triangulation, the questionnaire also specifically asked the participants about this aspect of the activity (see items: 1,2,7,11,12,13, Appendix E). A rich data set was generated from these methods, as reflected in the appendices.

Although, as Larsen-Freeman and Celce-Murcia insisted, the categories of Form, Use and Meaning overlap (1988), I have based the following data analysis around these categories as depicted in the protocol. Indeed, the data from the log sheets directly relates to these categories with the "Where? - Location and Hardware" column in the log sheets corresponding closely, I believe, to the 'Form' of the computer, that is to their physical attributes; the "When?", "What?" and "Who?" corresponding to the 'Use' category; and the "Why?" to the 'Meaning' or purpose for using the machines (Appendix F). These categories will be discussed in the following sections with examples also taken from the questionnaire, and where pertinent, the focus groups.

8.1   Interactivity and Form

Item nine of the questionnaire asked the participants, "What access did you have to computer facilities for the project?" (Appendix E, pp. 430-1). The written responses to this question revealed that all the group members predominantly used their own home computers for the group projects in addition to other machines at a variety of other locations including university laboratory computer facilities and work related computers through friends and relatives. Kylie, from group 2, for example wrote:

> Everyone in the group had a computer @ home.
> I had access to my dad's work one as well, which had a fast printer
> ∴ Handy for final printing. Some others had more than one
> computer @ home and some also would use their parents work
> computer for software programs as well.

The participants evidently had access to much computer hardware. Sufficient access to hardware was not, therefore, an issue in these projects, which was also reflected in the participants' responses to the following questionnaire item that asked

them directly, "Did your group have sufficient computer facilities?" (Appendix E, p. 432). Eighteen out of the 22 responses to this question were "yes" (82%), and of the others, only one answered negatively, stating emphatically that "there are never enough computer resources". The other three responses were not negative so much as comments upon aspects of computer resourcing that the participants thought could be improved.

In general, as mentioned, the participants used their own home computers configured individually and therefore differing widely in age, specification and footprint. In group four, for example Jay commented about her home computer that it "isn't very good, slow & old", whereas Neil, a member of the same group, commented, "I recently just purchased a new computer, which I always had access to" (Appendix E, p. 431). All of the computers used for the group projects were Windows based systems except Natasha's, which was an ibook Macintosh system. Many of the machines used were laptops and being portable, were used in a variety of locations throughout the project as reflected in the log sheet responses. Group two, for example, assembled together in one location for final report compilation, and brought laptops with them, to create a pool of five computers. Regarding location, most joint computer oriented activity occurred at participants' houses with a small percentage of activity (estimated at less than 2% of the time) taking place around computers at the university and other activity taking place at work locations, for example, for printing with the students using floppy disk and email to transfer the files.

For printing, each group used different resources. Chris from group four used his girlfriend's work-based printer, Kylie and Bryce from group two used their fathers' work printers, and the other two groups used participants' home printers, which were relatively slow; Tarah's 2.5 ppm[1] printer in group one, and Rachel's Canon Bubble jet in group three (see Appendix A, p. 321 and Appendix C, p. 385). This difference in printing activity is also reflected in the log sheet reports (see Appendix F).

For these projects, therefore, the participants brought their own machines, together with individual histories of use and abilities with them to the group project and to the shared problem space. They preferred not to use the generic computer facilities at the University, the academic community of which they were all a part of,

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[1] Pages per minute (PPM)

but instead chose to use their own individually configured machines. Some participants also used access to other computer facilities through personal contact for activities such as printing. They were personalized tools, in other words, each with a unique history of use built up with each "owner". The mediated activity afforded by each machine could thus be seen to be embedded within a unique individual set of capabilities.

8.3   Interactivity and Use

As discussed in chapter seven, qualified descriptive statistics were available concerning computer usage in this study based on their responses to the log sheets. These numbers are listed in the two tables in Appendix G and can be seen to be a good estimate of what computer activity took place. For example, the third entry, or row, in the first table in Appendix G collates the responses that Tarah of group one gave as reproduced on the third page of Appendix F, that is what computer applications she used, with whom and for what purpose. The following two pivot tables summarize the figures related to the different types of computer activity reported by members of each group. The first table overviews statistics related to the raw number of computer-related instances reported by individuals and subgroups. For example, members of group four reported using the computer 133 times in total and, of these, 86 were reported as individual use, that is, 65% as listed below (Appendix G):

Table 8.1: Interaction with computers: Reported frequency of use.

Group	Solo	Pair work	Threes +	Whole Group
One	81%	8%	4%	6%
Two	64%	13%	2%	21%
Three	83%	8%	0%	8%
Four	65%	16%	10%	10%
Mean	74%	11%	5%	10%

The greatest number of sessions at the computer reported by the participants comprized solo use, with group two, as indicated, reporting the highest incidence of whole group activity around computers. The next table breaks down this reported activity in terms of time.

Table 8.2: Interaction with computers: Estimates of time.

Group	Solo	Pairwork	Threes+	Whole Group
One	50%	8%	13%	29%
Two	45%	7%	3%	46%
Three	61%	10%	0%	29%
Four	43%	25%	18%	14%
Mean	48%	17%	12%	24%

As seen, 74% of the total number of reported instances of computer use and 48% of the reported time was individual activity while 10% of the reported instances and 24% of the reported time was spent in whole group collaborative activity. The tables above enable cross comparisons to be made between the groups in terms of collaborative activities. Group two, as mentioned, reported more whole group collaboration than the other three groups, as measured by both indicators, activity that was also reflected in some of the responses in Table 8.1. Group four, in contrast, reported higher proportions of pair work and subgroup work around the computers, when compared to the other groups. There were substantial differences between the four groups in terms of how they reportedly worked together "at" and "around" computers. Rather that conforming to a wider shared community practice, this indicates that each group developed their own collaborative style, or mode of operation.

In order to obtain further information about this activity and to triangulate, questionnaire item seven then asked the participants, "How did your group use computer technology to assemble the final report?" (Appendix E, p. 427). The responses reflected the differences discussed above particularly between group two, the most 'collaborative' group and the other three groups that chose more clearly

defined divisions of labour and specialization. Karen from group two, for example, wrote, "We all met at Bryan's over 3 or 4 days with 3 laptops & 2 PC's, all working together to finish each others work, proof-read, and join saved documents (on disk) together. One main PC was used to assemble the final report into one document". In comparison, Mandy, from group three wrote, "All using home PC then using disks to put all the material onto one computer. Never used AUT computers" (Appendix E, p. 427) and Cameron, from group four wrote, "Lots of emailing, with 2 –3 terminals operating in the meeting rooms at one time, meaning lots of cutting and pasting to create efficiency" (Appendix E, p. 428).

Notwithstanding these differences, the participants in general, worked individually on their own computers, while keeping in communication with the other members via email and other methods, and then came together as a group, or subgroup at some stage around one computer to assemble the final document. The degree to which this interactivity occurred, however, varied between the groups. This joint activity is also reflected in many of the comments made during the focus group meetings. From the third meeting with group two, for example, came the following description of their joint activity (Appendix B, pp. 342-3):

32.	Researcher	Ok. Um, and how did you do it? You worked individually and then?
33.	Bryan	Yeah
34.	Researcher	Whose computer did you….
35.	Bryan	(interrupts) We just used our own computers and then just, disks on Word, to each other and then Marcus did something.
36.	Researcher	Ok, so you worked on your own computers individually on these subjects, put them on disk?
37.	Bryan	Yep.
38.	Researcher	And then where did you take them to put them all together?
39	Bryan	At my house.
40.	Researcher	At your house?
41.	Bryan	Yep.
42.	Researcher	And how did it happen? Originally you said you were going to use two computers, one for the body and one for the in between parts. And you were going to allocate two weeks weren't you?
43.	Andrew	Well, what we did is that we had two laptops going.
44.	Matt	Three.

45.	Andrew	Oh three, and um…
46.	Bryan	(interrupts) I had most of it at home going hard obviously.
47.	Andrew	But the main PC which was Bryan's home PC and um another one going, a PC just going for um, just for someone to type something up on if the laptop was being used for something, proof reading and stuff.
48.	Researcher	So, five computers at your place?
49.	Bryan	Yeah.
50.	Researcher	And so what were they used for?
51.	Andrew	Basically just Word.
52.	Bryan	Yeah, just basically Word. Working off the notes that were used. Just editing and collating.
53.	Researcher	Ok, and um so you were all working individually on 5 computers and then at some point you must have brought it together?
54.	Matt	Yeah. Two people on one PC. Started editing and finishing it and taking disks from other people and just banging it in.
55.	Researcher	Ok.
56.	Andrew	So, like after Matthew was going through my Operations part or something like that, that I did some typing up on, and Matthew went away because after a while you get diminishing returns you could say. Like, say they put 'Rice', for example, on the computer and then read through it so you can see that Matt hasn't done any mistakes. Reading through mine like, trying to find my mistakes, so it's more of like a sifting process.
57.	Researcher	Sifting?
58.	Andrew	Yeah.
59.	Researcher	And how long did this take? Did you do it all in one hit? One session?
60.	Andrew	No.
61.	Matt	It took three days.
62.	Andrew	Three hits and it consisted of like good 8 hours, 8 to 10 hours per hit. At times it was a scream.
63.	Researcher	And was it all of you?
64.	All	Yes.

This joint activity described by the participants of group two illustrates, I believe, the 'final phase' in the use of computer, the compilation of the report by the group that took place in this group with all members co-located at one member's house, working together at the computers. This particular group brought all of their resources, including laptops, to one location, one of the member's houses, and

remained there for a substantial period of time constructing the final report. An 'initial phase', one in which individuals worked separately on components of the project, was also clearly identified by the data for this group. The three other groups used similar strategies, as can be seen in the appendices. At all stages the mediated activity best afforded by the computer was individual, even during times of whole group activity when much of the activity essentially surrounded one machine or "mother ship" as Jay once termed it (Appendix D, p. 409).

8.3   Interactivity and Meaning

The category of the protocol related to the meaning of the interactivity concerning computers can be interpreted in terms of the purposes for which the machines were used. The following tables constructed from log sheet data, indicate what computer applications the students used, and why. The tables were designed to provide an estimate, or "snapshot", of computer software usage within the projects, rather than precise statistics as discussed previously. By targeting specific applications, the data also enables estimates of virtual collaboration "through" computers, as well as the extent of other specific activities such as word processing.

Table 8.3: Computer application usage: Reported frequency

Computer Application	Purpose of Activity	Instances
Word processing	Typing, editing report.	38%
An Internet Browser (e.g. Explorer, Netscape)	Research on the Internet.	12%
Email program (e.g. Hotmail, MSN)	Communicating electronically with other members.	34%
Spread sheet	Producing statistics and accounts.	12%
Graphics Applications (e.g. MS Paint, Adobe Photoshop, PowerPoint)	Preparing logos, graphics, and presentations.	3%
Business On Line	Interactive AUT site with resource access.	1%

There was some variation between among the group with these reported frequencies as indicated in Appendix G. Group one reported the most email activity (44%) and group two the least (16%), for instance, but then this group (two) reported the most word processing activity (68%). Whether this indicates a different mode of operation for each group, or limitations in the method is not clear, however, and needs further investigation of other data. In terms of reported time spent on each application, the overall picture for all groups is presented below:

Table 8.4: Computer application usage: Estimated time

Computer Application	Purpose of Activity	Time
Word Processing	Typing, editing report.	68%
An Internet Browser (e.g. Explorer, Netscape)	Research on the Internet.	8%
Email program (e.g. Hotmail, MSN)	Communicating electronically with other members.	7%
Spread sheet	Producing statistics and accounts.	15%
Graphics Applications (e.g. MS Paint, Adobe Photoshop, PowerPoint)	Preparing logos, graphics, and presentations.	2%
Business On Line	Interactive AUT site with resource access.	<1%

One again there were many inter-group differences in terms of this reported computer use (see Appendix G.). To highlight, group four spent the least amount of time on the Internet (6%) and group three the most (19%). Group two reportedly spent the most amount of time of all of the groups word processing (84%) and group three the least (46%). Group three also spent much time apparently using MS Excel (28%) while group two made little mention of using this application despite the clear task requirements. These differences, together with the results concerning the frequency of use, indicate much variation between the groups in terms of application use. There were different patterns of computer use in the groups reflected in the log sheets with group two, for example, standing out as collaborating the most around computers which usually involved word processing activities. The patterns of interaction of the

groups were unique. This will be explored further with corroboration from other sources (see note on triangulation on page 203).

The statistics presented indicate the differing amounts of time required for each application based on the participants' reports as can be expected given the nature of the tasks. This is revealed by the frequency of use reported for each application versus the time spent. The typical time reported for sending or receiving email was between 5 and 15 minutes, for example, whereas using MS Word typically used much longer periods of time. Approximately one third of the reported instances of computer use involved sending and receiving email, yet only 7% of the time reported was used for this activity, which clearly, I think, reflects on the speed of use and convenience of this application. As can be seen in the log sheet transcripts (Appendix F), the bulk of this emailing activity occurred when individuals and groups were working separately during the initial phase of the project, when they reported that they were sending sections of work to each other as well as negotiating content and meetings.

The largest number of sessions and the longest amount of time by far involved word processing activities, which is not surprising given the basic group task of producing a written report. Microsoft Word was utilized as the main word processing application in the projects, with only one other being reported, Clarisworks used on the Macintosh ibook by Natasha, who soon dropped this after obtaining MS Office software (Appendix D, p. 413). This usage conformed with the academic and business culture at the time with the University, for example, configuring its computers with, and teaching, MS Office 97 applications including MS Word. In the case of word processing activities, the figures reveal that much longer lengths of time were reported in comparison to the emailing activity reported above. Word was reportedly used 68% of the time and for 38% of the total number of reported incidences. Much of this activity, particularly towards the end, was joint even though MS Word is a single user application essentially requiring collaboration by groups and subgroups around one computer.

Another program reportedly used by the whole group, as well as subgroups, was MS Excel (15% of the time), with one use of an alternative spreadsheet program, Lotus 123 being reported in group two (Appendix B, p. 347). Once again this reflects the culture of the university as well as the business environment at the time, with MS Excel applications being taught in Accounting and Statistics classes. This is an important point: the participants operated within an environment, or community of

practice, that clearly had pre-established norms for computer application use, in this case, MS Office 97 with all its incumbent applications.

Overall, the students mostly worked with two programs, MS Word and a browser, either Internet Explorer or Netscape Navigator. Most of the activity with a browser was relatively brief and centred on sending and receiving email via an Internet service such as Hotmail[2], and approximately 8% of the time involved conducting research over the Internet. MS Excel was used to a lesser extent for building accounts and statistical analyses, as were graphical applications such as Adobe Photoshop, Corel Draw, and more Microsoft products including Publisher, PowerPoint, and Paint for logos and other paraphernalia. Business On-Line (BOL), an application developed by AUT to enable student access to resources and such things as threaded discussions, was used very little in the projects. This web browser-enabled application was mentioned a few (five) times by members of group three and represented a tiny percentage of use in terms of time (less than 1%).

The relative amounts of collaborative activity around and through computers is also reflected in the data presented in Appendix G. During the initial phase of the project, the participants tended to use email a lot for communicating with each other about the project, which indicates much interactivity in the virtual sense. Toward the completion of the project the participants worked more closely around computers, which is reflected in the log sheets in their decreased use of email applications and increase in shared use of programs such as MS Word and Excel. This part of the project involved more face-to-face, or 'real', interactivity.

The data in the log sheets enabled me to pinpoint not just where, but the period of time in which the different groups assembled together and switched modes of activity from division of tasks in the initial phase to construction in the final phase. All four groups switched over in the last few days of May, 2001, one week before the deadline for the report. Some groups, such as group four, had begun transferring files two weeks earlier but were still working individually and updating earlier uploads. The construction phase for all groups typically involved long group and sub-group sessions around computers at one member's house, as seen in the previous section, when more immediate modes of communication were clearly required.

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[2] Most of the students preferred to use web based email accounts instead of their AUT student accounts or other types of email accounts with 17 of the 24 students used Hotmail as their email account for these particular projects

Item five of the questionnaire broached this issue by asking the participants directly about their preferred communication method, the results for which are listed in Appendix E (see pp. 425-6). The participants' responses were mixed with support for both face-to-face meetings and email, with some also mentioning the telephone. Jay group four, for example wrote, "Meetings as face-to-face all in same room. Less room for misinterpretation". Others such as Sam, Neil, Cameron, Alistair (all male interestingly) listed email while Andrew, Matt and Natasha mentioned the telephone. Chris raised accessibility as an issue writing that it was, "Quite hard to get group of 6 together each time, so email was effective". Hannah, from group three, I think summarized these differences writing that it, "Depends for what purpose, e.g. text mess. Or email fine to organise meeting times. Meetings all together were best for discussion or editing" (Appendix E, p. 425). This comment, and the range of the other replies, supports the concept offered in chapter four, that different communication modes support different purposes, and highlight some of the individual preferences within these choices. That is, that the type of mediation offered by these devices differed qualitatively within the specific context of the communication and also reflected personal histories and preferences of use within the specific academic community of practice. Unfortunately I did not have the opportunity to specify what aspect of the project the participants preferred email or face-to-face meetings for information that, in hindsight, would have been useful.

The data also revealed some of the other non-task orientated activities that reportedly kept some participants occupied during the collaborative group work at the end. These included playing pool (group three), getting "the drinks" (groups one and three), and, as the following dialogue from group two indicated, entertainment (Appendix B, p. 357):

212.	Kylie	Karen and I were sitting there rewriting Marcus's thing and proof reading and
213.	Karen	(interrupts) Bryan's thing.
214.	Kylie	Sorry, rewriting Bryan's thing and proof reading other things and they were all sitting there going, "Oh, well". You know? "I'm just using the computers to play games".
215.	Researcher	So, there was a fair bit of argumentation and stress towards the end?
216.	Karen	Towards the end there was heaps.

217. Kylie   Yep, and I think um, Marcus just said, "you know, I would prefer not to be sitting on a computer putting this all together but I am the one who started it and yeah"

This excerpt reveals that some of the participants in group two amused themselves playing computer games whilst others completed compiling the report which reflects some of the negative aspects of group work discussed in chapter four. In the case of group two, the most collaborative group based on the log sheet listings, the findings indicate that, while the students may have been at the same location, their activities were less interactive, or 'joint' than indicated by a strict analysis of their physical location. That is, even though they elected to collaborate around the computer the most of all four groups, this activity was not shared in terms of computer use even though the members reported no shortage of computer resources. Instead they used them for non-project related activities. The evidence that this created friction in the group, which reflected tension between the computer as a mediational tool and the collective requirements of the task will be taken up in the next chapter when debate and negotiations concerning these issues in the groups will be discussed in detail.

8.4   Examining the overlaps

There were numerous overlaps between Form, Use and Meaning demonstrated in the findings presented in the last three sections. While Form is concerned with the physical attributes of computers, and Use with how the machines were used, the hardware setup clearly is related closely to, and even determines how it can be used. However, while the physical attributes, or Form, closely integrate with Use, the two clearly have different meanings. Whether or not the computer included a good printer, and whether or not it was fast, for example, determined how it would be used by the group. If it was a slow printer, as in the case of two groups, then adjustments had to be made during the final interactive assembling of the project, as is seen in the following quote from group one (Appendix A, pp. 321-2):

144. Researcher So, your computer Tarah turned into the centre of the universe for this project?

145. Tarah   Yep.

146.	Sam	And her little printer can only do like, two and a half pages per minute.
147.	Tarah	Less than that!
148.	Kurt	It started at like six o'clock and finished pretty much just after midnight. Six hours went without stop.
149.	Suzy	Went for hours on end.
150.	Sam:	The thing is that while it was printing one section or one part of a section, we were formatting the other one. So, it wasn't time consuming like that but I guess that if it was, it would have been impossible anyway because we would not have had time to print it all out.

In contrast, in group four as seen earlier, one of the group members used a faster laser printer at his girlfriend's work place, a resource that saved much time for the group, and that entailed a different use of computer technology than that of group one above. Similarly, the purpose for using the machine, its meaning in terms of activity, was seen to be largely determined by how it was configured. In the case of the present project, all of the machines except one had MS Word installed, hence that was the word processing application used, although it was clear that different versions and configurations created problems. In this sense, however, the purpose and meaning for the use of the machines was closely related to hardware and software issues. The three aspects of activity, as listed within the interactivity column of the protocol presented in chapter five in this case, therefore, conform to Larsen-Freeman and Celce-Murcia's belief that Form, Meaning and Use are overlapping categories (1988).

8.5   Synchronicity

By way of a summary for this chapter, I have constructed the table below based on an overview of the data that describes the manner in which each group divided up the report content amongst its members. The table also includes notes on how the groups approached the process of collating the report:

Table 8.5: Division of activities in each of the project groups.

Group	Division of project	Size of subgroups	Collation phase
One	Allocated sections of the report specified as Introduction, Executive Summary, Marketing, IT, Accounting, and Operations.	Introduction and Executive Summary completed as a group. Marketing by a subgroup of three. IT and parts of each discipline by individuals.	Two weeks at one member's house by the whole group.
Two	By main disciplines: Marketing, Management and Accounting and by minor disciplines of Law, Economics.	Pairs worked on Management, Marketing, Research. Operations, Accounting and IT were completed individually. Law was integrated into each section.	Whole group at one member's house over the course of four days.
Three	Allocated sections of the report based on previous plans. One member did Marketing Analysis while another did Marketing, One worked on Management, one on Health, and one on Accounting specifically.	Worked on sections individually (separates) and then discussed overlaps in subgroups (crossovers).	Met at one members house as a group for the last week.
Four	Split the report up into the discipline areas of Accounting, IT, Marketing, and Management/ Law.	Pairs were allocated to each topic.	Sub groups worked on the report sequentially at different locations over the last week.

Although each group adopted its own style, or strategy, for working on the projects, in all groups there were, I believe two clear phases. The first stage, as discussed, could be termed the division, or deconstruction phase, the period of time in which the groups divided the project up into equal sections, and allocated these sections to individuals or small subgroups, the "separates" as coined by group three (Appendix C, p. 372). The second phase could be identified as the construction phase, that is, a distinct point in time when the groups began to compile soft and hard copies of the individual or sub-group work into a central document, and then proceeded to prepare this to an acceptable standard for printing.

One way of capturing the interactivity illustrated in the projects can, therefore, be made in terms of synchronicity. The group task essentially asked for the

synchronous development of a single document using technology that was designed for single, asynchronous use. This was to be carried out within an established community of practice surrounding the computer as a cultural determined tool, or mediator. Computers within this specific community did not easily support sharing in a physical sense, however, their resources could be shared via networking, and indeed this was the initial interactivity observed within the group projects. As a result, much asynchronous activity and collaboration was widely reported, with file sharing enabled by disk and email and with work carried out by individuals in many different locations. Yet, because of the overlying demand for consistency, or synchrony, in report formatting, in the final stages the activity centred around one participant or computer user on one computer surrounded by an audience of other group members.

There was much discussion about these aspects of interaction in the final interview, with all groups reflecting upon the trials, tribulations and tensions involved in appropriating the computer as collective mediational tool for co-constructing a joint written report. This discussion, therefore, reflects directly on the research question and the neo-Vygotskian concerns of this thesis. The next step, as outlined by the protocol, is to review just how these interactions flowed into intersubjective understandings regarding the computer as a collective mediator. This is the topic of the next chapter.

Chapter Nine: Understanding the intersubjectivity

> Vygotsky argued that cultural artifacts – whether physical or conceptual tools – are historically constructed. He made explicit acknowledgement of the centrality of language as a semiotic tool through which individuals across developmental stages make sense of phenomena and solve problems. His conception of the ZPD includes the use of language between novice and more expert others as a tool for mediating misconceptions and consolidating understandings. (Lee & Smagorinsky, 2000, p. 5)

This research is concerned with how computer technology collectively mediates group projects in a particular context. The concern for the negotiation of meaning regarding such entities, as addressed by the research question, reflects a neo-Vygotskian perspective of the social construction of intersubjective understandings of such cultural practices. What is of specific interest is how the participants viewed the tension, reported in the last chapter, between the computer as a mediational means used for the construction of the report, and the collective nature of the group task. This interest will help examine how closely the collective mediation enabled by computer technology matches the neo-Vygotskian model presented in chapter five.

Intersubjectivity, as Bruner explains (1999, p. 13), refers to the extent to which participants within a textual community collaborate to negotiate meaning using language as the primary tool, that is, to the shared discourse that takes place within the communities of practice formed by the groups. This chapter will, therefore, analyze the talk and negotiation concerning the use of computers as a mediational tool within the group projects. The following sections follow the protocol presented in chapter five as the framework for this study and allocate conversations recorded in these meetings to one of the three categories of Form, Meaning and Use and will discuss these utterances within that theoretical framework. As explained in chapter five, these three categories can be envisaged as overlapping, a point that will be developed separately once they have been discussed.

9.1   Intersubjectivity and Form

Regarding the Form, or the physical attributes of the computer, there was basic negotiation and agreement concerning the location and type of machines to be used at the beginning of the projects by all of the groups (see Appendix E, pp. 427). As seen in the last chapter, all the groups initially decided to base their work around individually owned PCs with the occasional use of parents' and friends' work PCs and university computers. The initial discussion on this aspect tended to be brief with little negotiation or disagreement. For example, here are group one's comments from meeting one regarding computer resources (Appendix A, p. 313):

61.   Researcher   Ok, and where are you going to do that? What facilities? Are you going to do that at AUT or someone's house?

62.   Rob   Someone's house. It will take quite a bit of time so we thought it was important to be at someone's house.

63.   Researcher   Ok, and have you got something organised?

64.   Suzy   We are still discussing it at the moment.

However, later on the groups tended to have more to say about the physical attributes and configurations of the computers. For example, I asked the same group as above to reflect upon this aspect after the completion of their project, which generated a little more discussion of hardware issues as can be seen below (Appendix A, p. 319):

87.   Researcher   Ok, what about the computer facilities? Would it have helped if you had more computer facilities? You talked about one computer. What if you had more?

88.   Rob   Yeah, I think it would be nice to have had…

89.   Tarah   (interrupts) Laptops.

90.   Rob   (interrupts) Like six computers networked and just sit there and ruck it up as you do work and send it over to people and they send you stuff but…

91.   Tarah   (interrupts) It's not likely.

92.   Rob   And also have the face-to-face kind of stuff like also because you tend to forget things if you like just ring someone up or like, send an email. You tend to forget kind of why you are doing it in the first place whereas if you are meeting face to face you can sit there and work through it.

93.	Sam	It would be really, really good if you could have an internet application possibly a little bit like Business-On-Line, where you had web space on a server like 20 megs or 30 megs and you work on your bits and pieces on the Internet and maybe a video type thing where you could talk and see each other. I mean you organise to meet from your own home on the net and do your assignment so that any questions that come up at that point in time could be asked right then and there and you can get an answer.
94.	Researcher	Kind of like a virtual…
95.	Melissa	(interrupts) Yeah.
96.	Researcher	A virtual group, not a face-to-face group?
97.	Sam	More virtual than what is considered virtual now.
98.	Researcher	What does that mean?
99	All	Laughter.
100.	Sam	I mean you're actually like using multimedia like sound and video.
101.	Rob	But that would be painful unless everyone got like a really good Internet connection.
102.	Sam	True, true, but I would say that it could be done.
103.	Rob	Yeah, if everyone had a really good connection.

In the dialogue above the participants are suggesting alternatives to the hardware that they used for the project, highlighting a number of issues related, essentially, to the communication of data. One suggestion quickly made by Tarah was the use of laptops. This was quickly countered by Sam's proposition of a computer network that enables real time video conferencing. Both suggestions can be seen to be related to the portability and transparency of data, a clear concern evidently to this group. However, the argumentation and discussion surrounding the ideal form of computer technology for the task is also evident here with no clear consensus being reached.

Laptop computers were also mentioned elsewhere, particularly by other groups who had access to these. Group two, for example, used laptops for the project and they seemed to make a difference, as the following extract from the final interview with this group suggests (Appendix B, p. 344):

82.	Researcher	In terms of the computer. How easy was it?
83.	Matt	It was easy with the laptops.
84.	Researcher	Easy with the laptops?

85.	Matt	Because we could work on our own pieces.
86.	Researcher	So, the challenges weren't at the computer so much as?
87.	Matt	Nah, it wasn't really. It was basically just making sure we had everything we needed for our parts. We had like 80% of what we needed to do before we got together.

Laptop computers helped with this group's project due to their perceived portability, even though, as was indicated in the previous chapter, much of this hardware was not utilized in the final construction of the report, which essentially centred around one main computer. This change in focus can be seen to reflect the changeover discussed in the previous chapter in terms of asynchronous and synchronous computer activity. It appears that, in the final stages of the project, the number of computers was not as important as the quality of the machines in this group. This apparently was a key factor for similar reasons in other groups as well. From group three, meeting three, for example (Appendix C, pp. 381-2):

156.	Researcher	And did you have sufficient computer facilities? Did you have sufficient machinery?
157.	Hannah	Yep.
158.	Monica	Definitely.
159.	Hannah	The one downstairs was really good.
160.	Rachel	Yeah.
161.	Hannah	It was really big and fast.
162.	Monica	Yeah.
163.	Hannah	And it meant we could all be in that room and all watch.
164.	Alistair	Yeah.
165.	Researcher	So, the key was, not how many computers, but having a good computer?
166.	All	Yeah.
167.	Hannah	You need a big, fast computer and Internet. I remember like with Sandra's one was a bit smaller.
168.	Sandra	Yeah.
169.	Hannah	And like, a little bit slower and mine is like that too. But if we had it, like getting up to 100, 120 pages...
170.	Sandra	(interrupts) Yeah, and it "rrrrrrr".
171.	Hannah	It sort of didn't really like it but Rachel's computer is really big.

The power of the computer resources was clearly a consideration for this group, as illustrated above, with much agreement amongst the group about this aspect of computer resourcing. A key comment above which characterizes much of the computer activity during the final stages and some of the issues present was Hannah's comment that they could all be in the same room and "watch". There was no disagreement about this, which further supports the observation of a changeover from asynchronous individual activity to collective, but apparently more passive (for those individuals not on the computer), synchronous activity.

Some members of this group, as seen in the above transcript, also tended to anthropomorphize the computer, discussing it using personal characteristics like "it sort of didn't really like it". Sandra also said of the computer at one stage, as another example, that, "it's so cheeky to want to do that" referring to problems related to backing up and transferring files (Appendix C, p. 379). This tendency to treat the computer as human-like seemed to be a habit, or mannerism, of particular individuals and reflected their understandings of the computer as an appropriated cultural tool. This was not noticed in the other groups, however.

Group four had similar concerns with computing power in the initial stages, as shown in the following excerpt from the second meeting with this group (Appendix D, p. 396):

33.	Researcher	Well, the present project. Where are you up to with the present project?
34.	Natasha	We have decided to pair up. Essentially Jay and I are working on Marketing. Neil and Cam are going to do Accounting and IT.
35.	Researcher	Neil and Cam Accounting and IT?
36.	Natasha	Yes, and Troy and Chris are doing Human Resources.
37.	Troy	Human Resources and the Management side.
38.	Natasha	And as we do a little bit of work we will email it to Neil because he's got a pretty grunty computer.
39.	Jay	And then when that parts done, we'll all sort of get together and work on it as a team I suppose.
40.	Troy	Sort of not allowed to mix computers. Will have a "home" computer that's going to be the heart of everything. We'll send stuff to Neil's once we have got bits. So just incorporate that into the one document.

41.	Nat	And then we'll send it to you once a week, for backup.[1]
42.	Troy	Yeah, backup once a week to mine.
43.	Chris	I have sussed out a source for printing out just for reference at the end. My girlfriend's got a huge printer at her work. So, we can all get it done there.
44.	Jay	Oh, good.
45.	Nat	Yay.

We can see the negotiation within the group in the above dialogue, I believe, and the reaching of a consensus. Although these aspects had perhaps been discussed by the group previously, the group at the end of this discussion had agreed upon several aspect of constructing the project, who was responsible for what topics, and which computer and printer would be used for the final phase of the project, based evidently on how powerful each of these machines were. After the project was completed, however, this group made some other suggestions that mirrored concerns mentioned by the other groups as shown in the following dialogue (Appendix D, p. 408):

105.	Researcher	Ok. Access to computers and facilities. What do you think about the facilities that you had access to? Did you have enough or did you need more?
106.	Cam	We had lots of computers. It was strange, we had three laptops, and four PCs between us as well. But it was the location. That was an issue eh? Everyone has access to a laptop, two laptops? But there was a problem created by the size of the file like we really did need a CD burner. It was a drain. Also our email addresses. Like our hotmail mailboxes couldn't receive it because it was too big.
107.	Researcher	Too big?
108.	Jay	Hmmm.
109.	Troy	There's also that conflict you know because you need the group to be together but then you can't work together computer-wise with the whole group. So you need the group but you also need the computer going at the same time.
110.	Jay	It's pretty much like this (hunches) with a laptop.
111.	Nat	But if they are all connected together.
112.	Troy	Yeah.

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[1] Addressing Troy directly.

113.	Researcher	So ideally, if you name the resources that you could use what would be? Would it be a lab? Would it be a room like this?[2]
114.	Troy	Yeah, networked.
115.	Nat	Each with a laptop.
116.	Jay	Yeah definitely, connected to a mother ship, or online.

At the completion of the project, this group was evidently more concerned as a group about the connectivity between, and the tension with, the computers rather than their power. Similar to the comments from groups one and two, support was given by this group for more laptops and networking, clearly because of the portability and connectivity of such machinery. Essentially the focus in all groups was in being able to easily assemble all aspects of the report together onto one, preferable powerful, main computer. These resourcing issues relate to evidence and discussions regarding how the computers were used to complete the projects, that is, the specific cultural practices with the computers within the context of the projects.

9.2 Intersubjectivity and Use

As discussed, the groups used computers initially in an asynchronous fashion, then moved, in the last stages of construction, to synchronous activity by the group, or subgroup, around a computer. This can be envisaged as expected practice within the specific cultural and academic context of the study. The bulk of the initial work was completed predominantly by individuals working on components in isolation and sometimes by pairs of participants working on geographically separated computers. During the initial stage, the participants communicated their progress via a number of means including phone, emailing, text messaging and face-to-face meetings. The latter synchronous phase of the project work caused the most difficulty for the groups, and it was this collective activity that led to much discussion, negotiation, and some conflict and counter-subjectivity.

Group two, the most collaborative group in terms of reported time spent together, for example, dissolved and essentially became dysfunctional[3] during the final stages of whole group collaboration, because of conflicts concerning workload

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[2] This meeting took place in a computer laboratory at AUT
[3] The class supervisor used this term to describe what happened with this group.

involving the computer. The members of this group openly disagreed with each other concerning the contribution of members, specifically Matthew and his use of his father's expertise in producing the accounts for the proposed business. This was not seen to be a valid use of the computer by other members of the group. Indeed, as the transcripts reveal, the members of this group were so angry with each other that they did not want to meet together again as a group following the exit interview with the supervisor. How this related to the use of computers is illustrated in the following excerpts from the separate meetings I held with members at the end (Appendix B, pp. 344-5):

90.	Researcher	Oh, so um lets just, so, Matt was saying that it wasn't really the computers it was the people that caused the conflict?
91.	Andrew	Yeah, I agree on that as well. Because everybody in my group, I felt, had good computer skills and good background on that. So, they already knew how to use Word and Excel and stuff like that.
92.	Researcher	Ok, and so, you say it was good right up until the exit interview and then it all blew up or was it?
93.	Andrew	There was a bit of a tension, I felt, what I saw from when everybody was putting it together when we were spending such long amounts of time. That's when people starting getting, like when something was wrong that's when, like, it was more of like a "hen" than like better or something, they started picking away at it kind of thing. That's when the conflict. Like when we had to make a decision it was like, "pick, pick, pick away at it" sort of thing.
94.	Researcher	So, the project actually caused this conflict because of the time involved?
95.	Andrew	Yeah.
96.	Researcher	All right, interesting, well, let me think. Ok, well…
97.	Andrew	(interrupts) Well, I felt that I tried to get those guys up here, the ones with the group so I thought it would be fair kind of thing like just trying to tow the line at times. So, sorry about that.

Andrew did not mention in this discussion that there was a split in the group with some members wanting to mark others down for poor contribution, while others like himself did not, information that the group supervisor told me about later. Andrew tried to "tow the line", as he put it, by bringing along the other members to the research meeting and not creating friction. Although he made an attempt to complete the research obligations that his group had volunteered for, Andrew appeared to me to be upset over what happened in the exit interview and commented

after the meeting that he "hated" group work. It is interesting that he did not make this comment during the formal taped session, nor would he elaborate further on the split within the group, although he clearly hinted at a gender issue in the above extract. I met later with the two members of the group who were absent from the third meeting, both female, who then clarified further upon what happened in the group from their point of view. The following is a transcript from the relatively long conversation that I had with these two members (Appendix B, pp. 347-8):

33.	Kylie	So, he[4] kind of gave a bit of the Accounting and Marketing. Matthew took over that part anyway. He got his Dad to do it really.
34.	Researcher	Laughs.
35.	Kylie	Because they had an Accounting package called like Lotus 123 or something?
36.	Researcher	Yes, yes?
37.	Kylie	And um. He just put it in that and created problems.
38.	Researcher	What problems?
39.	Kylie	Well, because we sort of…
40.	Karen	(interrupts) Were supposed to do that.
41.	Kylie	Yeah, well apart from that. Like the students were supposed to do the Accounting.
42.	Karen	It was supposed to be in Excel as well. Others were in Excel and ours stood out. People were thinking like..
43.	Kylie	(interrupts) Because his Dad actually gave it.
44.	Researcher	Was that a problem? Because it stood out?
45.	Kylie	It wouldn't have been a problem if it had stood out if he knew what everything in the file meant.
46.	Karen	It was also in a different font, like it had page numbers.
47.	Kylie	And he didn't have it on disk.
48.	Karen	Yeah, he didn't have it on disk.
49.	Kylie	So, he did it at his Dad's work and printed it out, all 50 pages. Printed it out and that was it. And this was before we had sort of decided, you know, done some things. Before we had put it on a main copy so in our final report and Marcus was pretty much doing that and he had to do like a page break to 50 pages so he would get the numbers going through it.

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[4] Referring to Andrew.

In this group there was a very clear disagreement and lack of a shared understanding concerning the appropriate use of computer technology specifically concerning one member (Matthew), as well as some issues over inequity of workload concerning another member (Bryan). In the case of Bryan, Karen complained that "we had to redo quite a lot of Bryan's work" (Appendix B, p. 354), probably referring to Marcus, Kylie, and herself, who reportedly did the bulk of the construction of the final report. These issues, and disagreements over them towards the end of the project, particularly in the final exit interview with the supervisor, evidently resulted in hostility between members of the group, to the extent that both Kylie and Karen commented that two of the members, "won't talk to each other again" (Appendix B, p. 358). In this group, a lack of understanding, or intersubjectivity, between members resulted essentially in a social breakdown of the group at the very end of the project, with one member (Marcus) constructing the report with the help of Karen and Kylie, while the others occupied themselves in other ways as the following reveals (Appendix B, pp. 356-7):

193.	Researcher	Ok, would you change anything about the way you did the report at the end?
194.	Kylie	Like the way we put it together?
195.	Researcher	Hmm.
196.	Kylie	There was one point where the whole computer crashed eh?
197.	Karen	Yeah, a couple of times.
198.	Kylie	Marcus was really good. Marcus got really um, it was really good but he got really um, sitting here in front of the computer for how many hours straight and he wasn't feeling a lot of support. So, he was getting a bit frustrated which was really granted but, I think um, there was one point where it was good just having one person doing just for things like, there was one thing where I think what happened was that someone took their disk out of Marcus's computer and then we would just get a blue screen saying, " put the disk back in". He was like, "look don't do it, just let me do it!". So, he was really a bit known to shove the disk in. Putting it on and so then, did we save to the actual C drive on that last one?
199.	Karen	I think we did, yeah.
200.	Kylie	Yeah, I think we had the, it saved to the, I mean we must have because we put in other disks in there.
201.	Researcher	So, one expert, so to speak, doing the formatting and putting it together?

202.	Kylie	I know.
203.	Researcher	And they started to feel a bit, left out and a bit?
204.	Kylie	I think he was feeling, I think that he was just feeling that he…
205.	Karen	(interrupts) There were kind of three of us doing it and the other three…
206.	Kylie	(interrupts) Were doing computer games on the laptops.
207.	Researcher	Ahhh…
208.	Kylie	And because he did kind of choose his battles quite well. Like when he had um, a bit of an argument with Andrew, Marcus and Andrew just, Marcus was just sort of saying to Andrew, "Come on, help me out here", because I think we've been on at Bryan for quite a lot of the time and Marcus was really feeling, like saying something to Bryan. But near the end we were talking to him about telling him off all day so, he just said to Andrew, "look can you just help me out here?" and he just really needed to let off a bit of steam. And um, I think the thing that, I don't know if anyone, if it was Marcus annoying me, it was just saying things like, "Oh well, you are not asking me to do anything, you are not asking me". Yeah, it was like…
209.	Karen	(interrupts) "Well, I've done everything now that I've been told to do" that there's no initiative to do anything more.

In the case of group two, the one group that was not self selected, much tension was created by the disparate practices of the members in using computers to create individual pieces of the shared written report, to the extent that the term collective, or joint, activity can only be used in a narrow sense with this group, I believe. While the last chapter revealed that this group was interactive in terms of collective activity around computers, the level of intersubjectivity attained regarding these activities was constrained by disagreements concerning individual practices of members.

Tension was also reported in the final phase of the project in the other three groups but not to the same extent nor as destructive as was evident within group two. Indeed members from other groups also admitted that they had sought substantial outside help with aspects of the project that they did not fully understand, but this did not appear to cause the same level of disagreement between group members. Take, for example, the following excerpt from group three (Appendix C, pp. 387-8):

277.	Monica	I was lucky because we had no idea what a Gantt chart was, and my mum's a computer trainer and works with Microsoft Project and I just happened to say to her, "is the Gantt chart out of Project?" and she went, "yeah", and I said, "wonderful, can you show me how to do this?"
278.	Sandra	We were in the dark without her.
279.	Monica	I just had no idea.
280.	Researcher	So, was that something that you specifically needed help with?
281.	Monica	Yes.
282.	Sandra	I didn't even know what it was.
283.	Researcher	You did not have any?
284.	Monica	Didn't have, no knowledge of it at all, and something they expected us to put in having no knowledge about it at all.
285.	Alistair	You didn't have any knowledge?
286.	Sandra	Unfair. It's not us.
287.	Rachel	Imagine the people that didn't have someone like your mum. Like, I wouldn't know where to start finding it.
288.	Researcher	Were there any, um?
289.	Bryce	(interrupts) Table of Contents and that, headings.
290.	Hannah	You call it days like that it's pretty sweet.
291.	Bryce	Oh yeah, the headings, the Table of Contents mainly.
292.	Rachel	Bit of formatting, yeah.
293.	Alistair	I used my mother for the accounts.
294.	Sandra	Could you reckon if we said, "Bryce Ok you've got to do it all over again can you change the headings". Would you be able to do it? And the new contents?
295.	Rachel	I know that it's there.
296.	Bryce	It's a learning experience. I wouldn't have a problem.
297.	Sandra	Even though they are watching I don't think they understand what's happened with the printed page and all that, you know? So…
298.	Hannah	(interrupts) I don't think you knew all the problems.
299.	Bryce	Oh, I don't know.
300.	Monica	All the little tricks you pick up in the last – definitely.

The members of this group appeared to agree upon welcoming outside assistance, that is, expert help from the wider community of practice, unlike group two. In the case of the Gantt chart, the participants complained that they had had no

previous training or experience with these, which illustrates the authentic and self-directed nature of the task and also their acceptance towards contracting this part out. What is interesting in the above exchange between members, I think, is the extent to which two of the members received help from outside (the members' mothers in both instances), and the questioning by Sandra regarding how much they had all learned from the exercise, which reflects further the way in which individuals rather than the group constructed separate, specialized aspects of the project, and asked for outside assistance with some aspects related to computer usage. While open to this, Sandra evidently was concerned about how much each member had learned from the process, that is, the intersubjectivity concerning the final product, or outcome, that is, understanding the Gantt chart process. This, once again, comments upon the tension created by computer technology within the specific context of the group project.

In terms of using the computer collectively to construct the project, all the groups had similar concerns over the unfairness and constraints created by the use of computers to complete the report and developed different shared understandings and levels of acceptance surrounding this issue. Group two did not fare well in this regard, because of friction and disagreement within the group regarding computer generated aspects of the report, whereas the other three groups experienced greater levels of understanding regarding the challenges involved. To illustrate this, consider the following comments by members of group one (Appendix A, pp. 317-8):

58. Rob   It does end up with only like one or two people like really doing the bulk of it. The rest just sitting there like patting them on the back, getting drinks.

59. All   Laughter.

60. Melissa   That's because like you need someone who, like the whole report stays the same and if you start changing it and then format, like changing people's formatting might change a bit so its good to have one person who's got the same idea the whole way through.

61. Sam   It would be really, really good if Microsoft Word had some sort of plug in. So that you could decide on the format of the assignment before you start it and then everyone could plug it into their version of Microsoft Word. So, that as you typed it up it would use the right font and it would space everything exactly the same. It would use the same grammatical and spelling check and that sort of thing. Because whenever Tarah sent me something, it came up with loads and loads of mistakes, but whenever it was on her computer everything was fine, because she was using US English and I was using New Zealand English. So, I would change it all back to, like the word

optimise, I would change it all back to ss's and give it to her and she would change it back to zz's.

62.	Researcher	So, the spelling was the thing that was confusing?
63.	Tarah	We could have changed that.
64.	Sam	Yeah, yeah.
65.	Researcher	So how often would you meet at Tarah's place?
66.	Tarah	Everyday for the last week or so
67.	Melissa	Week and a half probably.
68.	Kurt	Probably from about lunchtime through to midnight the last few days.
69.	Tarah	Oh, it wasn't that long.
70.	Rob	That was only the last days.
71.	Melissa	That was only for a few days. The other days were quite full, not to midnight though, but...
72.	Tarah	(interrupts) Till nine o'clock.
73.	Researcher	So how many hours do you think together? Putting this report together?
74.	Rob	Too many.

Although dissatisfaction was expressed about the single user capabilities of the computer, this group appeared to accept the process. No one in the group disagreed with Rob's comment about one person having to do the bulk of the work, with much of the discussion then elaborating and reaching agreement upon how long this process took. In the scenario described by the members of this group, the role of the participants not using the computers was that of a support crew, assisting as needed or "patting them on the back" as Rob commented above.

Group three, like group one, came together at the end at one member's house (Rachel's) and spent most of the last week together constructing the report around one main computer, editing, formatting and printing the final report with members working on other computers as needed to support the main collation. With up to 12 hour stretches being reported, the time together as a group that members commented they needed to complete this phase resulted in shared understandings and intersubjectivity in other forms as well. For example, consider the following excerpt from the final meeting with this group (Appendix C, p. 381):

148. Researcher	Ok, um, sounds like it was a real team effort. I was going to ask you about preferred communication methods, but it sounds to me as if in the last week you met.
149. Monica	We all came.
150. Hannah	We were always there.
151. Rachel	From nine o'clock in the morning I think.
152. Monica	Yeah.
153. Hannah	Basically everyday. And everyone was really like, even though like you might have had people dying to put things, it was quite good in that last week we all kind of knew where we were up to. But before that, because before that we weren't really, we were just kind of like, "Oh I'm a geek". But in the last week we all sussed each other out.
154. Alistair	Wow.
155. Bryce	Yeah.

As a group, this conversation reflects how much closer the members felt towards each other after the event, an observation upon intersubjectivity that surprised one of the male members evidently and perhaps even embarrassed him. This group ended up spending a substantial amount of time together, which then became evidently a social event, illustrated by comments about playing pool and getting drinks. In this instance, rather than stressing about this lengthy process, group three can be viewed as turning the challenge created by the group project and the constraints of the computer into a social opportunity. This appeared to become part of their strategy for coping with tensions of the task, a dynamic that related to the requirement within the particular cultural and academic setting of the projects to use MS Word, a single user program, to assemble the final written report.

This shared understanding of each other's role in the process was also evident in group four, but rather than crowding around the computer as a group in one location, this group differed from the other three groups in their strategy towards the use of computers in the final phase. This group deliberately "chose" to avoid the issue of sharing a single user computer resource by allocating the construction of the report to subgroups in the final week, a strategy which two members reported they saw as the "only way" of doing it (Appendix D, p. 408). First Neil and Cameron, and then Troy and Chris were thus given responsibility for constructing the final report from all of the pieces that other members had emailed them. However, this sequential strategy

evidently did not work as planned. At one point the first subgroup became fatigued and gave up. This was phrased the "meltdown" by Troy, as reflected in the following excerpt (Appendix D, pp. 405-6):

35.	Troy	Well, after the …meltdown. Chris was there, and so me and Chris took over from there.
36.	Nat	Yeah.
37.	Researcher	Ok, well let me delve into this further. After the "meltdown" what meltdown?
38.	Cam	It wasn't a meltdown.
39.	Troy	Well, it wasn't a meltdown, just needed a change of freshness or something perhaps.
40.	Cam	Yeah.
41.	Jay	Cam was exhausted.
42.	Cam	I couldn't even see straight.
43.	Researcher	This was after the 15 hours and the 12 hours?
44.	Jay	Friday night. It was Friday night wasn't it?
45.	Nat	And Neil had to go to work.
46.	Cam	Yeah, Neil had to go to work.
47.	Nat	(interrupts) It was five o'clock and so it was like…
48.	Jay	(interrupts) email the troops in!
49.	Troy	Because Chris came round to my place Friday night and said he's had enough of this and so yeah just do the Table of Contents and a bit of editing and add on the appendices. Chris did the whole formatting and just took it from there.
50.	Researcher	So, was this still at Neil's place or had it moved?
51.	Troy	To my place.
52.	Researcher	So, you did the 15 hour plus the 12 hour at Neil's place?
53.	Cam	Yeah, that was Wednesday. A lot of time during the week and I just really wanted to have it done by Thursday and went through Friday because Thursday night it all went bung again didn't it?
54.	Troy	Yeah.
55.	Researcher	What went bung?
56.	Cam	Oh just formatting. The software just kept doing things for no apparent reason whatsoever. We just love Microsoft (laughs).

As illustrated within this particular group project, a large amount of time was invested by pairs of group members in turn over the course of the final week

preparing the final document on their own PCs. While little tension between members was reported, fatigue and frustration were challenges, much of which was caused by difficulties with the application itself, according to Cam. In addressing fatigue amongst some members responsible for the construction of the final document, the group then collaborated more closely and shared the load, as reflected in Jay's remark, "email the troops in". This group also experienced technical issues due to their strategy of passing the file from one computer to another in the final stages, which led to compatibility issues. This reflects a limitation in the software to be able to work with such files, as reflected in Cam's sarcastic comment about Microsoft Word. However, the strategy of not meeting as a group to construct the final report ironically had the effect of bringing the members closer together, in this case with the group clearly 'rising' to the challenge of the constraints of the computer. In this particular case the stress led to a greater level of collaboration and shared understanding, or intersubjectivity. This was reiterated in some of the concluding comments from members of group four as listed below (Appendix D, p. 404):

20. Researcher   Sounds like it was not a positive experience?

21. Cam   No, it was fine (laughter) We knew it was coming. We knew it was going to be like that.

22. Jay   But it ended up being completely unfair, I mean Neil and Cam did most of the work and the rest just...

23. Cam   (interrupts) It's just the way it worked out.

24. Jay   I mean with editing its like, you can't have six people sitting around editing.

25. Nat   No, and you can't have one person pick up where another one left off.

26. Researcher   Ok, this is a really important part of the whole research is its unfairness. Can you see any other way around it or do you think its?

27. Cam   Not really. I mean I'm sure there would be but if you want a consistent report.

28. Nat   Yeah.

In the above conversation a consensus of opinion regarding the difficulties of sharing one computer for the final stages was voiced by members of group four. While the computer machinery did not easily afford the joint activity, the group

members appear to have been able to reorganize themselves based upon a shared awareness of the constraints of the computer technology in this context.

Overall, the division of activity in all groups, particularly towards the end, was perceived as being dictated by the use of a computer, and its constraining features, to construct a shared project. In group two this challenge resulted in irreconcilable tension and a lack of intersubjectivity amongst the group, while in the other three groups, the constraints of the computer appear to have brought the participants closer towards a shared understanding of the limitation of the machine within the context of the study. Such intersubjectivities and countersubjectivities were constructed by members in response to the unique demands of using computers as tools for the purposes of the projects, and can be seen to be part of the unique cultural and academic context, rather than part of the tool itself.

9.3   Intersubjectivity and Meaning

Remarks made by the participants about the purpose and meaning of computer use within the context of the group projects were gathered verbally in the last focus group meeting and in written form in the questionnaire once the project was over. The groups disclosed different attitudes towards the use of computers as revealed in the following transcripts from the groups. Some of these are quite long out of necessity, because I want to illustrate the level of agreement within groups of six people.

Group two, as discussed, differed from the other groups, as they essentially disintegrated as a unit, and would not meet together at the end of the project to discuss shared understandings regarding computer use evidently due to an argument over the allocation of marks in the final contribution to syndicate process. I met with three of the members straight after this meeting but, as indicated in the transcripts from this meeting, they were fairly guarded about the details with two making excuses to leave fairly quickly and not handing in their log sheets or mailing them in later as asked (Appendix B, pp. 340-3). They appeared angry, with Andrew coaxing them to attend. The following transcript, for example, gives some idea of what they thought of the final stages of the shared collation process where they all gathered together at Bryan's place:

82.	Researcher:	And how long did this take? Did you do it all in one hit? One session?
83.	Andrew:	No.
84.	Matt:	It took three days.
85.	Andrew:	Three hits and it consisted of like good 8 hours, 8 to 10 hours per hit. At times it was a scream.
86.	Researcher:	And was it all of you?
87.	All:	Yes.
88.	Matt and Bryan:	We need to go.

The perceptions of the project and the use of computers to complete it by some members of group two were clearly negative. Karen, for instance, openly blamed the task for the social problems experienced (see Appendix B, p. 358). Other members commented, in hindsight, on the miscommunication and inequity of labour within the group(see Appendix E, page 434). Kylie, for instance, was very critical at the end, openly accusing others, such as Brian, of being "slackers" and commented on the "drawn out" yet "realistic" process of working around computers on the project. She explained that Marcus ended up doing the bulk of the computer work towards the end yet added that it "was good just having one person" (Appendix B, p. 356). Physical co-location in this case with abundant computer resources did not equate to collaboration and shared understandings of the task.

Group one similarly experienced frustration with using the computer to collate the written report in the following stages but not to the same degree as group two. They met with me as a group following the completion of the written report and gave the following impressions of the process (Appendix A, pp. 320-1):

119.	Researcher	Ok, just some comments on what it was like to work, thinking of some adjectives and adverbs to describe what it was like to work on this group project? Positive or negative?
120.	Kurt	Stressful.
121.	Melissa	Stressful.
122.	Researcher	Stressful?
123.	Suzy	Yes, that is definitely the word I would use and frustrating.
124.	Researcher	Stressful, frustrating.
125.	Rob	It's kind of rewarding I suppose at the end of the day. When you see the assignment.

126.	Tarah	It's a huge thing.
127.	Rob	When you see it come out at the end.
128.	Researcher	Ok, and the computer?
129.	Kurt	Throw it out the window.
130.	Researcher	Throw it out the window?
131.	Tarah	It makes it look all professional.
132.	Melissa	Yeah.
133.	Kurt	It does but it's really frustrating just sitting there. Just trying to get everything exactly how you want it and when you can't get something to go up exactly how you want it to.
134.	Rob	It's worse than that. All the headings, trying to do some graphs in Excel, they are so limited when they need… - all the hours trying to get a graph to show exactly what you wanted them to show. I suppose, because everyone had different ways of doing things on their computer, and then trying to bring it together it just sort of, we really had to go through it together as a group to make it sound as though one person had sat down and written the whole thing by themselves.
135.	Researcher	So, what was the hard part? The most challenging part do you think?
136.	Sam	It was time consuming.
137.	Suzy	Yeah.
138.	Rob	Stressful.
139.	Kurt	It wasn't like, challenging mentally, just sitting there and just…
140.	Sam (interrupts)	Because Tarah's computer turned into a bit of a factory really.
141.	Tarah	Printing for like hours.
142.	Sam	Smoke started to come out of the back of it.
143.	All	Laughter.

In this conversation a number of points of shared understanding about the computer and the task are illustrated which reflect on the role of computer technology in the projects. In general, this group agreed that it found the projects stressful and time consuming, with some humour towards the end about the constraints of the computer within such projects, for example, Kurt's comment "Throw it out the window". This indicates relief that the project was finished, as well as negative perceptions towards the use of computers in the projects. Rob, Tarah and Melissa all indicated that that they were pleased with the result, while Sam, Rob, and Kurt

reminded them how frustrating the computer was in such circumstances. Computers evidently constrained the groups collaborative efforts. They ended up being together huddled mainly around one computer (Tarah's) reportedly for hours at the end. This supports the view, discussed earlier, of tension between the mediational attributes of the computer and the collective nature of the task in this context.

Unlike groups one and two, group three at the end did not mention stress at all, and were generally more positive in their remarks relating to how glad they were that the project was over. This was probably due to a different tactic this group used for the final assembling of the report. Consider, for example, the following, relatively short, excerpt from the last meeting with this group (Appendix C, pp. 386-7):

260.	Researcher	Great. Well, that's about it. Sounds like it was?
261.	Hannah	Pretty much sweet as I reckon.
262.	All	Yeah.
263.	Sandra	We passed.
264.	Hannah	We had a really good group and we all worked, I reckon really well together.
265.	Researcher	And so that made a big difference you think, having a really good group?
266.	All	Yeah.
267.	Sandra	It made all the difference.
268.	Monica	Because I think that if we had been having arguments and stuff trying to be all in one place hovering over the computer would have made it really difficult.
269.	Sandra	I heard of one group that just got so fed up with it that one guy ended up taking the disk and spending like 15 hours on it by himself, editing it all, because everyone was fighting and everyone was like, fed up.
270.	Hannah	We were really lucky…

Group three seemed relieved that it was over and that they had passed, yet unlike group one, reported little intra-group tension as illustrated succinctly in Hannah's remark, "sweet as". In this particular case, however, Monica's remark indicates that this group chose not to "hover" around one computer in the final stages. This is a key point as evidently they evaded much of the tension and frustration by choosing not to gather intensively around a single computer at the end and instead distracting themselves with other social activities. Group three subsequently

considered themselves as being a "good group" and compared themselves to other groups outside this study that had not worked well together due to conflicts around the computer.

Group four, were also positive about the outcomes for similar reasons as group three, that is, they chose not to gather around a computer as a group in the last stages and appeared to recognize the limitations of using a computer to collectively mediate the task in this fashion. They all agreed about the tension between the collaborative nature of the task and the mediational constraints of the computer as used within that particular community of practice and so chose a strategy that would avoid that. Consider, for example, the following excerpt (Appendix D, pp. 409-10):

117.	Researcher	Ok, so what was it like to do this project? I mean, if you were going to use some words what was it like? Listening to you before talking about the meltdown…
118.	Cam	(interrupts) Challenging, I mean it wasn't too traumatizing.
119.	Nat	Challenging.
120.	Jay	In fact the meltdown was the worst.
121.	Researcher	Challenging, not too traumatizing?
122.	Cam	Quite stressful when you're pushing towards a deadline and you really want to get it done and software is just doing things that it has not been told to do and it's randomly formatting things for you. You can't seem to get it together.
123.	Nat	We also put pressure on ourselves because we all wanted to get it finished by Friday and although like, it wasn't 100 percent it was, but still it was good.
124.	Troy	It was good.
125.	Researcher	So, you felt pressured?
126.	Cam	Yeah, that was something else.
127.	Troy	Yeah, I mean that's, I've never had an assignment that's not like that, you know? Always, assignments are going to be pressured.
128.	Nat	Yeah.
129.	Cam	It's more irritating because the work was actually done but the configuration wasn't.
130.	Researcher	So, the work, the content work had been completed?
131.	Nat	Yeah, that was good.
132.	Researcher	Way back?

133. Cam	Not way back but there were still dribs and drabs coming in but the majority of the document had been done by Tuesday/ Wednesday minus a few bits.
134. Troy	There was still a wee bit to add in the weekend, editing and stuff like that.
135. Cam	For sure, yeah.
136. Troy	Just a few sections to integrate a bit more.
137. Researcher	Ok.
138. Nat	I enjoyed it, I mean it was the group.
139. Researcher	So, the group thing was enjoyable?
140. Cam	Yeah.
141. Nat	When we all came together it was fun.
142. Researcher	Working together was fun but not, the technical side was?
143. Nat	Just towards the end.
144. Troy	Yeah, I think it's better when you have it together in front of you and then you work on it. I mean, it's all together and you sort of, you know, improving it rather than that initial trying to get the stuff together. That's a pain in the arse, like trying to get everyone's stuff you know? Like once it's in one document it seems like that's worthwhile. You can all work on it and you can see it and change it and it's not, you are not outside anything any more.

After the completion of the construction of the report the students in group four, while voicing the challenges and stress of using computers for such a task, can be seen to be generally positive and realistic about the technology with some members mentioning, for instance, that it was "fun". Another member, Chris, reiterated this view of the computer later, adding that, "I mean of course it has its frustrations and things but you couldn't possibly have done it any other way. You couldn't have written it. It's 29,000 words" (Appendix D, p. 418). The shared attitude expressed by this group was one of the computer as a necessary, albeit an imperfect tool for the construction of the report; a sentiment echoed by Jay when she jokingly said in a group meeting, "Burn the computer. No, don't quote me on that one" (Appendix D, p. 412).

The results displayed in this chapter give a good idea of the differing perceptions of the computer as a collective mediator by members of the various groups. While accepting that the computer was a necessary mediational means, or tool, within the specific culture of the project environment, that is, one that they were

expected to use in a certain way (for example, using MS Word), in co-constructing the report, some groups had evidently come to a shared understandings of the issues involved and developed tactics to avoid many of them, while the other groups failed to achieve this intersubjectivity to differing degrees.

9.4   Examining the overlaps

In reviewing data from the transcripts related to intersubjectivities concerning the Form, Use and Meaning of the computer in the context of the present study, I have found it sometimes difficult to separate out specific instances of conversation surrounding each of these aspects of technology. This reveals some of the overlap between the categories of the protocol as discussed earlier. In general, as can be seen in many of the examples presented above, the group meetings included discussions that interwove each aspect. Consider the following excerpt from group three, for example (Appendix C, p. 378):

85.	Hannah	We ended up with about 10 to 15 disks that, we just didn't know what they were.
86.	Monica	Because I would save them down onto the Hard Drive and then make the copy was still on the disk, but the computer would still want to work off the disk, even though it was on the Hard Drive. So, you would take the disk out and five minutes later when you went to try and move something or change something it would just go "nuts, forget this, I'm not doing it and close down".
87.	Rachel	It would asking, "please put this disk in" and it's like, what disk?
88.	Sandra	It would say, "Disk 000" and we had about five.
89.	Monica	And because the disks weren't named you would have about five disks that you were throwing in until it finally spurted out something like, " Ok, I'll take this one".
90.	Sandra	And that took about an hour.
91.	All	Laughter.
92.	Hannah	At times it was like you were spending so much time just trying to find it.

This example concerns an issue directly concerned with both the Form and the Use of the computer. In this instance the students were reporting that they experienced difficulty with using the computer to manage files on floppy disks, not knowing how to import or merge the files correctly, nor the master document feature of MS Word.

That is, they were experiencing difficulty with both the medium, or form, of transfer, and the process of transferring files to and from this medium. In addition, as mentioned previously, some of the students in this particular group anthropomorphized the computer, treating it as human, which could be argued as relating to an individual's understanding of the role of computer technology. Despite the continual interweaving between the three aspects, the negotiation regarding the Form, Use and Meaning of computer technology has generally been distinguished in the results.

This chapter has presented results pertaining to the group discussions and negotiations regarding the joint use of computers within the integrated group projects that formed the context of this study. Examples of both agreements and disagreements within the groups concerning the technology framed within the neo-Vygotskian based protocol presented in chapter five have been outlined. While all groups differed significantly in their relationships with the computer and the task, three out of the four groups could be seen to develop, or construct a shared understanding, or intersubjectivity concerning the role of the computer while one group, group two, failed at the end to achieve this state and essentially disintegrated. To recap, the members of group one reported this relationship as stressful, requiring hours of time to construct the final report yet completed it together. Group three shared a slightly different perspective even though they chose a similar strategy, and turned the final group effort together into a social event, which evidently relieved some of this stress and enabled them to cope with the task. Group four took a more practical stance and pre-empted what they saw as a tension between the single user nature of the computer and the group task by allocating the final construction to small sub-groups; a strategy which needed to be modified with the consensus of the whole group.

The findings listed in this chapter pertain to the basic agreements expressed by individuals in groups concerning the challenges of using computers in face-to-face collaborative efforts and reveal the tensions between the cultural practices of using computer technology with an authentic, collective task in an established community of practice. Together with the data discussed in the previous chapter, a powerful image of the dynamics involved in such situations has been illustrated. In the next chapter I will discuss these results from the thesis's neo-Vygotskian perspective upon collective mediation, as well as underlying theoretical and pedagogical implications.

Chapter Ten: Addressing Collective Mediation

There is more to knowing than just being correct (Hoff, 1982, p. 29).

Chapters eight and nine have described, using a variety of methods, how the groups in the study approached and collaborated over an authentic shared problem and produced a single computer-generated report about it. These two chapters followed the outline set down by the protocol, presented in chapter five. This chapter discusses these findings from a more theoretical perspective of group work with computers based upon the literature review. As part of this discussion, I will address the neo-Vygotskian model of collective mediation developed in chapter five. Indeed, addressing this issue will provide the initial focus in this chapter.

10.1   The computer as a tool

Vygotsky conceived of two broad classes of mediator that interface between the internal and the external worlds of an individual; signs directed inwards and tools directed outwards. As Cobb points out, this difference can also be seen to represent a conflict between constructivist and socio-cultural accounts of human behaviour, although he argues that the two are "complementary" (1994, p. 13). Envisaging the computer within the results of the study as an artificial device that mediated an individual's activity reveals both these aspects of mediation in the form of receiving and transforming information although, as Vygotsky commented, "based on the conventional figurative meaning of the term we usually speak of tools when we have in mind the mediating function of some object or some activity" (1997b, p. 60). It is this externally orientated aspect of the computer as a tool for "subjugating the environment" as Vygotsky once described tools (1997b, p. 62), that I think was particularly well illustrated by the results of the study pertaining to the interactivity recorded; aspects that I will discuss first in this chapter.

The interactivity recorded concerning the Form, Meaning and Use of computer technology for the projects demonstrated how each of the four groups orientated themselves towards the shared project using these particular devices as tools. The computer was shown to mediate three main, or core, activities directed towards the

completion of the group task as well as sub-core activities, such as graphics design and other activity that, while not directly related to the task, made life easier for some members while 'participating' in the project. First, the computers, in all but one case Windows based PCs, were used by individuals and small groups to co-construct a written report using commonly used office applications including MS Word and MS Excel. The report was the main goal of the project, which the participants then presented to a panel of lecturers at the University. All four groups completed this task with varying degrees of success. Second, in addition to other communication methods, the computers were employed for communicating between members in each of the groups, as well as with other individuals about aspects of the project through the use of email software. A third core activity that the computer mediated was Internet based research that members carried out to help them search for information pertaining to their proposed businesses. A non-core activity was playing computer games, an activity by some participants that was evidently used to fill in time, particularly towards the end of the group project, when some groups gathered in one place to compile the final report. None of the computer activities was evidently new to the participants, who commented at the outset of this study on their histories of use with similar tasks, some more substantial than others. In general, there was found to be wide variation between the participants in terms of their skills with the machines.

Computers as tools, therefore, were used in a wide variety of ways by the participants in relation to the projects which reflects, what Blaye, Light and Rubstov observed in a similar setting as, "the multifunctionality of the computer, which can be seen simultaneously as a specific device for the presentation of tasks, and as a dialogic partner" (1992, p. 259). In this context the computers were used for both of these purposes, as seen. This usage also reflects the multifunctionary skills demanded of the participants involved in the joint activity, an aspect of group projects that was noted as a key principle of the socio-technical approach (see page 119). The computer, in this particular context, was definitely "not a monolithic technology", as Ahern and El-Hindi have expressed it (2000, p. 385).

Indeed the technology directed, to a large extent, how the groups carried out the work needed to complete the project. Generally, the groups were seen to divide the project up into two phases, or modes of joint activity based largely upon the constraints of the task and of the computer, different phases that have been recognised in the field of CMC (see page 125). The first phase was described as an asynchronous

phase of independent work upon components of the group task and the second synchronous phase, as when the whole group, or subgroups, in the case of group four, came together around a single computer to construct the final document.

During the initial phase, the individuals and subgroups responsible for each section used their own personal access to computers that they had brought with them to the project, which included access to home computers and other personal resources through family or friends. During this phase, which took up the majority of the project time, computer-related tasks were carried out separately by individuals and subgroups physically dislocated from the other members of the group. The computer facilities provided by AUT including the use of on-line services were seldom used. Rather than being one sharable resource, or tool, that was introduced into the project, the computer was apparently already integral to each student's own set of abilities, or part of their "toolbox" to use Crook's term (1994, p. 20), prior to the start of the project. That is, each individual brought their own already established history of computer experience and knowledge with them to the context of joint activity, a result which also reflects Crook's observation that:

> Collaborating pupils bring to an interaction a history of other experiences that are potentially shared and potentially known to be shared. Sometimes, the value of these experiences may be obvious; they are about circumstances that are very closely related to the intellectual demands of some task that collaborators are currently engaged with (1999b, p. 107).

The skills that the participants had mentioned that they had brought forward from previous experiences reflects, to a certain extent, that these individual computer related practices and habits were well formed and perhaps even "fossilized" to use one of Vygotsky's terms (1987). This is illustrated by how the group project then challenged the participants to extend these established practices to cope with a shared group task, highlighted, for example, by the differences observed between email and word processing activities observed in the present study. All of the participants used pre-existing email accounts, as well as other methods, to communicate with each other and to pass on files by attachment. There were few concerns voiced over this aspect of technology, except for some comments on the file size restrictions by hosts such as hotmail (Appendix A, p. 315). Yet, there were substantial comments upon

formatting issues using MS Word by all four groups that related largely to incompatibility between different configurations of this program on different machines and to problems with the transfer of files between computers by attachment or floppy disk (see, for example, Appendix A, p. 315, Appendix B, p. 331, Appendix C, p. 383, Appendix D, p. 408). This indicates the extent to which the participants had well-established personal practices using MS Word as configured on their own computers and struggled with compatibility issues when uploading files onto one machine, as this involved skills that were outside the participants' normal range of experience and use.

Partially for these reasons, it was the second phase of synchronous group activity around a computer that presented the most difficulties and challenges and that, in all groups, led to one or two members of each group working on the final document on a single computer, whilst the others present either assisted with this activity using other machines as necessary, or did not, as illustrated by the pool playing, computer gaming, and the getting of drinks. Examination of the negotiation and discussion that occurred around this joint activity revealed the social and practical challenges that this final phase created. Group two, as seen in the previous chapter, experienced much intra-group stress and essentially disintegrated. The others coped with the inherent difficulties in different ways and reflected back upon these once the project was over. As Rob from group one observed, for example, "When you are all trying to work on one computer, there's a lot of sitting around just basically" (Appendix A, p. 317). This sentiment was common and was reflected by much evidence that some of the participants in the study contributed little during the last phase, while a few key members operated the machine and did the bulk of the work. So while, for example, in groups one, two and three, the groups met with the intention of sharing the load during the final stage, sharing did not eventuate with there being instead a necessary inequity of labour. Instances of social loafing and other tensions related to factors such as gender were observed which reflects further some of the literature concerning group work discussed in chapter four. I will return to some of these issues later after I have addressed the research question.

10.2 Collective mediation

The reported struggles surrounding the use of the computer in the final stages of report construction highlighted the difficulties in sharing such technology in a face-to-face group context. While the computers may have effectively mediated communication between participants prior to this final phase of report construction, which can be seen as support for asynchronous virtual group work, they did not easily support communication and joint activity around computers, due to the single user nature of the software used. Table 8.1 (page 208) illustrates the predominance of solo activity within the group projects, as do comments such as Troy's that, "...you need the group to be together but you can't work together computer-wise..."(see page 226).

In this particular context, computers did not support collaborative face-to-face group work and therefore, failed as collective mediators in the real sense. However, these tools operated quite effectively in the virtual sense as demonstrated by the wide spread use of email. This finding reflects an observation made by Golay Schilter, Perret, Perret-Clermont, and de Guglielmo that:

> The characteristics of the computer used are equally susceptible to influencing the modes of collaboration adopted. The way the use of the keyboard and mouse is (or is not) distributed is a major issue (1999, p. 120, parentheses in original).

To summarize, computers inhibited the face-to-face collaborative activity in the study simply because of the physical limitations of working on one document together as a group. This hindered the socialization of knowledge construction, which supports many of my concerns regarding its use within education discussed in chapter one. The computer was seen as a constraint by the participants rather than as a facilitator, limiting and directing how the groups could work together to produce a single document within the context of the study. The computer could not functionally be viewed as a single collective mediator introduced into the projects to be shared and negotiated over by the participants. That is, the data have shown that the model presented in chapter five is incomplete and needs modifying, something that will be pursued next.

10.3 Revising the model

The results of the study indicate that, while collective in the sense that many different computers were used by many people for constructing a single printed report, the computer was not seen as a single device introduced into the study at one particular point. Instead, the computers were used by each individual as part of their ongoing history of practice with these machines within an academic and cultural environment. That is, the computer were individualized systems already present within each participant's set of personal resources and practices, part of their 'toolbox' as mentioned (on page 248). Recorded in the study was interaction amongst various individuals plus their computer tools, not interaction between individuals gathered around one single set of computer resources. The verbal comments made in the focus group meetings support this. Bryan simply commented, for example that, "We just used our own computers" (see page 210) while Rob said that,

> …everyone had different ways of doing things on their computer, and then trying to bring it together it just sort of, we really had to go through it together as a group to make it sound as though one person had sat down and written the whole thing by themselves. (see page 240)

Troy makes a similar comment on page 243 as does Nat on page 237. These results support a view of the computer mediating the groups' joint activities on an individual rather than a collective basis, which is compatible with Vygotsky's perspectives on the notion of instrumentality and internalization via individual mediation (see chapter two). This alternative view of the computer as an individualized cultural tool, or mediator, also incorporates the concept of a "functional organ" depicted in Figure 3.6 in chapter three (page 62). These entities, which Kaptelinin describes as "functionally integrated, goal orientated configurations of internal and external resources" (1996, p. 50), envisage individuals plus external tools as independent elements of activity within a wider social and cultural environment, a viewpoint that matches more closely the results of this study and yet ignores psychological aspects such as the role of intersubjectivity (see page 63).

A revised view describes at least two interfaces, or borders: one between the tool and the individual, and one between the combination of these and the outside

world. This was indicated in the study by the two modes of activity observed, the first between individuals with computers working on separate sections (the asynchronous phase) and then the presentation of this to the outside world, in this case, the rest of the group (the synchronous phase). Rob's comment above illustrates these two levels of computer use, as does Troy's that, "Sort of not allowed to mix computers. Will have a 'home' computer that's going to be the heart of everything" (page 225).

Results like these indicate the personalized nature of the computer, which can now be viewed as an integral part of an individual's available resources, which they carry around with them to contexts, such as the group project. This view conforms more closely with how the computer was used by members of the groups than with the vision proposed in chapter five of a single shared collective mediator. The diagram below presents a modification of the original model that encapsulates this new perspective.

Figure 10.1: Modified model
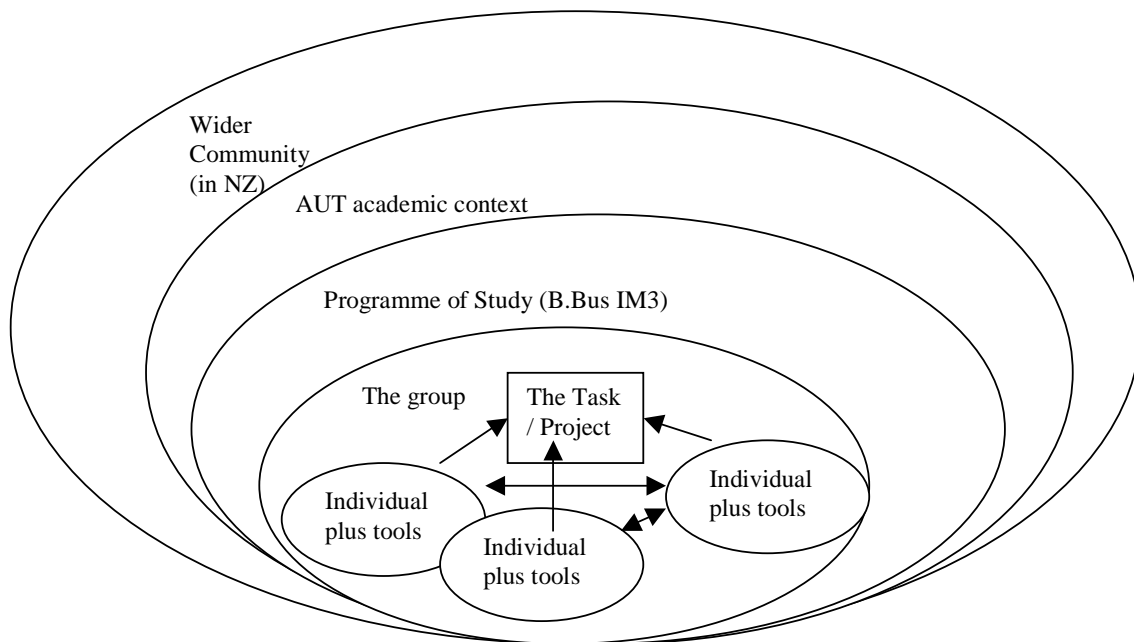
In this figure, the individual group members are seen together with their personal tools, or mediational means to use Wertsch's alternative term (1998, p, 17). In this specific context, this contains their access to and abilities with computers. The interactivity and negotiation between the individuals in relation to the task, or group

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project, is depicted[1] by double-pointed arrows and an overlap, a limited representation of the rich dialogue that actually occurred in the study. The relationship with the group project, on the other hand, is depicted as one-way; the participants worked on the task, it did not operate on them. The unique social and dynamic formed by negotiation within each of the groups in relation to the task then determined their co-constructive activity.

Figure 10.1 is intended, similarly to those presented in chapter five (see Figures 5.1 and 5.2), to represent a snapshot in time of the interactivity occurring during the project life cycle. In this snapshot, for example, there is a sense of synchronicity in that all three individuals are working together at this point in relation to the task. At other times there may be little interaction going on regarding the project with each working on their own pieces of the project, that is, asynchronous activity. The extent of 'collective mediation' then depends entirely on the extent to which the participants negotiate shared understandings and activities in relation to a particular mediational tool, whether it is an individualized tool in the form of computers, or something else, for example, a projector used for the final presentation which is not personal, but something that belongs to a wider context, such as the University.

In this study the participants generally decided not to use the university's computers, preferring to use their own personalized machines. It appears that they were more comfortable using their own computers rather than the generic, though sometimes more powerful, ones that were also available within the wider community of practice. This suggests that locally constructed, convenient, and personalized tools were of more use to the participants than those constructed and provided by the broader cultural and academic environment. In other words, there was a cascading set of influences with the local tools being dominant over tools available within a broader context.

An 'onion rings' view of group activity within ever increasing circles of contextual breadth is included in the conceptualization depicted in Figure 10.1 based upon the observed influences upon the interactivity from outside the immediate group environment in the study including supervisors, lecturers, friends, work colleagues, family, and expected norms from the wider cultural environment. This supports

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[1] In the figure I only had room for three participants.

Matusov's view of an individual's solo activity being embedded in a wider socio-cultural environment and his comment that, "a socio-cultural individual never joins or leaves the socio-cultural activity, but changes partners, directions, and forms of participation, even when the individual is in a solo 'phase' of the activity" (1998, p. 338). The individual computer activity noted in the group projects could be envisaged as being embedded first, within the short term context of the group and then, within the wider community of computer based practices at the time in that particular context, which would include the specification of common practices determining such things as type of hardware and software used within that community. While the individual's solo activity then took place within a group project, this capability, or history, of individual practice can be envisaged as being within a wider cultural framework, which determined and constrained to an extent, what activities were expected. That is, the individual's use of the computer did not begin and end with the project but instead could be envisaged as just one more instance of the individual's computer practices within an ongoing history of activity and living. This new representation conforms more closely with the activities and findings of the study. Consider, for example the following excerpt from group one (Appendix A, pp. 313-4):

68.	Melissa	I think it's worthwhile because, I mean, like all businesses and stuff these days have computers. I've learned heaps just from this, I mean since I've been here about how to do things on computers. So, I think it's worthwhile.
69.	Researcher	So, you have learned through the group rather than being taught in a class?
70.	Melissa	Oh, both really because we did have IT last semester which was really helpful with the graphs and tables and stuff.
71.	Suzy	Yeah.
72.	Melissa	Table of Contents things like that.
73.	Tarah	And we've also just learned from other people, asking questions and that.

In this excerpt Melissa discussed computer use in a wider context, beyond the scope of the project and over a longer time frame. She could evidently see beyond the group project to wider applications in Business and could also see links back to prior learning experiences. That is, the use of computers was seen as being embedded

within a wider context and not just contained within the specific instance of the group project. This illustrates socio-cultural concerns regarding wider contexts of individual activity. The last comment by Tarah also reflects influences of others from within the broader socio-cultural context, as well as issues to do with the construction of meaning resulting from that influence, factors that represent different aspects of a neo-Vygotskian perspective.

10.4   Socio-cultural influences

Much of the above discussion points towards a socio-cultural perspective of computer practices as being part of an individual's enculturation within a wider community of practice (Lave & Wenger, 1991). Indeed, the results indicating wider cultural influences upon the activity recorded in the study conform with Vygotsky's argument, according to Lee and Smagorinksy, "that cultural artifacts – whether physical or conceptual tools – are historically constructed" (2000, p. 5). The findings illustrated the participants of the study as having access to an individual set of resources developed historically and culturally in Vygotsky's sense of the terms. But, as discussed in the literature review, Vygotsky's theory was essentially an individual one. He was primarily interested in the influence of social and cultural factors upon individuals via internalization, rather than upon groups of individuals. As a result, as Matusov has pointed out, one criticism of Vygotsky's perspective is that "it overemphasizes solo activity and individual skills at the expense of joint activity" (1998, p. 327). Within Matusov's participatory approach, in contrast, a wider view of the process is taken within increasingly abstract levels of culture permeating out of a narrow focus upon solo, individualized activity. This view also conforms with Cole's (1999) similar vision as depicted in Figure 3.8 (see page 71). That is, embedded circles of culture of ever increasing abstraction of socio-cultural influence, circles that have been included in the revised model presented above. Wertsch, another neo-Vygotskian, similarly points out that:

> The task of a socio-cultural approach is to explicate the relationships between human *action*, on the one hand, and the cultural, institutional, and historical contexts in which this action occurs, on the other (1998, p. 24, italics in original).

This research has revealed some of the wider social and cultural perspectives upon the joint activity. Stepping back into a wider cultural perspective, away from the individual, the specific use of computers within the group projects seen in the study was clearly situated within the wider academic and business related environment of which the participants were a part. For example, consider the specific hardware and software that were used by the groups in the study. In all but one instance, Windows based PCs with MS Office software were used. A wider socio-cultural stance can be seen to explain why. The groups were directed and expected to use this type of machinery as typifying standard business practice at the time. That is, the groups did not freely choose this particular configuration of computer, but an assumption was made that they would, based on standard practice within the wider community, or culture. It was an integral part of the authentic, 'real-life' scenario offered to the participants. The only 'tailor-made' feature provided as part of this effort towards authenticity was Business on Line (BOL), a web based resource provided by the wider community of practice for the participants, a computer application that was seldom used. The participants were constrained by cultural and academic norms of the time regarding computer use, norms which had not yet, for example, adopted BOL within the broader community of practice.

Socio-cultural influences upon the joint activity were apparent, therefore, within the context of the study and, in a sense, could be envisaged as 'holding back' the participants from progressing from novices to experts within the community of practice. The specific use of the software and hardware in the projects, while limiting and helping to define exactly how the groups approached the joint problem, also situated the study within a specific cultural and historical environment in terms of computer resources and practices. The computer tools determined the type and extent of collaboration within the groups, both in the real and the virtual senses. This highlights a view of the culturally determined nature of the mediated activity and supports Saljo comment that:

> Learning is located in the interplay between culture and individuals, and it implies the *transformation* of individuals and collectives in terms of the nature of the tasks they master (1999, p. 149, italics in original).

As well as cultural and historical influences, a large part of neo-Vygotskian thinking, as summarized in chapter three, is centred upon social constructivist accounts and the potential for transformation of meaning in individuals and groups within communities of practice. I will now turn my attention towards evidence concerning these aspects of the joint activity that occurred in the study.

10.5 Computers and the ZPD

Up to this point, this chapter has focused predominantly upon a view of the computer as a cultural mediator, or tool, which has orientated the discussion towards the interactivity recorded in the study concerning the use of computer technology and the socio-cultural influences upon these devices. That is, it has focused on the outward manifestations of the use of the tool. Yet, as argued previously, a strict activity orientated approach is not sufficient from a neo-Vygotskian perspective. Vygotsky spent much time in trying to understand the formation of unique higher mental functions that resulted from the dynamic between two mediators; signs, primarily in the form of language and tools, in the form of artificial, man-made devices, which computers would no doubt have been included had they been invented in the 1920s. It is the results of the study concerning the sign related mediation, the inwardly orientated, or co-constructive, aspects of the joint activity, that contribute to the neo-Vygotskian focus of this thesis that will be addressed in this section.

To review, Vygotsky saw psychological development in humans as comprising the formation of higher functions, primarily through the internalization of social activity with others, particularly more capable others (see page 37). He saw this process of internalization as being mediated by signs, primarily language and other cultural artifacts, such as technology (Lee & Smagorinsky, 2000, p. 2). Valsiner and Van der Veer elaborated upon this further and point out that the distinguishing characteristics of higher mental functions are that they are cultural, social, mediated, and internal, but add that these meanings "do not fully overlap" (2000, p. 371). It is, therefore, necessary to find distinct examples of these influences. In this study, Vygotsky's view that mental functions originally derived from socialization via signs, led to the choice of methods that capture the verbalizations and intersubjectivities uncovered within the social arena of the focus group discussions.

However, at this point it is also worth reminding ourselves of Vygotsky's warning that physical objects such as technology are often "illegitimately psychologized" (1997, p. 61). Vygotsky believed that it was the meaning associated with the mediated activity that was important for the internalization of concepts rather than a focus upon the activity itself, which is the realm of the activity theorists (see Vygotsky, 1987, p. 244). Assistance from others leads to transformations in knowledge and thinking in the individual via the use of signs. It is this internalization of what was once social that is the crux of Vygotsky's theory. Vygotsky argued, for example that, "What the child is able to do in collaboration today he will be able to do independently tomorrow" (1987, p. 211). He, therefore, placed much emphasis on social assistance, or scaffolding, by more capable others, that is, within a ZPD. Relating this concept of "elaboration", using Webb's term (1991), to the use of computers in the study, it is how the computer was co-opted, employed, or was not as part of this co-constructive activity, that is of interest here, rather than an analysis of the computer as a meaningful object, or sign, an exercise that Vygotsky cautioned us against. That is, it is the extent to which the computers, or artificial devices, afforded social elaboration, or co-construction, within the context of the study, a necessarily more subjective and, therefore, more problematic, process than uncovering the interactivity. Rogoff clarified this point of view further when she said that:

> Central to Vygotsky's theory is the idea that children's participation in cultural activities with the guidance of more skilled partners allows more children to internalise the tools for thinking and for taking more mature approaches to problem solving than children have practiced in social contact. Cultural inventions channel the skills of each generation, with individual development by interaction with people who are more skilled in the use of the culture's tools (1990, p. 14).

It is how the use of the computer by the groups, a "cultural invention" in Rogoff's terminology (1990, 1995), channeled the group members towards giving and obtaining assistance from others that is of interest here rather than observations that, for example, the computer was used to communicate, therefore it functioned as a sign. This is a key point of neo-Vygotskian thinking. On page 254, for example, Tarah's comment that, "…we've also just learned from other people, asking questions and

that."(Appendix A, p. 314) indicates in this context the value of shared understandings and intersubjectivities. Troy's comment that "Yeah, I learned lots of stuff, picking up stuff from other people" (Appendix D, p. 411) similarly reflects a positive view upon scaffolding or social elaboration both within the group and from outsiders. Other 'snapshots' of dialogue throughout the group meetings provide further illustrations of learning from more capable others, which apparently occurred even though most of the project contents were completed by individuals and subgroups, which indicates that this assistance and elaboration was perhaps not to the extent hoped for within a cognitive perspective upon group work.

Indeed, the necessity to construct a single word processing document limited the extent to which members of groups could discuss and elaborate upon each other's activities in real time, although there was much evidence of regular communication with each other about the project, initially via telephone, email, and face-to-face meetings, and later by coming together around a computer as a group and editing the report. The mode of communication was clearly determined by the nature of the task and the use of computer technology with participants citing convenience and immediacy as important criteria for communicating particularly during the initial phase of group activity[2]. This dynamic reflects Michailidis and Rada's view that "The communication mode choice for group writing may be influenced by the degree to which the mode supports the regularization of information flow and access to information and people" (1997, p. 482). In this context, the task directly influenced the participants' choices of communication method. For example, Hannah, of group three, wrote the following in response to a question regarding preferred communication methods (Appendix E, p. 425):

> Depends for what purpose, e.g. text mess. Or email fine to organise meeting
> times. Meetings all together were best for discussion or editing.

Collaboration and discussion by various means was evident within all groups, although towards the end of the project this became more difficult and stressful for the individuals involved, with an individual, or subgroup being responsible for the final collation and printing of the report with little time or opportunity for intra-group

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[2] See, for example, the responses to questionnaire item six (Appendix E, p. 426),

discussion and elaboration. Indeed, after the report was completed, some members of group four mentioned that they had not even seen the final report (Appendix D, p. 416), having left that aspect of the report to one member, Chris, to complete, who evidently used his girlfriend's work printer for the task.

To what extent assistance from others helped the groups co-construct knowledge was an issue that reflects back on much of the theory concerned with the social construction of knowledge within such entities as a ZPD. As Golay Schilter et al comment, in a collaborative group context, this assistance is reflected in the extent to which interactions become asymmetric, that is, "with certain participants in the position of expert and others in the position of novice" (1999, p. 120). It can also be reflected in support received from more capable individuals outside the group. There were some instances in the projects in which this happened, which raises ethical issues regarding whether or not the projects represented the groups' own work. Within group two, for example, the outside assistance given to one member was seen as inappropriate by other group members, whereas in groups three and four it appears to have been accepted openly by the group (see Sandra's remarks on p. 232). There seems to be a subtle difference in contexts like this between being assisted by outsiders and contracting work out completely to outsiders. This difference can be interpreted in terms of differences in the amount of elaboration, or scaffolding given to members of the group as part of this assistance. In the case of group two, for example, the members' complaints appeared to be not so much concerned with the fact that one of the members had sought outside help with accounting, so much as the fact that he was then unable to answer any questions about the accounts afterwards. That is, the member responsible evidently still did not understand the content after seeking help and so could not elaborate, or assist the other members with information about the accounts that influenced their own sections of the report. This point is illustrated clearly in the following dialogue from the final meeting with two members of this group (Appendix B, p. 349):

60.	Kylie	So, that was all fine if Matthew could tell us beforehand what everything meant. But when we would ask things like, well why have you done that …
61.	Karen	(interrupts) Depreciation?
62.	Kylie	Depreciation as diminishing returns or something like that.

63.	Karen	He couldn't tell us.
64.	Researcher	He couldn't tell because his Dad had done it so he would go back to his Dad to ask. Would it become like that?
65.	Kylie	It wasn't even like that. He was kind of like dealing with a brick wall. It was like, you would ask him and then he would say…
66.	Karen	(interrupts) "Yeah, yeah, yeah, yeah, yeah."
67.	Kylie	"Oh, don't worry. Don't worry about it". And then it got to the point where we were asking him so many questions that he didn't know the answer to, or he would be looking up the answer that he would say, "Oh well, the questions are only like 2% of your overall mark, so I wouldn't really worry about it". But it kind of wasn't the point. It was like we really need to know if we are going to be asked them.

The fact that Matthew could not answer questions about the accounts, which led to inconsistencies in the final Business Plan, nor could he provide a soft copy, which created formatting problems in the final construction of the report, as well as his general attitude, evidently 'sickened' other members of the group (Appendix B, p. 351). This finding brings forth Vygotsky's following corollary when he was explaining the concept of ZPD:

> The only instruction which is useful in childhood is that which moves ahead of development, that which leads it. However, it is only possible to teach a child when he is able to learn. Instruction is only possible where there is a potential for imitation (1987, p. 211).

In the example above, the assistance received from a more capable other (Mathew's father) was not useful as there was clearly no opportunity, or potential for elaboration about this aspect of the group project. It was an area that could not be co-constructed by members of the group as it was just handed to them without further information, an act that members who wanted to learn were evidently not happy about. That is, the "mechanism for learning" from social processes, as Webb and Palincsar term it, was not available in this instance (1996, p. 845).

Group three potentially faced the same issues as they also sought substantial outside help with two aspects of the report. Like group two, this group sought help with the accounts and, in addition, the Gantt chart, an aspect that this group, along

with some of the others, admitted they had "no idea" about (Appendix C, p. 387). In this case, however, there was a clear indication that the members learned something via the assistance sought, as borne out by the transcript given previously (on page 232) and illustrated further by comments from members, such as Monica, that (Appendix C, p. 362):

| 31. | Monica | My mother is a computer trainer. So, it's a lot of help when you might have problems. Its like, "I'm here and I don't know what I'm doing, so help me". So, that really helps out a lot. |

This example reflects a different attitude towards the outside help to that of group two. The members of group three were open to outside help, but only in so far as this assistance would lead them to a better understanding of the content. They wanted to learn from the assistance and not just take the information without any further elaboration, a big contrast to the situation reported by the disgruntled members of group two. Similarly, the log sheets for the members of group four cite instances in which the outside help was sought from lecturers and from the husband of one member, Jay (Appendix F, p. 470). However, this did not noticeably disrupt the group and was scarcely mentioned in the group meetings. That is, the new information appears to have been absorbed seamlessly into the report constructed by the members.

Concerns such as these, over the impact of assistance from others, not only reflect cognitive learning approaches towards joint activity but the neo-Vygotskian concept of scaffolding within a community of practice, itself based upon Vygotskian notions of socially and culturally determined human functioning and the value-added nature of assistance from more capable others. In these cases, there were clear examples of Vygotsky's concept of ZPD and the importance of more capable others in guiding individual learning, which brings forth the related concept of cognitive apprenticeship and social constructivist theories in general (see chapter three).

While clear functioning instances of co-construction of meaning were recorded in the study, these dynamics were clearly limited by the 'divide and conquer' strategies adopted by all the groups; that is, by the evident deconstruction of the task into individual pieces, necessary given the tools available and the nature of the task. This finding evades one of the prime purposes, or characteristics, of collaborative group work, which after all, according to Webb and Palincsar, "is convergence – the

construction of shared meanings for conversations, concepts and experiences" (1996, p. 848). In summary, even though the groups may have started the projects with the intention of sharing knowledge, as much of the initial dialogue from the group meetings indicates, the opportunity in this context for such "convergent conceptual change", as Roschelle terms it (1992, p. 235), was clearly limited by the nature of the computer-based task and there were clear instances where the skills and knowledge required were outside the capabilities of the group. That is, the theoretical ideals of group work pedagogy were not met by actual group practices in this context.

10.6   Issues of interdisciplinarity

Although this study was focused primarily upon the use of computer technology from a neo-Vygoskian perspective, the findings also raise questions regarding the interdisciplinary, or integrated, intentions of the group task, a related issue in this context due to the influence of the computer as a mediational means. While integration across disciplines was clearly outlined as a goal in the student handbook (see Appendix I, p. 495) the groups deconstructed the projects into discipline-based chunks that were then worked on by individuals and small subgroups, the allocation being largely based on each participant's subject strengths and weaknesses. As Sandra from group three, for example, outlined (Appendix C, p. 372):

158.   Sandra   Hannah's going to do Law, I'm going to do Marketing, Alistair's going to do Accounting and then we are going to try to integrate it all in that horrible way which is what we found with our last one.

This initial strategy of specialization was noted in all four groups and, essentially, describes an activity that appears to miss the point of interdisciplinarity, which after all is concerned with, "multiple boundaries being crossed" (Klein, 1996, p. 4). While the groups may have written a report that incorporated different disciplinary accounts, the specialization revealed within the group projects and the evidence that some of these subgroups then contracted out work to outsiders, indicates that, in many cases, members of the groups did not fully understand these differing aspects of the final report. For this reason I was lucky to be able to speak with two

members of group two after their presentation. This is the group that contracted out the accounting section. They commented that (Appendix B, p. 350):

75.	Kylie	Well, I think we were all very lucky in our presentation.
76.	Karen	Except they caught Matt.
77.	Kylie	Yeah, yeah.
78.	Karen	Gave kind of a good answer actually but the rest of us didn't get asked Accounting questions.
79.	Researcher	So you just…
80.	Kylie	(interrupts) No, they caught Marcus really.
81.	Karen	Did they?
82.	Kylie	Yeah, Marcus right at the end.
83.	Karen	And they, Matt as well.
84.	Researcher	On Accounting questions?
85.	Kylie and Karen	Yeah.
86.	Kylie	But I think that we didn't have the Accounting guy in out presentation and so I think that we kind of…
87.	Researcher	Lucked out?
88.	Kylie	Yeah and, yeah, if we had had him we would just…
89.	Karen	(interrupts) Yeah, but I think with the Marketing, of the assignment, I think they will pull it to bits.

In this instance, the participants evidently thought that they were lucky not be asked questions about the accounting side of the report because they knew very little about it due to issues related earlier. They also had concerns about the marketing content and the overall impression was that the members of the group had large holes in their interdisciplinary understanding of the content. This evidence supports one of Benson's key criticisms of an interdisciplinary approach where he pointed out that, "it is pedagogically doubtful business to spend time in interdisciplinary learning projects when the student lacks a mature base in any of the contributing disciplines" (1982, p. 41). While debate may arise over what Benson exactly meant by a mature base, the results of this study have shown an instance where the students openly admitted that they lacked sufficient knowledge about a discipline for the purposes of the project, even after they had received assistance.

10.7 Tension

At the end of the focus group meetings many participants reflected on the stress and frustration involved in the project, which illustrated some of the dynamics operating within each group (see pages 239-43). These remarks demonstrate much of the theory discussed in the literature review regarding groups and computers specifically and also upon the "myriad forces operating in group contexts" already well known to group learning perspectives (Webb & Palincsar, 1996, p. 868). I will address some examples of these more general forces, or tensions that were made apparent in the results of this study.

Gender issues were mentioned a few times throughout the study, both from previous experiences with group work, as well as within the present context. It was interesting to observe that within two of the groups, specifically groups two and four, the female members of the group formed a subgroup that worked together separately from the other members of the group in the final stages. This division was illustrated by references in the log sheets, for example, to the "boys" (Appendix F, p. 471), or Chris's observation in group four that, "Cam, like during mid week he was sort of like 'just keep the girls away'. You know, it was just easier not to have the girls there and I'm the same, you know what I mean" (Appendix D, p. 415). Within group three, a similar 'us and them' perspective regarding gender differences in previous group experiences was reported, based apparently around the different academic aspirations of each group (Appendix C, p. 366). Comments marginalizing one sex or the other apparently reflected differences in perceptions regarding how males and females use technology, with criticism working in both directions. These findings can be seen to support much of the literature pertaining to such issues usually concerned with younger, school age groups (see, for example, Underwood & Underwood, 1999). This study indicates that these differences can also exist at undergraduate level.

Social loafing, as mentioned, was another issue that was raised in particular by members of group two concerning one member, Bryan. Here is an excerpt from members of group two regarding this issue, for example (Appendix B, p. 360):

267. Researcher   But, overall do you think that these group projects are a good
                   way to learn?

268.	Kylie	I think that they are a good way to learn how a business operates because you are always going to get a slacker in business.
269.	Karen	Yeah.
270.	Kylie	You are always going to get people who go out and motivate themselves like Andrew. Just go out and do the project without being asked. You are always going to get, you know, the person who knows a bit more about technology and all that kind of stuff.

In the context of the group projects, Kylie appears to be weighing up the benefits of authenticity against the social loafing and the specialization that was apparent in her group. While the scenario may represent business reality, as she suggests, it still leaves open a concern regarding the extent to which the participants learned about each content area, as well the debate surrounding the 'slackers', as Kylie described them and the 'workers', to coin another term. Well illustrated in the findings related to this particular group was the extent to which this issue caused conflict within the group. This tension was highlighted when some members of this group enforced measures of individual accountability at the end of the project during the exit interview using the "contribution to syndicate" form illustrated in Appendix I (see page 503). In this case, rather than settling the differences concerning the contributions of various members fairly amongst the group, this action, while altering each student's score in the group by a few percentage points, led to much interpersonal tension and essentially to the break up of this particular group. Regarding the use of such punitive measures at the end of the project, this evidence raises questions about the value of these measures as summative rather than as formative processes, as well as the underlying motivational standpoint presented by the cooperative learning genre (see Slavin, 1996; Lejk et al, 1996). In this context, enforcing accountability by adding or removing marks after the group project had been completed had little positive effect.

The frustration and stress reported by groups one, two and, to a lesser extent, four, reflect some of the negative aspects of using computers for learning activities listed by Shenk in chapter four (1997, see on page 118). Other negative effects listed, specifically, decreased benevolence, as illustrated by Mathew's unwillingness to collaborate in group two and overconfidence, in terms of the expected time for compiling the report by most groups in comparison to the reality were also illustrated well in the study. In general, the groups, to differing extents, overestimated the ability

of the computer as a mediational means for co-constructing the report, which resulted in frustration and tension particularly in the final synchronous phase of joint activity. As a tool, the computer was revealed as problematic and complex but necessary, with the groups having to devise strategies to deal with the constraints within the context of the study.

Evidence of a 'rallying around' effect within most of the groups, particularly in the final stages of report construction, reinforces the notions of "social facilitation" (Zajonc, 1965) and of "least collaborative effort" (Clark & Wilkes-Gibbs, 1986), discussed in chapter four. Jo's comment, for example, when her group encountered difficulties towards the end, to "email the troops in", is a clear illustration of this sentiment (Appendix D, p. 405). Other evidence included comments regarding how lucky participants felt that they were part of a good group (Appendix C, p. 386, Appendix D, pp. 409-10). There was evidently a level of cohesion, to use Pheysey's term (1993), in some groups, particularly one and three, that was revealed by a heightened level of effort and motivation for much of the final stages of report construction when they chose to physically be together throughout this process. The members of these groups, and of group four, illustrated much support for each other in different ways in the quest towards finishing the project using computer technology and once it was over, these participants then reflected back upon the challenges of the process with differing forms of intersubjective understanding. In this sense, the group-goal directed nature of the project was also well illustrated, thus reinforcing perspectives upon the motivational aspects of group process.

10.8   The complexity of the projects

Overall, this study indicates the complexity of factors influencing group work with computers as suggested by Webb and Palinscar's Input-Process- Output model in chapter four (page 104). It can also be seen to reflect broader socio-cultural and constructivist viewpoints and the neo-Vygotskian perspective upon joint activity that was the theoretical focus in this thesis. The participants had to negotiate individual needs and academic aspirations of the group with technology and the construction of an authentic project within a particular community of practice, or culture. This was a complex project. The results also lend support to theories focusing upon the motivational and situated nature of joint activity as well as many of the critiques of

computer-based educational practice and views concerning the complexity, or even supercomplexity of learning within such contexts (Fielden, 2000, Barnett, 2000).

The findings illustrated many constructive, cultural and social aspects of human functioning within groups in relation to computers, as well as some of the more anti-social aspects. Specifically, this study revealed tension between the socially interactive nature of face-to-face collaboration and the physical capabilities, or in-capabilities, of the computer introduced into this social arena, as Blaye et al also noticed (1992, p. 259). The ability of the groups in being able to cope with the fairly rigid requirements of the computer in meeting the expectations of the academic task varied. Some, like group four coped well, while group two fell apart towards the end.

In terms of computer use within the group projects, two different computer-based communication modalities were employed within the groups with different levels of success, which supports similar perspectives within the field of CMC (see Michailidis & Rada, 1997, for example). The asynchronous communication afforded by the widespread use of email produced little concern whereas the synchronous communication and collaboration around the computer was generally problematic. Reflected in the findings was an uneasy relationship between the computer and the social aspects of group work, which supports Crook's similar concerns for outlining, "a configuration of computers that goes some way towards avoiding the breakdown of community-based mutual knowledge – as it might otherwise occur in relation to computer work" (1994, p. 120). While relatively easy to use as individuals and for supporting virtual collaborative efforts, computer technology was responsible for tension within instances of face-to-face joint activity. Comments made by the participants in the focus group meetings (see page 233, for example) indicate that this was probably because of the obvious physical limitation, that is, only one could work on the computer at time, which entailed a clear separation of activity with one dominant individual operating the keyboard and mouse, something that was not palatable to the participants (see Cazden, 2001, p. 125). The participants indicated that they viewed the computer as a difficult tool to use together for constructing a community-based document and they finished the four month long project with a general view of the machine as a very necessary, but constraining device to use in a face-to-face group situation. In a final member check carried out a year after the study, I summarized and sent this view to the participants by email, with all those responding favourably and with Sandra adding that (Appendix H, p. 484):

I agree with everything here, but I think it was important to note, that the last comment, "it was not an easy tool" for a group to use was because on the most part, a lack of real knowledge of computers, could we have used better process, different programs?

In the study, the computer was seen to mediate an individual's activities towards the group goal by aiding communication with other members and with obtaining information from the Internet. It helped individuals create specialized sections of the report using single user applications such as MS Word and Excel. But it did not allow the students to work easily together using these applications, thus creating friction and inequity of work towards the end of the project. The solo nature of much of the activity was determined by the constraints of the software and of the task itself, as Sandra hinted in the excerpt above. The specialized and individualized nature of computer use recorded in the study highlighted wide individual differences in computer related practices and broad differences in perceptions of the machine. The task, while authentic in the sense that it modeled a 'real-life' problem, was also constraining, with academic and cultural expectations regarding what the groups should include and how they should construct their reports. This meant that the groups had less autonomy perhaps than that hoped for within the ideals of socio-technical and Problem Based Learning approaches (see chapter four).

As mentioned in chapter four, Salomon suggests that there is a "reciprocal relationship" between technology and the cognitive processes of learning (1998, p. 4). This was reflected in the present setting. The groups had to balance the fairly rigid needs and criteria of the academic institution against the constraints of using computers in groups and the subsequently limited opportunity to be creative and original. The more successful groups were the ones, such as group four, that were able to grapple with and balance this rich set of social, cultural, technical, and constructive influences on constructing a joint project amicably within the unique social fabric of the group using stand alone computers. A neo-Vygotskian analysis has indicated the complexity of this relationship that will be considered further in the next chapter where I make my conclusions.

Chapter Eleven: Conclusions and Implications

> In the process of social life, man created and developed more complex systems of psychological connections without which work activity and all social life would be impossible (Vygotsky, 1997b, p. 56).

An underlying goal of this thesis, as stated on page four, was to ground an instance of 'modern' pedagogical practice within appropriate educational and psychological theory. I have addressed this task by conducting a case study on the use of computers within undergraduate interdisciplinary group projects in Business at AUT, a practice informed by emerging trends in tertiary education. Regarding a theoretical focus, a neo-Vygotskian perspective of group projects and computers has been utilized to explain how computers were successfully used, or not, within the projects to collectively mediate the joint activity. That is, both negative and positive aspects of the practice were illustrated via this theoretical perspective. This approach also allowed the construction and revision of a model and the establishment of a protocol, or methodological framework for the study. Alternative viewpoints, such as the motivational perspectives discussed in chapter four, were also included.

What has been attempted in this thesis is a critical and yet open-minded approach within a theme of, "interaction and appropriation" (see Fay, 1996, p. 221). Indeed, the neo-Vygotskian interest in collective mediation has critically commented upon aspects of the joint projects, which required the participants to co-construct an authentic Business Plan for a new fictitious commercial enterprise over a four month period. Instead of grounding practice, as hoped for in this particular setting, the results painted a much more complex picture of the dynamic between computers and groups.

11.1   The dynamic revealed

Rather than revealing rich collaborative effort and the expression of intersubjectivity concerning the group goal within a community of practice, the results reflected, not only a complex, but a variable and sometimes problematic dynamic between the participants taking part in relation to the computer technology present within a specific community of practice. The computer was revealed as potentially a

socially isolating device because of how it was set up and used in this particular setting. It failed as a collective mediator of learning in the physical face-to-face sense because it did not support or encourage the co-construction of a group project report. That is, the way the computers were used in this setting did not reflect the ideals of the pedaogogy. Instead, the groups divided up the task into chunks that could then be researched and created by individuals working on their home computers. This was demonstrated clearly in the results. While asynchronous communication between individuals was easily supported by the use of email, synchronous collaboration occurred over the telephone, or in occasional face-to-face meetings with little interactivity around computers especially in the initial phases of the projects. The computer was shown to be an uneasy machine to work with collaboratively in this particular context, with whole group efforts at compiling individual pieces into a cohesive document during the final stages being fraught with frustration and inequity.

In this context, the individualized nature of the computer was highlighted. It was seen as a tool belonging to an individual rather than to a group, in the sense of a collective mediator as proposed in chapter five. It constrained rather than afforded social construction, with any link between the terms collective and mediated being tenuous due to the nature of how the computer was utilized. An alterative model was, therefore, presented in the last chapter to better encompass the dynamics seen in the study. This revised model incorporates Vygotsky's emphasis upon the active use of cultural tools as mediators on an individual level, that is, the notion of individual internalization of meaning rather than the socially appropriated nature of knowledge. The computer could be best viewed in this context as part of an individual's toolbox, or "personal space", rather than as an asset of a group and something that can be shared, or socially constructed. It was used primarily as an individual device, which reflects Briton's view that,

> Developers of educational tools, like so many others, have tended to focus on the single user, ignoring the impact of technology on custom, community, and the way people work together. Such individualistic, instrumental approaches pay little heed to such non-technical factors as cooperation and collaboration, and do little to develop the technocultural competencies people need to cope with an increasingly complex life (Briton, 2001, p. 118).

This was the case in the present setting. The computers were used predominantly as solo devices, which reflected a history of typical use within a specific social and cultural environment, or within layers of context, as presented in the revised model (see Figure 10.1, page 252).This was indicated in the results through evidence that the participants were used to using the computers as single user systems, with single user software and hardware. This tradition in a specific community of practice within a broader socio-technical culture then influenced how the groups co-constructed the report. In the study, social interactivity that led to intersubjectivity concerning aspects of the projects tended to come after the individual computer-based construction of content, rather than being part of it. That is, in this context individuals first created parts of the report in relative isolation and then presented it to the rest of the group, which then led, in some cases, to discussion, negotiation and shared understandings and, in other cases, to little or no discussion. Indeed, as seen with group two, the computer-generated efforts of one individual were openly rejected by other members, with subsequent collaborative efforts towards the group goal being severely impaired as a result (see Appendix B). In this instance, the resultant polarization between members led to, what I saw as, inappropriate punitive measures being taken. In this particular group, computer usage could be seen to divide rather than bind individual efforts towards the group project, which reduced the level of intersubjectivity, or shared understanding.

The socially isolating effects of computers seen in this research was also illustrated by the success of group four, who deliberately chose not to meet together at all as a group for the final collation of the report. Not only did this group achieve the highest mark of all four groups but socially, it appeared to suffer the least amount of stress and discomfort. By switching as much of the work as possible to a virtual and asynchronous mode of operation, this group appeared to avoid many of the issues related to the sharing of resources experienced by the other three groups. The results revealed just how profoundly computers can affect collaborative group efforts and illustrate Light and Light's observation that "computer-mediated communication might seem to offer a more accessible medium than face-to-face interaction, especially face-to-face interaction in a group setting" (1999, p. 164). In this study this was seen to happen with face-to-face interaction around computers being difficult and with email, for example, being widely and effectively used by the participants along with a variety of other communicative modes.

Presented with an authentic business task and with access to typical business computer applications, rather than promoting face-to-face interaction, this study has revealed the tendency of the technology and the task to push groups in a different direction, towards less socialization and towards individual specialization and virtual collective activity. Within the culture of business, perhaps this makes sense, with the participants themselves commenting on the waste of resources and time involved in crowding around a single computer (see Appendix D, p. 408, for example). The task, designed to simulate a 'real life' business task, was revealed as fairly rigid in terms of expected content and formatting and so the division of labour should not be unexpected. On the face of it, this does not seem to be a problem with all groups successfully completing the joint project by meeting the criteria laid down by the academic institution. However, this strategy does not support the ideals of an interdisciplinary approach to education, with participants not being involved in disciplines they were weak in and, in fact, being able to avoid them completely. This study raises questions regarding this phenomena and also brings forth Vygotsky's argument that:

> Instruction would be completely unnecessary if it merely utilized what had already matured in the developmental process, if it were not itself a source of development (Vygotsky, 1987, p. 212).

This study raises questions concerning the extent to which such learning contexts and activities utilize new knowledge and skills rather than existing, 'matured' knowledge. That is, it queries the extent to which the pedagogical context allowed the participants to progress beyond being novices within a community of practice. The joint activity was seen to include many histories of individual practices within a specific culture based on similar past experiences, plus some challenges and subsequent social assistance. Any elaboration of new knowledge was limited by the task and the resources available, however, and also was seen to vary widely between groups and individuals. The findings indicate the difficulty of attaining such elaboration in this complex setting with numerous external cultural influences and expectations. Perhaps as a result, many participants consequently chose just to "tow

the line" as Andrew commented[1] (Appendix B, Page 345). That is, some participants followed along with the group and completed the minimal amount of work needed to conform to the norms and criteria set down by the academic institution rather than progressing via group negotiation of meaning, as hoped for within the ideals of a neo-Vygotksian perspective.

The results also query support for perspectives on the importance of socially rich learning environments, even though some social assistance and elaboration was revealed in these situations particularly with subgroups. In this study, socially rich environments were created towards the end by three of the groups, contexts that resulted in much social activity with the whole group but which tended to detract from the small subgroups who were left with the responsibility of piecing together the report. In these situations there was a clear inequity of labour, computer use, and perhaps in learning as well. The least socially interactive group, group four, as mentioned, was revealed as the most successful in terms of co-constructing a report that met the criteria of the broader academic community with the least amount of intra-group conflict and stress. When Cameron suffered a "meltdown" in the final stages, for example, another group member took over but still kept the work away from the rest of the group (Appendix D, p. 404). This group evidently gave priority to academic and cultural expectations, and relied on prior skills and knowledge of subgroups rather than on co-constructing meaning together as a group, a strategy that evidently paid off. This strategy comments on the balance of socio-constructive and socio-cultural influences that required management by each of the groups and further reflects the point that, as Hogan and Tudge comment, "social interaction cannot be assumed to be always beneficial" (1999, p. 61). Other groups evidently struggled together around one or two computers constructing and representing meaning in a single printed report, a very time consuming and inefficient process evidently.

While instances of learning via interactivity, negotiation, and shared understandings were revealed, which reflect neo-Vygotskian support for such phenomena, the extent to which individuals learned and the value placed upon this learning, were not pursued directly in this research. Some questions have been raised over exactly how much shared understanding of content took place within the projects, with the participants clearly leaving the responsibility of key disciplinary

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[1] In this instance he was referring to meeting attendance.

areas to specialists within the groups. Indeed the only impetus for the participants to learn other members' work was so that they could be ready for the final presentation of the report to a panel of lecturers; an event which the participants of group two, in particular, were apparently in trepidation about because they did not understand much of the content and did not want to be "caught" (Appendix B, p. 350). Essentially, the participants were expected to teach themselves any content through the experience afforded by the group task. This observation raises a question as to whether it is pedagogically sound practice to use such group projects for 'teaching' second year university students interdisciplinary knowledge, given the specialization revealed within each group's construction of the report. The projects were not a minor assignment; they were a four month long task weighted at 45% of the total semester's grade. The answers to such questions, of course, are best left to a full program evaluation of the group projects, something that I suggest as a research need given the issues raised in this research.

11.2   Further reflections

In this study, the participants described and reflected upon how they, in groups, constructed a joint project using computer technology within a specific environment during a specific period of time. That the results and the projects themselves are situated within a particular history of computer-based practices has clearly been demonstrated by the unique circumstances afforded by that particular context as well as by the methods used. In essence the findings conform to Littleton's conclusion that:

> A unified model of productive groupwork will need to embrace an understanding of collaboration as a situated activity, mediated by artifacts. …Capturing complex processes in a schematized manner without simplifying them will represent a considerable challenge for researchers seeking to understand collaborative learning in computer environments (1999, p. 190).

The present context has indeed revealed itself to be complex, with an initial 'naïve' view of the computer as a single collective mediator being modified to account for a multiplicity of individual configurations and usages. The influence of

wider academic and cultural factors were also seen as important influences in how the groups did, or did not, collaborate together on a joint task. Commonalities between this context and others is essentially left open to individual interpretation, although the results clearly comment on issues inherent in similar group projects and particularly those that require the use of standard commercial software and hardware. This was a key issue in this study. In this context, the participants were embedded within a community of practice relating specifically to computers that guided and constrained their practices. MS Office 97 was the core software package employed in the specific business culture at the time and, therefore, in the group projects, which was demonstrated as being difficult to collaborate with in a face-to-face sense. Although the intention was to simulate an authentic business-related task appropriate for undergraduate business studies students, this choice of software led to many difficulties and constraints upon the groups' collaborative efforts. This is perhaps expected given the single user design of MS Office. Suggested for further research are similar studies of such contexts but with software deliberately tailored for collaborative tasks, software that is readily available and commented upon within the field of CMC (see Light & Light, 1999, for example). The findings of this research indicate that single user designed packages such as MS Office are simply inappropriate for collaborative face-to-face group work, particularly where the intention is for all participants to equally contribute to the task in an interdisciplinary sense. The indications are that this did not happen in the present study.

From a neo-Vygotskian point of view, much of the tension viewed within the groups resulting from these practical constraints could be viewed as frustration concerning the lack of elaboration, or scaffolding, that resulted from the 'divide and conquer' approaches that the projects entailed. In some cases this lack of access put some participants off, with many just 'hanging around' in the background (see page 237), or not participating at all in the final stages, as planned deliberately by group four, for instance. In other cases this led to apathy and cynicism as revealed by members' comments from group two. In other instances there were very clear examples of how some participants learned from more capable others, for example, in the case of the Gantt chart with group three. These dynamics reflect the potential power of peer elaboration within such settings, which supports Vygotsky's basic view upon the individualized value of socially shared knowledge and helps underscore the existence and importance of elaboration and assistance. In this context these

potentialities were not fully realized within the pedagogical practice studied, however, which leaves it susceptible to criticism. While the intention of the architects of the integrated group projects may have been to construct a contemporary and competitive B.Bus degree (see Trenwith, 1998; Vile, 2000), that is, a pedagogical niche to use Draper's term (1998), the results of this study raise questions regarding the support from underlying theoretical perspectives. Indeed, this practice may well be one that reflects Hannafin et al's specific concerns, voiced in chapter one, about emerging learning environments which are not well grounded in theory and use methods that are, "inconsistent with presumed underlying assumptions" (1997, p. 104).

11.3   Evaluating the protocol

In this study, I developed and tried out a new framework, or protocol as I termed it, for investigating the dynamic between the computer and the participants in a group project. The protocol developed and presented in chapter five was based upon an amalgamation of methodological concepts and techniques already existing, but essentially represented a different view upon joint activity and one that generally was seen to work well. A main contribution of this study, therefore, is this new methodological approach stemming from the ideals of neo-Vygotskian theory.

While the protocol has essentially led to a rejection of the notion of computer technology as being a single collective mediator in the context of this study, the results nevertheless illustrate some major features concerning, what I have referred to as, a neo-Vygotskian methodological perspective. Specifically, the study has illustrated the merits of a methodology that encapsulates concerns for understanding both the interactivity and intersubjectivity that is negotiated within instances of joint activity, in this case, between the group project and computer technology. The study has illustrated, via these two foci, not only how the students co-constructed the projects within a community of practice, but the extent of the negotiation and meaning making between the participants that was inherent in this process. That is, both constructivist and social-cultural aspects of the phenomena were revealed to differing degrees, as was the bi-directional nature of mediation via computers, as postulated by Vygotsky's notion of instrumentality.

One aspect of the protocol that was found to be problematic was the overlapping categories of Form, Meaning and Use. Originally intended by Larsen-

Freeman (1991) as a way of describing the dimensions of grammar, these categories were adapted to describe the various, overlapping aspects of the computer in the context of the study in terms of both the interactivity and intersubjectivity recorded. Sometimes, however, it was difficult to differentiate between the categories, particularly, for example, between the negotiation, or intersubjectivity concerning the Form and Use of the computer. This issue was resolved in presenting the results by melding the findings together and by stressing the interrelatedness of the categories, but clearly this aspect of the protocol requires further development and would benefit from further research.

A combination of focus groups, surveys and member checks, were used as data collection techniques for gathering information to meet the aims of the protocol. The use of focus groups, a controversial practice, worked well in this research to produce a rich collection of participant discourse regarding the projects, even though the conversations were necessarily retrospective and reflective rather than a direct, 'real time' recording of joint activity (see Pearson, Ross & Dawes, 1992). Indeed, it could be argued that focus groups were the best method available for accessing and capturing the negotiation and intersubjectivity that evolved between participants in each of the groups within the context of the study. At the same time, they were hard work and required the frantic scribbling of notes to record who was saying what and were political, with meeting times being negotiated and changed throughout the study. The social complexity of conducting focus group meetings over a four month long period of time was thus revealed, with it also being necessary for me to schedule extra meetings based on social dynamics within some groups. The surveys and the final member checks, while prone to non-compliance as Sarantakos noted (1993, 1998), were easier to administer and triangulated well against the focus group meetings to construct a consistent representation of the interactivity and intersubjectivity that occurred throughout the projects. Case studies are situated yet, as Yin points out (1994), the inclusion of multiple methods helps the reader evaluate their applicability to other contexts.

11.4   Practical implications

The implications of this research to practitioners in the field, that is, to teachers and designers of educational practices come from consideration of the factors

that both supported and did not support learning in this context. This case study provides many examples of how not to implement integrated group projects with computers. In key areas there was evidently a mismatch between the educational intentions of the context and the learning activity that actually occurred. More specifically:

- The tension between the goal of collaboratively constructing a single report by a group and the use of single user software on personalized computers indicated that, in this case, many of the students were not full participants in the process and so therefore did not benefit in terms of learning. The implication for practitioners is that it is a mistake to set up such projects with single user software and that more appropriate technology should be used.

- The study revealed the computer as being a powerful, yet personalized tool, that cannot be shared easily in a face-to-face context and yet can provide a powerful forum for virtual communication via email.

- The tension between the interdisciplinary requirements and the specialization that occurred in all groups indicate the failure of the projects in supporting the acquisition of interdisciplinary skills and abilities. The implication for practitioners is that the projects must be structured differently to support interdisciplinarity.

- The complexity of the learning dynamic revealed in the study reflected the multitude of factors that need to be considered when setting up similar pedagogies. Group and individual goals, for example, need to be consistent with each other, as reflected in the difficulties experienced in group two. Different expectations within the groups need to be discussed at the outset and planned for carefully. Motivational factors as well as cognitive factors need careful consideration in such contexts. This did not happen in the present context.

Other implications result from the more positive instances illustrated in the study of scaffolded or mediated learning that did take place within some of the groups especially when an outside expert, or more capable peer, to use Vygotsky's term, was brought in to the group. This indicates areas in which such pedagogies can become

powerful contexts for learning. Practitioners therefore could take such findings and develop educational activities that simulate this peer elaboration, or tutoring effect.

11.5   The role of theorizing

The neo-Vygotskian perspective developed in this thesis provided useful terminology and methods for examining how computers collectively mediated the participants' activities, in this specific context. The role of theorizing was to critically evaluate a specific educational treatment, practices which are, however, "situated and dynamically interactive", as Erickson and Gutierrez point out (2002, p. 21). For these reasons, such theorizing has limitations in terms of generizability to other contexts as discussed before. That is, although I state that computers failed as collective mediators in this particular context because of the way they were used, this does not mean that I think they fail in all educational contexts nor does it mean that the revised model is inaccurate. The value of this case study is the specification of factors that both enabled and hindered learning with computers in a group project environment, that is, the, "promises and dangers" as Solomon terms them (1998, p. 4).

This theorizing has resulted in a number of contributions to the field directly from the results of the study. A new protocol, or methodological framework, for researching similar contexts has been presented as has a neo-Vygotskian model of collective mediation. A critique of an educational practice that is typical of many new approaches in higher education has illustrated key factors that can influence the success and failure of these ventures. Finally, the theorizing conducted in this study has added to the debate and controversy surrounding the uneasy dynamic between technology and "the collaborative experience of learning", as Crook refers to it (1994).

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Appendix A: Group one focus group transcriptions.

Members: Sam, Rob, Melissa, Suzanne, Tarah, Kurt

First meeting: 26/3/01 8am All present

1. Researcher: The purpose of this meeting is to get a baseline - all its about is using computers with group projects. So the first thing I would like to do is go around and find out first of all, most of you came through IM2 and what you experienced with computers there with the BRR or, if you didn't come through IM2 what experience you have had with computers and groups and then just talk about this new project. What your ideas are and how you will go about it with computers in mind. So, Sam?

2. Sam: My experience with computers and groups hasn't been all that good because it tends to slow the group down a bit. Because you've got only one person on the input side of things and everybody else is left to either their own devices or to actually read something for someone else to type, or something like that, or the computer stuff is left to be typed up, or any formatting done, and sort of left till last or until when the groups gone. So the group gets together and sorts out what has to happen like anything - if everyone's input does have to go into any wording or anything like that then its usually the groups that's around or lazes around on the lounge furniture and someone sets the key words.

3. Researcher: Someone enters all the work?

4. Sam: I wouldn't say all the work. But its definitely slows things down when it comes to the sort of horsepower you can get from six people instead of one.

5. Researcher: Were you all in the same group?

6. Sam: We were all in the same class last semester but in different groups.

7. Researcher: Ok, Kurt?

8. Kurt: With our group, I would just like to say some aspects were a bit negative. Like sitting there typing most of the work sort of while everyone doing something else. There were some good aspects to it. Going surveying, just emailing the stuff you are doing. Its an easy way to communicate a lot of information like in our last assignment it was good, if we didn't have to meet just like sending tables or graphs or whatever. So, that aspect was good but like anything, it had good and bad parts to it as well.

9. Researcher: Thanks. Rob?

10. Rob: Yeah, I do agree with what Sam said although I do like using computers with group work, I just think the whole presentation thing and the, just the ease of organising all the information – you've got it all in one place. I hate

working on paper. I can't work on paper. I always work on computers just because, if I work on paper, normally I collect all my research and stuff on paper. I print it out and highlight bits but you know, I like to have everything on computer as well, so, I can cut and paste – cut and paste between files and just arrange things around. It means that, you know, if you want to move like, a whole few paragraphs from one area to another you not mucking around with rewriting stuff. You just – it's all there.

11. Sam: It does save time…

12. Rob: (interrupts) Yeah, but what Sam says about the whole like, kind of, you do your essay, or do the project and like, everybody's kind of like, "sweet, we are finished". So everybody goes home and the person who has it on computer says, "oh, ok, I'll just finish it up here", and normally it ends up taking quite a few hours just mucking around, like formatting it and trying to get it all sorted out and keep it like a set format the whole way through and re-paging it and, you know. The table of contents can be a pain in the ass most of the time. So, yeah you kind of forget that you've got to do all that and that it's a real major part of the whole assignment. You tend to think about it as a real small section, you know, the format like it's a big job to do it. That's probably all I want to add.

13. Sam: We um, for our BRR last semester we found email pretty useful. We shared a document and it went round our group I don't know how many times. And people just added to it and we made a big mind map of how we wanted to work it so that everyone could start from the same point. I thought it was quite good – it was a passive way of doing it – you could do it in your own time – and then flick it on. Really good.

14. Researcher: Ok, Suzy?

15. Suzy: Last semester I had quite a bad experience in the group. We basically only had three of us in the group to do the whole report. Which was a pain and Melissa and I sort of ran it and the other girl came, sort of minimal, like two nights in a row just doing the formatting. Its just like, as Rob said, we think its not a big part and it just takes one evening to do and then everything goes wrong. So, yeah that's just the pits; the part that I think people overlook too easily; the time that it takes to format. I did IM2 so we did IT last year. I didn't really like that too much. I didn't like the computers too much because everything seemed to go wrong on it.

16. Researcher: They are a bit like that aren't they?

17. Suzy: H'mmm.

18. Researcher: Melissa?

19. Melissa: I was in Suzy's group for our Business Plan last year. Presentation was the main thing that stuffed up. It just took hours and hours and hours and it was very stressful. Throughout the project we used disks and we shared that

around so that was quite good. But we preferred to work altogether on one computer rather than do separate bits and pieces. Then it was like whoever knew how do things had to do it. The main thing; it was just presentation.

20. Researcher: Presentation?

21. Melissa: I like to use computers but it looks better when it's printed off and stuff like neat writing but it is definitely time consuming.

22. Researcher: Tarah?

23. Tarah: First of all I was in Kurt's group and we found it was all right. It was quite good. We got email and drafts and stuff done, we also used disk. But, also what Sam said, like one of the girls in our group put it altogether and stuff. So, yeah.

24. Researcher: So, four of you said the presentation was a big deal. The formatting and the All headers and footers and margins – and that it was always left to one person?

25. All: Yeah.

26. Sam: That's why we couldn't share disks because we were using lots of pictures and you can't fit anything like that on a disk. We did end up putting a few bits and pieces on a CD. But, I mean you can't really rewrite the CD without it costing you too much. I think that if you don't have a high speed computer with presentation it does take ages and ages.

27. Kurt: With the CSOB we stuffed up, because it had like a very set format of how exactly they want the table of contents to look, and sometimes it just doesn't just do anything they say it does. It still doesn't work in the end and you are sitting there totalling up the marks saying like, "oh crap".

28. All: Laughter.

29. Kurt: Its like the little paper clips in the end – you don't care.

30. Suzy: It gets to the stage where what you have got, it has to be.

31. Researcher: Oh, Ok. Right the Business plan you are doing. What's the plan so far?

32. Sam: I can read to you the first paragraph.

33. Researcher: Yes, well, just to give us an idea.

34. Sam: Its basically a website and we are going to try to provide an extensive information resource for students and youth incorporating a market place search engine and mail gateway essentially connecting students to business in

the community in a fun and user friendly way. And so it will also be used for commission based market research information gathering.

35.   Researcher: OK, so it sounds like a great plan. How long do you have to do it?

36.   Sam: Not long,

37.   Suzy: its due on the 5th of April, no?

38.   Kurt: June! That's right.

39.   All: Laughter.

40.   Researcher: Do you have any ideas on splitting up the work? Is that what you are figuring out what to do?

41.   All: Yeah.

42.   Sam: We have to define exactly what we want and work on stuff.

43.   Researcher: Well, that probably enough for this interview.

Meeting Two 9.30 AM 18th May

Absent: Sam (flat battery).

1.   Researcher: Thanks for coming along. The second meeting, the purpose of the second meeting is to go through what I found from the first meeting. Just to give my impressions and see what you think of what my impressions were from the first meeting. And then just to get a progress report on how your projects going. I heard you talking about emailing this to here and that to there. So just an update on where you are at and then, look at the log sheets, or just ask how the log sheets are going and see if there are any problems there. See if you need any new ones and then plan a time for the third meeting. So, its fairly straight forward and then you have only one more meeting after this and it's a questionnaire, I collect the log sheets, and I just find out about the final, when you put the project together because that's a really crucial part. Um, ok? So let, me give you what I thought happened in the last meeting. In the last meeting we talked a lot about the last report in IM2. You all worked and did the Business Research Report last semester, and we spent a lot of time talking about the frustrations of working with a big project like the Business Research Report. Um, and you talked about how the formatting requirements were the biggest hurdle in terms of computer use and time. Some group members talked about how emailing attachments containing information was preferable to using other means such as sharing disks. But, the process was still not efficient. It was usually one person left to do the final report preparation and formatting. So, most of the group gave the impression that, last time that this was fairly unfair. That one person was left to do the report. I'm talking about last semester. And that in many ways the computer was a

major source of frustration rather than, you know, a benefit to the project. So, that's the impression I got from the last meeting. (NB: Rob turns up here).

2.   Researcher (to Rob): I was just talking about the last meeting and how in the last meeting we talked a lot about how the computer was actually a source of frustration when it came to the final formatting and everything. For this project, you were talking about developing a web site for students, and at the time, because you hadn't had the prelim report back, you had no plans for dividing the work up. So, first of all, feel free to comment on any of the impressions I got from the last meeting and, you know, feel free to disagree, or agree, or add to it.

3.   All: Long pause, and shaking of heads.

4.   Kurt: Did you say that you had thought that we thought it was more of a pain?

5.   Researcher: Especially in the, when it came to the formatting part at the end, when it came to putting the report together.

6.   Kurt: Yeah, it was the first time we had sort of done anything that large, I think.

7.   Suzy: It was good in the fact that we could email people, documents and do things on disk and stuff like that. Big way of communication.

8.   Researcher: Right. I mentioned that I think that some thought that emailing was better than doing it by disk. We talked about that. But overall, you talked last time about the difficulty of the sharing of workload. When you have one document to present and there's a group of you and you spent a lot of time talking about the frustrations of having to deal with one machine, one document and what, five people?

9.   Melissa: We haven't quite got up to that yet. That's sort of next week, when we all start putting it all together. Which is, we've allowed a couple of weeks to do this time whereas last time most of us thought it would only take a couple of days or something. But we've planned for it.

10.   Researcher: So for this project you are starting a little earlier?

11.   Melissa: Yeah.

12.   Others: Yeah.

13.   Researcher: So that was last years Business Research Report. Pretty much is that what you think?

14.   All: Yeah.

15.   Researcher: Ok and so for this project you are thinking of starting a little earlier?

16. Melissa: Yeah.

17. Researcher: Ok cool, where are you at with the project? How have you decided to divide up the work? And at what point are you at, at present?

18. Kurt: We've largely divided it up largely with regards to people's strengths. So we are particularly good at Accounting so we'll try to do that.

19. Melissa: Follow the outline that was given to us and use that to…

20. Tarah: (interrupts) Allocate?

21. Melissa: Allocate sections to people so, it was simple.

22. Researcher: Ok, what sections? Is it by discipline or is it by?

23. Kurt: (interrupts) An introduction sort of section, an executive summary, and then a marketing section and IT, and Accounting, Operations.

24. Tarah: Some of them are integrated. Law and Management are kind of integrated into one of the sections.

25. Researcher: Ok, and amongst the six of you how have you divided up the sections?

26. Melissa: Five.

27. Researcher: So, one person is doing the introduction, is that what I understand it or some sections are done as a group and or?

28. Kurt: Some sections are done as a group like, Introduction, Executive Summary are done as a group.

29. Tarah: Yeah.

30. Rob: Even the sections as well. Like, Tarah and Kurt are doing the Marketing section.

31. Researcher: Ok.

32. Melissa: Its just like some people are doing sections by themselves and a couple are doing bigger ones and group ones as well, so its not one person to each section.

33. Researcher: So for the Marketing section what's involved in that?

34. Melissa: Its all like, just the marketing mix and the…

35. Tarah: (interrupts) Target market.

36. Melissa: Pricing and stuff like that, and promotion, which is quite big for us. We also had like the SWOT analysis and like the…

37. Tarah: (interrupts) Future strategies?

38. Melissa: Future strategies. Quite a lot.

39. Researcher: I'm really interested in the computer side, as you know. I'm also really interested that you are developing a web site. So, the technical side of that, who's looking at that? Are you actually going to build a web site or are you just planning?

40. Kurt: Ah!

41. Tarah: We are going to, so like, for the purposes of the presentation, we were just going to do our home page and stuff to just show the directories.

42. Kurt: Background design…

43. Tarah: (interrupts) and how it was going to look.

44. Researcher: Ok, because we were talking about a web site with some kind of market based research built in. How is that?

45. Kurt: Will have a directory with a database that students can download.

46. Tarah: Students can register it or….

47. Researcher: (interrupts) Ok, and who's doing the research into that, into developing the page?

48. Rob: Sam.

49. Kurt: Well, Sam's doing the IT section and to a degree Operations, the work done by a section called Operations. But, largely it will be done as group. footnotes, different aspects and stuff. Some aspects of Management, IT, Marketing sort of all together. Will try and do that as a group. Sam will do the site itself. Knows how to do it.

50. Researcher: Ok, and for communicating. So, at the moment you are working on different sections. Is that right?

51. Suzy: Yep.

52. Researcher: And you said that in a couple of weeks you are going to come together and put into a report.

53. Tarah: Yes.

54.   Melissa: That's right. We've allowed two weeks for that sort for thing.

55.   Suzy: We've pretty much handed out sections do we are going to bung it all together and…

56.   Tarah: (interrupts) and then input, like ask everyone for their input.

57.   Suzy: Yeah, like formatting early.

58.   Kurt: It would be like the final, after we've done the individuals, and then we'll go through and read like each section and make any changes.

59.   Suzy: Get it done early.

60.   Kurt: Yeah, just fix any problems and change it, and make them, sort of format it.

61.   Researcher: Ok, and where are you going to do that? What facilities? Are you going to do that at AUT or someone's house?

62.   Rob: Someone's house. It will take quite a bit of time so we thought it was important to be at someone's house.

63.   Researcher: Ok, and have you got something organised?

64.   Suzy: We are still discussing it at the moment.

65.   Researcher: Right, Ok, and let me see, what about these log sheets here, how are they going?

66.   Rob: Ok, but I left mine at home.

67.   Researcher: That's Ok. I have some more forms if you need some more blanks, and I can collect them, the ones that you have done now or we can wait till the last meeting. These are just stuff for the project (collects some). Like I said, this is just a progress report. Just one thing I want to ascertain is, if you were going to redesign this course, if you were looking at redesigning this course in some way, is there something you would change about this Business Research Report? Do you think it's a good, I mean, trying to combine computers and group work so you think it works well? Do you think its realistic or do you think it's a bit of a farce? You know, going off and doing things individually and not really learning anything?

68.   Melissa: I think it's worthwhile because, I mean, like all businesses and stuff these days have computers. I've learned heaps just from this, I mean since I've been here about how to do things on computers. So, I think it's worthwhile.

69.   Researcher: So, you have learned through the group rather than being taught in a class?

70.   Melissa: Oh, both really because we did have IT last semester which was really helpful with the graphs and tables and stuff.

71.   Suzy: Yeah.

72.   Melissa: Table of Contents things like that.

73.   Tarah: And we've also just learned from other people, asking questions and that.

74.   Researcher: So, the stuff you learned last semester. You are now putting into practice, you are actually using it to a little bit more. Is it more realistic do you think?

75.   Kurt: We all used like last semester, with the CSOB, our BRR. This is different probably just due to the size of it. That's the main difference. Its appropriate that we are doing it all ourselves. Its our idea, its everything we've done at AUT. Like in the BRR basically you were given what to do.

76.   Researcher: Great, Ok well lets leave it there. We only need to meet one more time.

Meeting Three 11th June 2PM WW207

1.   Researcher: The purpose of this meeting is just to find, because in the last meeting we had you were in the middle of constructing a report and you had yet to bring it together. So, I've got what we found, a little short thing that I found from the last meeting. So, I just want to read that out and then I want to get your story on what happened with the rest of the report, and find out if there were any issues, particularly to do with the computer, because that's what this projects about. So, I found out that the topic is a web site with a marketing slant for students. Will contain a database for students to view and possibly down load. That was the topic of the report. You had decided to divide the project content up by people's strengths and by the sections of the report, ie: Introduction, Executive Summary, and then discipline based sections. Some sections like the introduction and executive summary were to be done by the whole group, and each discipline individually or by subgroup. So, from the last meeting I think Tarah and Kurt were doing Marketing?

2.   Tarah: And Melissa.

3.   Researcher: And Melissa, and Sam on the IT section and a section called Operations. Ok?

4.   Sam: Yep.

5.   Researcher: Because you weren't here for the last meeting. And you had allowed two weeks for constructing the report at someone's house and, at the time of the last meeting, you had not decided where. So, that's what I got from the last meeting. Any comments?

6.   All: Hmmm.

7.   Researcher: Any comments on that? Is that fairly accurate or?

8.   Melissa: Yeah, that sounds about right.

9.   Researcher: Sounds about right?

10.   Tarah: Yeah.

11.   Researcher: Ok, construction of the report since that last meeting. How did it go? Any issues particularly to do with computers?

12.   Suzy: Hotmail is a little unreliable.

13.   Reseacher: Hotmail?

14.   Suzy: Yeah.

15.   Researcher: Because most of you had hotmail accounts didn't you?

16.   Suzy: Just for some reason, sometimes something just doesn't get to you and it is the right address and everything. I don't know why.

17.   Kurt: It doesn't include attachments sometimes. I am not sure what the reason is, quite regularly. You can send an email and the attachment just won't go through.

18.   Melissa: Especially with my computer (laughs).

19.   Researcher: Especially with yours?

20.   Melissa: Yeah

21.   Sam: I found that even if you can send it from like, you know, your own ISP it won't take anything over one megabyte. So, if you've got pictures and that sort of stuff then its returned to you. So, you create it into sections.

22.   Researcher: I think the limit on hotmail is one megabyte.

23.   Sam: Yeah, Ok, 1.4 or just over.

24.   Melissa: Yeah, 1048 K to a megabyte.

25.   Researcher: Ok, so focusing on the report. You decide to do it at someone's house. Who's house and how long did it take, the two weeks?

26.   Suzy: Tarah's house.

27. Tarah's: Everyday for the last two weeks.

28. Suzy: Definitely the last two weeks.

29. Rob: Definitely.

30. Researcher: Tarah's house. So, any problems from the computer side apart from the hotmail account thing?

31. Kurt: Due to the size it didn't do the Table of Contents automatically.

32. Tarah: Yeah, because it's like 100 pages or something.

33. Kurt: Yeah, in one document. So, we had to break it down into different sections.

34. Suzy: (interrupts) And hand do the Table of Contents

35. Researcher: Hand do?

36. Suzy: Yeah, manually do the Table of Contents.

37. Researcher: So, it took the full two weeks?

38. All: Yeah.

39. Researcher: So, how would you describe the process?

40. Rob: What do you mean?

41. Melissa: The first week was not that much formatting or anything. It was the last week that was...

42. Suzy: (interrupts) Frantic.

43. Melissa: Yeah, what we didn't plan - we didn't want it to end up like that.

44. Researcher: Why was it frantic?

45. Suzy: Because things were not, things came up that were not expected. Basically, it took longer to do everything than expected.

46. Researcher: Ok, and did you work on the whole thing as a group? Or did you just go away and, who did the last report?

47. Sam: Whenever I was summoned to Tarah's house, I would come there and it would be good because everyone could sit around and talk about it, and share ideas and make sure that everyone knew what was going on. It was more of a "how are you going" with that. But I found that I couldn't do much actual work there, because the computer was always being used and…

48. Rob: (interrupts) There was a lot of sitting around.

49. Sam: Yeah.

50. Rob: When you are all trying to work on one computer, there's a lot of sitting around just basically.

51. Suzy: Yeah.

52. Rob: Because you can have only one user at one time and like especially when we are trying to format.

53. All: Laughter.

54. Rob: (interrupts) And like, page number everything and like, we had to do as per section, you know? Like, section-by-section so that we knew what the following sections page number would start at.

55. Melissa: It was a nightmare.

56. Rob: So, like I sat there because my section was right at the back, so I sat there for like an hour waiting. Annoying people.

57. All: Laughter and murmuring.

58. Rob: It does end up with only like one or two people like really doing the bulk of it. The rest just sitting there like patting them on the back, getting drinks.

59. All: Laughter.

60. Melissa: That's because like you need someone who like, the whole report stays the same and if you start changing it and then format like, changing people's formatting might change a bit so it's good to have one person who's got the same idea the whole way through.

61. Sam: It would be really, really good if Microsoft Word had some sort of plug in. So that you could decide on the format of the assignment before you start it and then everyone could plug it into their version of Microsoft Word. So, that as you typed it up it would use the right font and it would space everything exactly the same. It would use the same grammatical and spelling check and that sort of thing. Because, whenever Tarah sent me something, it came up with loads and loads of mistakes, but whenever it was on her computer everything was fine, because she was using US English and I was using NZ English. So, I would change it all back to, like the word optimise, I would change it all back to ss's and give it to her and she would change it back to zz's.

62. Researcher: So, the spelling was the thing that was confusing?

63. Tarah: We could have changed that.

64. Sam: Yeah, yeah.

65. Researcher: So, how often would you meet at Tarah's place?

66. Tarah: Everyday for the last week or so.

67. Melissa: Week and a half probably.

68. Kurt: Probably from about lunchtime through to midnight the last few days.

69. Tarah: Oh, it wasn't that long.

70. Rob: That was only the last days.

71. Melissa: That was only for a few days. The other days were quite full, not to midnight though, but…

72. Tarah: (interrupts) Till 9 o'clock.

73. Researcher: So, how many hours do you think together? Putting this report together?

74. Rob: Too many.

75. All: Laughter.

76. Rob: Total hours, everybody's total hours added up?

77. Tarah: Everybody didn't work together all the time, like there were three people together at our house.

78. Sam: It would be really difficult to get an accurate number on that.

79. Researcher: Alright, um, got a question here about preferred communication methods. Did you prefer to meet face to face or by phone, or by?

80. All: Yeah.

81. Sam: Definitely email.

82. Tarah: No, face-to-face.

83. Researcher: So, Sam thinks email and the rest of you think face-to-face?

84. Melissa: Definitely face-to-face.

85. Sam: That's how it works eh?

86. Melissa: I much prefer face-to-face.

87. Researcher: Ok, what about the computer facilities? Would it have helped if you had more computer facilities? You talked about one computer. What if you had more?

88. Rob: Yeah, I think it would be nice to have had…

89. Tarah: (interrupts) Laptops.

90. Rob: Like six computers networked and just sit there and ruck it up as you do work and send it over to people and they send you stuff but…

91. Tarah: (interrupts) It's not likely.

92. Rob: And also have the face-to-face kind of stuff like also because you tend to forget things if you like just ring someone up or like send an email. You tend to forget kind of why you are doing it in the first place whereas if you are meeting face to face you can sit there and work through it.

93. Sam: It would be really, really good if you could have an Internet application possibly a little bit like Business On Line, where you had web space on a server like, 20 megs or 30 megs, and you work on your bits and pieces on the Internet and maybe a video type thing where you could talk and see each other. I mean you organise to meet from your own home on the net and do your assignment so that any questions that come up at that point in time could be asked right then and there and can you can get an answer.

94. Researcher: Kind of like a virtual…

95. Melissa: (interrupts) Yeah.

96. Researcher: A virtual group, not a face-to-face group?

97. Sam: More virtual than what considered virtual now.

98. Researcher: What does that mean?

99. All: Laughter.

100. Sam: I mean you've actually like using multimedia like sound and video.

101. Rob: But that would painful unless everyone got like a really good Internet connection.

102. Sam: True, true, but I would say that it could be done.

103. Rob: Yeah if everyone had a really good connection.

104. Researcher: Um, did you use the AUT computer facilities much?

105. Rob: No.

106. Tarah: Not really.

107. Researcher: Not really?

108. Kurt: Just a little.

109. Suzy: Once.

110. Melissa: Oh that was…

111. Suzy: (interrupts) Trying to do the Gantt chart, but didn't really, Grotesque system.

112. Researcher: Gantt chart?

113. All: Hmm.

114. Researcher: Ok.

115. Sam: Just frankly, I don't like Microsoft Project.

116. Suzy: Didn't have to use that.

117. Sam: No, didn't have to use that but we…

118. Suzy: (interrupts) Tried to do it that. We were told it was to be used.

119. Researcher: Ok, just some comments on what it was like to work, thinking of some adjectives and adverbs to describe what it was like to work on this group project? Positive or negative?

120. Kurt: Stressful.

121. Melissa: Stressful.

122. Researcher: Stressful?

123. Suzy: Yes, that is definitely the word I would use, and frustrating.

124. Researcher: Stressful, frustrating.

125. Rob: Its kind of rewarding I suppose at the end of the day. When you see the assignment.

126. Tarah: It's a huge thing.

127. Rob: When you see it come out at the end.

128. Researcher: Ok, and the computer?

129. Kurt: Throw it out the window.

130. Researcher: Throw it out the window?

131. Tarah: It makes it look all-professional.

132. Melissa: Yeah.

133. Kurt: It does but its really frustrating just sitting there. Just trying to get everything exactly how you want it and when you can't get something to go up exactly how you want it to.

134. Rob: It's worse than that. All the headings, trying to some graphs in Excel, they are so limited when they need, all the hours trying to get a graph to show exactly what you wanted them to show. I suppose, because everyone had different ways of doing things on their computer, and then trying to bring it together it just sort of, we really had to go through it together as a group to make it sound as though one person had sat down and written the whole thing by themselves.

135. Researcher: So, what was the hard part? The most challenging part do you think?

136. Sam: It was time consuming.

137. Suzy: Yeah.

138. Rob: Stressful

139. Kurt: It wasn't like, challenging mentally, just sitting there and just.

140. Sam: Because Tarah's computer turned into a bit of a factory really.

141. Tarah: Printing for like hours.

142. Sam: Smoke started to come out of the back of it.

143. All: Laughter.

144. Researcher: So, your computer, Tarah, turned into the centre of the universe for this project?

145. Tarah: Yep.

146. Sam: And her little printer can only do like, two and a half pages per minute.

147. Tarah: Less than that!

148. Kurt: It started at like six o'clock and finished pretty much just after midnight. Six hours went without stop.

149. Suzy: Went for hours on end.

150. Sam: The thing is that while it was printing one section, or one part of a section, we were formatting the other one. So, it wasn't time consuming like that but I guess that if it was, it would have been impossible anyway because we would not have had time to print it all out.

151. Rob: It was just the fact of the sheer size of the thing. It's not meant to be formatted and then printed. It's funny, when we had to hand it in we still found mistakes, you still find things to do.

152. Suzy: You can't just get everything perfect eh?

153. Rob: It's hard to see it on a computer screen. Like, eventually you don't see the words and just the layout, you just see this like "woah!!".

154. Suzy: That's when you need a hard copy.

155. Sam: And for the proportion of how much work you do in formatting it and making it look all nice and pretty, there aren't really marks allocated for that sort of thing.

156. Researcher: So, I get the feeling that formatting was probably, if you had to name the biggest hurdle, formatting?

157. Melissa, Tarah, Suzy: Yeah.

158. Kurt: It was easier than last time.

159. Melissa: Yeah.

160. Rob: That's because we knew what we were doing, but, it was still a pain in the arse.

161. All: Laughter.

162. Melissa: Time consuming.

163. Sam: I don't mind doing it.

164. Rob: It's just time consuming that makes it quite difficult to get real good consistency through the entire thing. You will always go back and find different headings and stuff. But you know, you always have to make sure, you always have to go back and check like a couple of times just to be sure.

165. Kurt: Looks like we really needed to print one copy, go through that, and then make the changes. Because you can't see stuff on the computer you just don't notice, it doesn't mean as much.

166. Researcher: So, it easier to see hard copy than on a screen.

167. Kurt, Rob: Yeah.

168. Rob: Because on a hard copy you've got, you know, it looks nice. You haven't got all the dots and whatever.

169. Melissa: Yeah.

170. Rob: You know like cluttering up the page and the toolbar. So, that detracts from how it actually looks. So, when you've got a final copy and it's all set up, you know exactly how it looks. If something's wrong it stands out like a sore thumb.

171. Kurt: Change it over.

172. Researcher: Like the little paragraph ¶ thing?

173. Rob: Yeah, yeah.

174. Suzy: Yeah, I hate those things.

175. Tarah: You can take them off if you want.

176. Researcher: You can.

177. Rob: Well, I wished we did.

178. Tarah: I like them.

179. Researcher: Ok, well thank you very much, thank you for participating in this, I really appreciate it.

Appendix B: Group two focus group transcriptions

Members: Bryan, Andrew, Matthew, Kylie, Karen, Marcus

<p align="center">First meeting: 2nd April</p>

Absent: Marcus, Matthew

1. Researcher: The purpose of this first meeting is to just find out what experience you have had with computers in groups before. And just, like from last semester if you were in IM2, or if you weren't in IM2, any previous experience you have had with computers in groups. And just whether it was positive or negative, or what you thought about using computers in a group project. So, lets start with Bryan:

2. Bryan: I was in IM2 last semester. I didn't really have any problem with the group work with the group work with computers. Either, you did it by yourself at home and then put it together, or just had turns with it.

3. Researcher: Ok, so how did you share all the information in the group?

4. Bryan: If it 's on one computer and someone else wants parts of it, use a disk.

5. Researcher: Ok, Karen?

6. Karen: I didn't do IM2. I am from the sport and rec. course. We did group assignments, last year. Like, share; usually we just duplicated stuff to do for one person to just put it all together.

7. Researcher: How long were the reports in the sport and rec. projects?

8. Karen: Like, one was about 100 pages.

9. Researchers: About 100 pages. So, similar to what you are doing here?

10. Karen: Yeah, lengthwise.

11. Researcher: Ok, Kylie?

12. Kylie: I transferred over from a property degree from Auckland Uni.

13. Researcher: Ok, so this whole idea of group projects is new?

14. Kylie: We did group projects in property. So, it's not anything new but the way they do it here is different.

15. Researcher: Ok, so at Auckland how did they do…

16. Kylie: (interrupts) We had group projects in valuation and Marketing and it was pretty much the same, we were given different parts to it, but it was just with the one paper, as opposed to this which is equivalent to, like, four papers. But pretty much the same. We just emailed the information that we all did to each other and then on the last week we went around to someone's house and did it all.

17. Researcher: On one computer?

18. Kylie: We had like, a colour printer and stuff.

19. Researcher: Ok, Andrew?

20. Andrew: Yes, I did IM2, the IT paper and that. We all, in our integrated disciplines and, yes, we each did our own and emailed quite a bit. Using email. It was quite good. Right now I use it just everyday sort of thing.

21. Researcher: So, no real issues at all with groups and computers?

22. Andrew: There always are, like…

23. Karen: (interrupts) Especially in large groups…

24. Kylie: (interrupts) Four people who don't have the same versions of like, Word or whatever.

25. Researcher: Ok, this semesters project, what's your topic and what's your plan so far?

26. Andrew: So far it's a bath mat.

27. Researcher: It's a?

28. Andrew: A bath mat. Yeah, you put it in the bath and it uses like gel.

29. Karen: Gel.

30. Andrew: And its all slippery.

31. Kylie: It's a comfort gel mat that you use in the bath.

32. Researcher: That's an interesting idea.

33. Kylie: So, you put it on like the back of your neck so, it's not right up your back

34. Researcher: Up here? (pointing to neck)

35. Kylie: It goes right down…

36. Karen: (interrupts) right down but...

37. Kylie: ..instead of using a flannel.

38. Researcher: So, you put it underneath and lie on top of it?

39. Kylie: Yep.

40. Researcher: What a cool idea.

41. Kylie: It moulds to your, to the shape of your back.

42. Researcher: Cool, and has the proposal been passed?

43. Kylie: We are getting it back today. That's our preliminary report just saying what our idea was. One of our lecturers made the comment that he thought it had potential so we are going for it.

44. Researcher: Sounds really interesting to me. And your plan for dividing up the work? Because there are six of you isn't there?

45. Andrew: It depends on who's good at a discipline and stuff. Say someone's good at Economics, then they will do Economics. I mean the Accounting, we can do it by Marketing and Management, that's the process we will use. Might as well get the key people to do it – each discipline.

46. Kylie: We haven't sat down and sorted it out yet.

47. Andrew: But we are always helping out each - one another, likes that's important – like the IM2 group project, I guess. It was pretty good. Well that's why, because in our group it was a group project.

48. Researcher: So, pretty much by specialty? By who's good at what?

49. Kylie: Yes, but reporting back to the group.

50. Karen: (interrupts)…bringing it all together.

51. Kylie: Every time you do something just so the group knows where you are. So, just emailing it around or whatever.

52. Researcher: Ok, so emailing rather than meeting face-to-face?

53. Andrew: Sometimes.

54. Kylie: Yeah, it seems to work better than meeting face-to-face.

55. Andrew: Because you can read it in your own time. So you don't have to carry a copy around with you all the time.

56.	Researcher: Wonderful, thanks I better turn this off.

Meeting Two: 17th May 01

1.	Researcher: Ok, well welcome to the second meeting. There's only one more after this and I just want to catch up with the two people that weren't in the first one. So, if we can just start. What we did in the last meeting was we talked about previous group work experience with computers and, I think everyone except for two have done the Business Research Report in IM2. I think there were two, one that did the Sport and Rec, is from Sport and Rec, right?

2.	Karen: Yep.

3.	Researcher: And one did the property degree at Auckland. Ok? But I need to catch up with you two. What previous experience you have had with group work with computers? So, Matt?

4.	Matt: I did the Diploma of Business last year. We had, in the whole Diploma only had two group assignments. So, it's how we baulked at the computers. Like we got "sniff".

5.	All: Laughter.

6.	Matt: Pretty much I just said to other people, "you do that" and they did that and "you do that part" and we all went away and did it separately. So, we never got our computers together. It was all just individual stuff and, that's basically it. We just did our own thing, whatever we wanted to.

7.	Researcher: So, did you ever combine them together, or did you print out separately?

8.	Matt: We gave everything that we had on disk to one person and they printed it all out and formatted it together.

9.	Researcher: Any problems with that?

10.	Matt: No, it was fine once we had formatted like size and style and everything. We just did that and it was pretty basic.

11.	Researcher: Ok, Marcus? Previous experience with, did you come from…?

12.	Marcus: IM2. We had the BRR. It was kind of the same thing. We went off and did it, but towards the end we did most of that all on one computer together. One of the problems we had was with, when we came to formatting it, some people had already put like, headers and footers and things on.

13.	Researcher: Yep.

14.   Marcus: And when we came to format it at the end, because people had put headers and footers and, we couldn't generate the Contents because they had already numbered it and so, in terms of generating like, the contents and stuff, a lot of it we had to end up doing it like, just manually, without using the program to do it. We could still able do it, just took a lot more time. Rather than doing it in five minutes it took like an hour.

15.   Researcher: That was the Table of Contents? You were required to generate it?

16.   Marcus: Which ends up making it harder like, connecting it rather than all having in one file when people brought their stuff. It generates it differently, the page numbers. It ended up being like each paragraph ended up being a page number in our Table of Contents.

17.   Researcher: Well, thank you. Now, let's get onto this meeting. I have here some impressions from the first meeting when we met. I've written down pretty much what I found from the first meeting, what my impressions were and that. They are just my impressions so, what I would like to do is read out what I wrote and see if you, feel free to comment whether you agree or disagree or anything you want to say about what I found. We, from the last meeting, I found that, as I mentioned, all of you had had some group work experience with computers before. One from Sport and Rec, one from Property. Pretty much the consensus was that you said that you had few problems, no real issues, just some minor concerns over compatibility of software and hardware. I found that, in previous experiences, you had shared work either via disk or email, with the final report being put together by part or all of the group around one computer. So, it was a matter of divide and conquer?

18.   All: Laughter.

19.   Kylie: Felt good.

20.   Researcher: Ok, So, essentially its what you two said. Everyone worked on their own individual part and then a small subgroup got together and you sent it each other by email or disk and put it together. And that's where the problems, if any, occurred.

21.   Andrew: What, formatting?

22.   All: Laughter.

23.   Researcher: So, it was a fairly short meeting that we had, it was fairly rushed, and there were no real issues. So, the overall impression I got was that, from previous with groups and computers, was that it was all Ok, nothing special, pretty run of the mill, ho hum?

24.   Kylie: Mmmm (murmurs).

25. Researcher: And that you were all fairly, I think the word I thought of was, ambivalent about computers. You know, a bit of a machine that you had to work with, a bit of a necessary evil, no real big deal. How does that sound? Does that, the four of you that were here last time?

26. Andrew: The awesome foursome?

27. Researcher: The awesome foursome, yeah.

28. Kylie: Sounds good.

29. Andrew: It sounds pretty right, yeah.

30. Researcher: Fairly ho hum, the computer? Just a machine that?

31. Karen : You just use it.

32. Andrew: I found it was good for getting information like, local, just on CD's. It's easy when you just don't ring them up I'm finding its easier to send a fax.

33. Researcher: Ok, well its cool because that means that my impressions are pretty much spot on. There was one group I had where they argued with me for about half an hour because I had it completely wrong but that's good. The current project, the topic is a bath mat with gel, and its goes in the bath. It works instead of a flannel, like a hot flannel, and it goes in the bath so it's a pretty innovative product and at the last meeting you hadn't yet organised who was doing what, but you had thoughts concerning how you were going to divide it. You were thinking of dividing it by discipline strengths and using email instead of face-to-face meetings. So, trying to avoid face-to-face meetings where you could and trying to do it all through email and virtually send it back and forth. So, what I would like to do is find out the progress on that since then and whether the topic has changed or whether it's coming together and how you have decided to divide it up.

34. Matt: We've done it by disciplines. We've got six people and so we've got two people for each. We got Marcus and Kylie doing Accounting and we are going to get together and do Law after that, and we've got like, most people contact each other by telephone. Just ring each other and say, "do this, do that".

35. Karen: Yeah, make it fast, really basic.

36. Marcus: Yeah.

37. Kylie: And send emails.

38. Marcus: (interrupts) Yeah, send emails all the time.

39. Kylie: and some people text message each other.

40.   Matt: Yeah, well dunno. Text messaging on telephones.

41.   Kylie: Cell phones.

42.   Matt: Yeah, on cell phones, sorry. We have done a little bit of stuff by email. Like just surveys and, questionnaires, yeah, just quick messages, but I don't think that much.

43.   Andrew: It's just a hassle, just that little bit to get on the net.

44.   Matt: It's a chore to check your email.

45.   Bryan: If you want to say something like prepared something for the next day it's just easier to ring them up and say, "make sure you bring this" or something like that rather than email.

46.   Karen: We've had a couple of meetings.

47.   Marcus: Sometimes its like a last resort like with the questionnaire.

48.   Researcher: That's Ok, so, you used the old-fashioned telephone technique rather than?

49.   Karen: Yeah.

50.   Bryan: But, like, for some materials and stuff you need get hold of, like on someone's computer that someone else needs like the survey. We'll send it over by email because it's easier than like handing it out.

51.   Kylie: Yeah so you've got a file.

52.   Karen: But hasn't worked that well though.

53.   Marcus: The survey was all right.

54.   Matt: One problem with that was the compatibility of different programs.

55.   Karen: Yeah, that's what you guys were doing.

56.   Kylie: Yeah.

57.   Marcus: Your one screwed up eh?

58.   Karen: What was that? Matt, the survey you gave us, was it on your computer?

59.   Marcus: Had no numbers…

60.   Matt: (interrupts) It had no numbers on it and the questions were laid out differently?

61. Karen: No, no, it wasn't mine.

62. Matt: Who's was it?

63. Bryan: Not mine.

64. Karen: I photocopied it.

65. Marcus: Oh, it was Kylie's.

66. Andrew: It was like some people have…

67. Marcus: (interrupts) Well, someone had a different program.

68. Kylie: No one will take responsibility for the program.

69. Andrew: Different formatting made it hard.

70. Kylie: So, in the future we will probably just put it on a disk and hand it out.

71. Researcher: So, when you sent it by email, it was the survey?

72. Kylie: Yeah, the questionnaire.

73. Researcher: The questionnaire with numbers and when you send it by email the numbers…

74. Kylie: (interrupts) The formatting changed.

75. Andrew: On one person's survey it had numbers they were, like, collecting the data. It was just harder to look at because the number of questions on it so, you had to sort of guess at the marks

76. Researcher: In that case it would be easier just to stick it on disk and do it that way rather than email where you muck things up.

77. Karen: I think it's faster too.

78. Andrew: But email is good for like, that long distance stuff.

79. Marcus: See, we needed it quite quick.

80. Kylie: Yeah.

81. Bryan: By email you can send it to everyone at like, one time.

82. Kylie: Just to reiterate, it's a bath pillow. It's like a waterproof pillow you use in the bath. So, we had to try and source stuff to manufacture it with.

83. Researcher: Okay.

84. Kylie: So, to do that, we have gone on to the web and looked up a web server, we call it.

85. Researcher: Yep.

86. Kylie: The product and we, a company that made the product and emailed them like a All email saying, "Do you make the product, would you make it like this, what would your costings be?"

87. Researcher: Mmmm.

88. Kylie: And so, in terms of email, that obviously is vital because I am going to get online throughout India and chat to someone, you know.

89. Researcher: Is that where the research led you to, India?

90. Kylie: Well…

91. Research: (interrupts) For manufacturers?

92. Marcus: It didn't actually say India.

93. Kylie: Well, it was sent to America and I got a reply back from India. So, I don't whether, they must have matched me up to a company.

94. Researcher: Oh ok, no, so there is no way you would want to phone then so…

95. Kylie: (interrupts) No.

96. Researcher: So, I guess using the Internet would be the only way?

97. Kylie: Yeah.

98. Marcus: The only thing is they haven't emailed us back, and its importance is, like, it's the basis of so many things.

99. Karen: The main part of our assignment really.

100. Kylie: Yeah, it's called, what Marcus, Thermal?

101. Marcus: Thermo-plastics and polyeurothene.

102. Researcher: I guess you have to work out, what it will, if they don't respond, then you'll be stuck won't you? You'll have to figure out maybe alternatives?

103. Kylie: Maybe.

104. Craig: Its what we have in mind.

105. Researcher: Ok, so you are using the computer for researching and also for contacting. What I can gather as a group, you are not really using it together?

106. Kylie: Yesterday we did.

107. Matt: We did until like the…

108. Karen: (interrupts) Exams.

109. Bryan: We did, Kylie and I like, use the computer like, together.

110. Kylie: Yesterday, we were using it.

111. Marcus: Like, a laptop and a normal computer.

112. Researcher: Ok, two computers side-by-side.

113. Kylie: Yeah, I was getting stuff off the Internet as the same time that Marcus and I were looking at using like, Internet and Word on two computers. It was like doing two jobs at once. While we were waiting for the Internet to find stuff, I was typing stuff.

114. Researcher: Ok, as Matt said, you were dividing this thing up by discipline. So that's your area, doing the Marketing,

115. Marcus and Kylie: And Management.

116. Researcher: Who's doing the survey and the analysis of the survey and all that?

117. Kylie: That's been done. Oh, yeah, Marcus did that.

118. Marcus: Me and Andrew did the analysis of the survey but, just the statistical, but we are using for a marketing perspective.

119. Andrew: I'm the boss.

120. Researcher: Ok so, what about bringing it all together, what about the integration and putting it into a single report at the end, have you thought about how you going to do that?

121. Matt: We are probably going to do it all by disk, eh?

122. Kylie: Everyone put it on disk, go to some ones house…

123. Bryan: (interrupts) Sort it out.

124. Matt: Like, Bryan and I did it for IM2. We just all met on a Sunday night and all put it together. Sent someone through for printing it all.

125. Bryan: Get out the red pens.

126. Matt: Check all the i's and r's and stuff.

127. Marcus: On the Internet where you can send your business plan. You can send it as an attachment? And they check over it for you for free.

128. Kylie: They just say whether it's viable or not.

129. Matt: Could work.

130. Researcher: Why do you think they do that?

131. Kylie To try and get you to buy their software?

132. Researcher: Or to try and?

133. Marcus: Copy your idea?

134. Researcher: Copy your ideas.

135. Kylie: Well, copy away.

136. Marcus: A plot.

137. All: Laughter.

138. Matt: You know I'm thinking about a Logo guys.

139. Kylie: An emblem?

140. Karen: What about a logo?

141. Matt: Give me a second, - Poly...

142. Researcher: (interrupts) So is this meant to represent something?

143. Matt: Yes, our business plan.

144. Researcher: So, you've decided the product itself isn't that great, but its good for your project?

145. Kylie: Oh no, a couple of people have decided its not.

146. Andrew: It's a good product.

147. Marcus: Yeah, it's a good product, it's just…

148. Andrew: (interrupts) Hard trying to sell stuff.

149. Karen: Actually trying to put the product together itself.

150.   Andrew: But when we get the thing done, I think it will go down quite well.

151.   Kylie: Yeah, and I think we've got to focus on developing the product more than anything.

152.   Karen: More than actually getting it, prototypes done and stuff.

153.   Marcus: Because no ones ever thought of something like that, a bathmat.

154.   Matt Its because its only for people who take baths, its not that big a market, its not an expanding market.

155.   Kylie: Yeah, well that why we can expand out to kids, because kids always have baths, you know. And to disabled people.

156.   Researcher: Mmmm. Ok, if I get back to the computer side of things, sorry.

157.   All: Laughter.

158.   Researcher: So, working individually and in pairs and groups, bringing it altogether, going around to someone's place one Sunday night or something like that, and putting it all together. So, that would be on one computer right?

159.   All: Mmmm.

160.   Researcher: So, how would you, would you have one person?

161.   Kylie: No.

162.   Marcus: We wouldn't have only one person doing it. We would have to have all of us in there probably.

163.   Bryan: You put it on the computer and then print it off and have some people reading through it, checking it, and then like give it back to someone.

164.   Karen: Yeah.

165.   Bryan: Like, there would be one person, maybe two at the actual console, at the actual computer.

166.   Kylie: Well, you would have two computers because one person doing all the in between bullshit, like the contents page.

167.   Marcus: Like in between "beep".

168.   Researcher: That's all right. You can, this is not TV. This is research. I mean, you can say whatever you like.

169.   All: Laughter.

170. Kylie: Yeah, like you know like you have one person doing the pages that you put in between and then the other person doing, you know, getting the disks and doing the main stuff on and so, you are printing them off, so you are keeping the two separate like that.

171. Andrew: What I've done in previous assignments is that we've had like, the actual laptops, like, four going at the same time.

172. Researcher: Four laptops?

173. Matt: Well, no, two laptops because I bring mine.

174. Kylie: Because we are told to like, never put everything, like, never put the whole business plan in one file.

175. Karen: One file.

176. Kylie: On one disk because it will like, die.

177. Karen: Crash it.

178. Researcher: Especially if you are cutting and pasting. Have you ever had that problem where you take a disk out, but it wants it back again but, you've put another disk in?

179. Kylie: Oh yeah.

180. Andrew: One thing was that tomorrow we are looking at some potential properties, a warehouse and stuff. And I'm getting hold of a digital camera.

181. Researcher: Uh huh.

182. Andrew: Because that means it's just easier because we can fit apparently 20 normal pictures on one little spare little 3 and half inch disk. So, we can use that for when we use Powerpoint. Yeah, so that it's easier so we are not standing. It takes up more room eh?

183. Kylie: It's just easier.

184. Andrew: Yeah, it's just easier.

185. Kylie: Yeah, no hassles.

186. Matt: But just one thing, we were speaking to Lynne, our group supervisor, and she was saying about not having more than, one might not have access to a projector.

187. Researcher: In IM3 I think you should.

188. Kylie: With PowerPoint there's a problem. Apparently there's a shortage of rooms.

189. Andrew: Well, then we should have overheads as well.

190. Kylie: Well, apparently it's a real possibility that we might not have a projector.

191. Matt: Well, if we are going to do it one PowerPoint how can they say no.

192. Marcus: We should just do it.

193. Kylie: Well, we will print it our on overheads.

194. Researcher: I think you should check with Fiona, because there should be one available.

195. Matt: Well, if we have to put it on overhead it will cost us a lot more, like, I don't know how much it costs to put it on overhead but colour.

196. Karen: Yeah, its do much more.

197. Kylie: Yeah, but if we say that, "oh no, we are not going to put it on colour overheads, we're only going to put it"

198. Matt: But the thing is that that will be rubbish.

199. Marcus: It's so much easier to discuss it on PowerPoint because instead of like, holding the paper like this, you can just click.

200. Bryan: And go back.

201. Marcus: I mean, I'm not talking about our group but, you know how some people get real nervous and when they are trying to point their finger? They are like, shaking.

202. Karen: Yeah.

203. Marcus: But if you click a button you don't even notice.

204. Kylie: And like, covering up as well.

205. Researcher: And like you said, colour overheads are really expensive.

206. Bryan: We could just do a little bit at one time. Like, just print a little bit and you don't have to pay too much.

207. Karen: Yeah.

208. Marcus: (interrupts) And you know what else we could do? There's that program that you can take a picture from like, a digital camera, and make like, a 3d image of yourself?

209. Kylie: Oh, that's right.

210. Marcus: And make it talk and stuff? So, we could just like leave that on, just…

211. Kylie: (interrupts) We should have done the whole thing on…

212. Marcus: (interrupts) You just take picture of your front and your side and it make a 3d head and it turns and makes faces and moves and stuff like you are talking.

213. Researcher: Ok, so that's some really good ideas, I like that one of the talking head, so using technology for that. But, getting back to the report, what's the most stressful part from the group and the computers? Is it this bit at the end where you get together? Because at the beginning I got the feeling that most of the group thought it was fairly routine, fairly under control, that the computers just a tool. But is there one point where it becomes a real hassle?

214. Matt: Yeah, the bit about India, like trying to get answers and we need them like, now.

215. Kylie: Yeah, but I think the whole thing like, in All, in grouping, the biggest hassle is right at the end, especially if you get to Uni and think like, "shit I've forgotten that page", and its not like you can just whip out your laptop and type it and print it out. Its like, you have to write neatly and know that you've forgotten that page.

216. Marcus: Most things I screw up are those things that need a program, like that generates things. That it always screws up when you are trying to print things together like, Headers and Footers like, self-generation, and also what happens sometimes is you try and generate layouts and stuff.

217. Researcher: Hmmm.

218. Matt: You know like, they have format programs? And if someone put in tabs or something, which don't show up, but they put in tabs, that changes the whole format and you can end up like, deleting stuff and putting it in the wrong place?

219. Researcher: Hmmm.

220. Matt: And that can be annoying because it's quick.

221. Kylie: Like, typing and stuff, like, Allly through the whole assignment, like, I'm not a touch typist or anything.

222. Researcher: So, it can be a hassle but could you do it without it?

223. Kylie: You are not allowed to, are you?

224. Matt: Print a report with 80 pages in it? It would take too long to write.

225. Matt: People make mistakes, it would be ridiculous.

226. Researcher: Ok, one last question, If you were going to redesign IM3, would this be something you would keep – the ideas of computers with group work? Do you think it's a good project to do or do you think a lot of its, you know, what are your thoughts on that?

227. Matt: I can't imagine the course without it.

228. Karen: I think it's a necessary.

229. Kylie: Yeah, for business, we use it every single day, so you have to start to be comfortable with them at some stage. You have to use it for university and if you don't use it at university and you go to a business dock in an office or whatever you are going to be pretty screwed.

230. Matt: You can do so much more research over the web especially when you need something fast where you don't have to go to a library and look up stuff.

231. Kylie: Or even Statistics NZ or something, just type in.

232. Researcher: So pretty realistic this project?

233. Karen: Yeah.

234. Kylie: I think so. I think we are learning so much about just how businesses are run, without actually realising it.

235. Matt: I like the computers at home sort of thing. Like when maybe we have books that are more specific than the Internet because it comes up with so many things. But when you've got a time limit to finish something, it's where the computers are good. I don't think it makes it any better, but it makes better use of, it just saves time.

236. Researcher: So, that's talking about researching on the Internet more than?

237. Matt: Yeah, it's more like a stress reliever.

238. Kylie: It's also good instead of like, having to copy things out or print things out or whatever, to every person in the group have their own copy and whether it is sent to us by email or just you know? Like, now we have some results from the questionnaire and we have a disk floating around and, every ones getting a copy of those instead of having to write it out on separate pieces of paper, its clean in the computer.

239. Researcher: Ok, well that's probably enough. We have one more meeting.

Meeting Three 10.30 AM 15th June -DW

Researcher notes: Only Andrew, Bryan and Matt were present and only Andrew was willing to talk. I see them outside WX before the meeting following their exit interview. They seem upset and say they will find Kylie and Karen and meet me in 15 minutes. Only these three arrive saying that they could not locate Karen and Kylie and add that Marcus is working and is not available at all. Bryan and Matt say they cannot stay long and so I give them the questionnaire to fill out and attempt to ask questions at the same time. Bryan and Matt leave before finishing the questionnaire and say they will complete it and mail it to me. Only Matt does this in the end.

1.   Researcher: Why don't you just tell me what happened?

2.   Bryan: No, there's basically just us.

3.   Andrew: So you ask me what sort of happened about the place.

4.   Researcher: So, can you just, this kind of changes the whole research thing. So, two of the members?

5.   Andrew: Oh, there was just a bit of a conflict at the end towards the group not to mention any names. But we've got one member away that couldn't get here. So, just kind of conflict sort of thing so, just over the allocation of marks, I think. Like, one particular member, um, got marked down. Some members felt that that was not correct. Others felt that he should sort of be marked down. That's what it was and stuff and so we were conflicting.

6.   Researcher: And so how did the group allocation thing work?

7.   Andrew: Well, we got an average score of 82 I think it was. Was that right Bryan?

8.   Bryan: Yeah.

9.   Andrew: Yeah 82, and um then from there we get on a minus like, if some, if one of the six members have got to come to a zero sum. So, if somebody gets a negative 10 and say, that means the other members have obviously got to get say a positive 1, and positive 2 or point 5 up to the zero mark again. And there was just a bit of conflict on how that was going.

10.   Researcher: Ok.

11.   Andrew: And we were the only ones that wanted to come up, well, sort out the marks between 10 because I don't know whether it was enough.

12.   Researcher: Well, what I could do is I could get kind of a report on how the report, how the Business Research Report was put together from our last meeting.

13.   Matt: Yep.

14.   Researcher: And if I could just get some of your …

15.   Andrew: (interrupts) Well, my computer screen two weeks ago, no was it two and a half weeks ago? Ah, it literally blew up.

16.   Researcher: The computer screen blew up?

17.   Andrew: Well, like a bulb or something. I turned on the screen and it went whoosh, and I saw a white mark, and a flash and it just didn't like, I had obviously blown up a light bulb or something.

18.   Researcher: Oh, Ok the tube.

19.   Andrew: Yeah, so that's why I haven't been able to access on to my computer. So, that's something I can work on and increase.

20.   Researcher: What I would like to know is last time we met, your group, you divided the project up by discipline into pairs. So, Marcus and Kylie were doing Accounting, and also the survey. I'm a bit confused about who did what, and how it came together.

21.   Andrew: Ok, well just that Marcus and Kylie did the Management part not the Accounting.

22.   Researcher: Marcus and Kylie yeah, did that.

23.   Andrew: Right the Management side of it. Matthew did the Accounting and well, I sort of helped in giving them, I did the research and operations stuff and gave them the results and we were sort of in a pair together. You reckon?

24.   Matt: Yeah.

25.   Andrew: And then Bryan and Karen worked on the Marketing part and so that's how it worked. So, hopefully that's correct.

26.   Researcher: Ok and so, Bryan?

27.   Bryan: Yeah?

28.   Researcher: The bit that you did. Can you just basically tell me what was involved in that section?

29.   Bryan: Just like, Market analysis and Marketing. Not too much there.

30. Matt: Murmur.

31. Bryan: Marketing analysis, stuff like that. Oh yeah, and I did IT as well.

32. Researcher: Ok. Um, and how did you do it? You worked individually and then?

33. Bryan: Yeah.

34. Researcher: Whose computer did you?

35. Bryan: We just used our own computers and then just disks on Word to each other and then Marcus did something.

36. Researcher: Ok, so you worked on your own computers individually on these subjects, put them on disk?

37. Bryan: Yep.

38. Researcher: And then where did you take them to put them all together?

39. Bryan: At my house.

40. Researcher: At your house?

41. Bryan: Yep.

42. Researcher: And how did it happen? Originally you said you were going to use two computers, one for the body and one for the in between parts. And you were going to allocate two weeks weren't you?

43. Andrew: Well, what we did is that we had two laptops going.

44. Matt: Three.

45. Andrew: Oh three, and um…

46. Bryan: (interrupts) I had most of it at home going hard obviously.

47. Andrew: But the main PC which was Bryan's home PC and um another one going, a PC just going for um, just for someone to type something up on if the laptop was being used for something, proof reading and stuff.

48. Researcher: So, five computers at your place?

49. Bryan: Yeah.

50. Researcher: And so what were they used for?

51. Andrew: Basically just Word.

52. Bryan: Yeah, just basically Word. Working off the notes that were used. Just editing and collating.

53. Researcher: Ok, and um so you were all working individually on 5 computers and then at some point you must have brought it together?

54. Matt: Yeah. Two people on one PC. Started editing and finishing it and taking disks from other people and just banging it in.

55. Researcher: Ok.

56. Andrew: So, like after Matthew was going through my Operations part or something like that, that I did some typing up on, and Matthew went away because after a while you get diminishing returns you could say. Like, say they put Rice, for example, on the computer and then read through it so you can see that Matt hasn't done any mistakes. Reading through mine like, trying to find my mistakes, so it's more of like a sifting process.

57. Researcher: Sifting?

58. Andrew: Yeah.

59. Researcher: And how long did this take? Did you do it all in one hit? One session?

60. Andrew: No.

61. Matt: It took three days.

62. Andrew: Three hits and it consisted of like good 8 hours, 8 to 10 hours per hit. At times it was a scream.

63. Researcher: And was it all of you?

64. All: Yes.

65. Matt and Bryan: We need to go.

66. Researcher: You've got log sheets too right?

67. Matt and Bryan: Yep.

68. Researcher: Can you please um, give them, will you be coming in at all to Tech?

69. Matt and Bryan: No, not really.

70. Researcher: Or, I could just give you my address. I'll just write it on the back…

71. Matt and Bryan: (interrupts) Sorry we have to go.

72. Researcher: No, that's Ok, I understand. So, what about, was there a lot of conflict?

73. Matt and Bryan: Yes, I suppose.

74. Researcher: Just at the end part or?

75. Bryan: During the development.

76. Matt: Yeah.

77. Researcher: And who was it between?

78. Bryan: Oh.

79. Researcher: Was it a girl-boy thing or was it?

80. Matt: Yeah, boy-girl probably.

81. Andrew: But I had a conflict with Bryan but we mentioned that last time. It was actually the day we cut out and, but what I found was we had groups like…

82. Researcher: (interrupts) In terms of the computer. How easy was it?

83. Matt: It was easy with the laptops.

84. Researcher: Easy with the laptops?

85. Matt: Because we could work on our own pieces.

86. Researcher: So, the challenges weren't at the computer so much as?

87. Matt: Nah, it wasn't really. It was basically just making sure we had everything we needed for our parts. We had like 80% of what we needed to do before we got together.

88. Researcher: Well, just mail it in and fill it in as best you can.

89. Bryan: No worries. See you. (Bryan and Matt leave)

90. Researcher: Oh, so um lets just, so, Matt was saying that it wasn't really the computers it was the people that caused the conflict?

91. Andrew: Yeah, I agree on that as well. Because everybody in my group, I felt, had good computer skills and good background on that. So, they already knew how to use Word and Excel and stuff like that.

92. Researcher: Ok, and so, you say it was good right up until the exit interview and then it all blew up or was it?

93. Andrew: There was a bit of a tension, I felt, what I saw from when everybody was putting it together when we were spending such long amounts of time that's when people starting getting, like when something was wrong that's when. Like, it was more of like a "hen" than like better or something, they started picking away at it kind of thing. That's when the conflict. Like when we had to make a decision it was like, "pick, pick, pick away at it" sort of thing.

94. Researcher: So, the project actually caused this conflict because of the time involved?

95. Andrew: Yeah.

96. Researcher: All right, interesting, well, let me think. Ok, well…

97. Andrew: (interrupts) Well, I felt that I tried to get those guys up here, the ones with the group so I thought it would be fair kind of thing like just trying to tow the line at times. So, sorry about that.

98. Researcher: No that's Ok, no that's great. I'll turn this off.

Notes: Afterwards Andrew talked about how he hated group work. That he always had to give 110%. And thought it was a pity that the group punished some members through mark. He would have left it to avoid bad felling in the long term. Stream supervisor, Fiona added after explaining what happened in the exit interview immediately following the above interview that the group was "dysfunctional".

Meeting Four 22nd June 10 AM – DW

Note: With just Karen and Kylie

1. Researcher: All right we are on the home straight. With this group I have talked to Andrew and Matt and um?

2. Kylie: Bryan?

3. Researcher: Yeah, Bryan. So, I just wanted to catch up with you two and to get your ideas on what happened because I believe there was a bit of a blow out towards the end. But we will get to that. What I would like to do is go back to the last meeting and say what we said in the last meeting and go on from there. And see what happened after that. Ok?

4. Karen and Kylie: Yep.

5. Researcher: Ok so, from the last meeting I found that, the topic is still a bath gel mat, a waterproof bath pillow, with material sourcing and prototyping

being presented. You were awaiting costings via the Internet on thermal plastics with some material coming from India. Some members of the group were not that keen on the idea but others though it was a good product. The group, this is where I am a little bit unclear. The group had divided the project up by disciplines into pairs. Marcus and Kylie doing Accounting, Marcus and Kylie also doing the survey, and Kylie also on Marketing? So I am not sure?

6.   Kylie: Yeah no, that's completely wrong.

7.   Researcher: Yeah, I though that was wrong. I didn't really get a clear idea on who was doing what.

8.   Karen: Ok.

9.   Researcher: Um, two others were doing Law and the others were not specified. At the time of the last meeting you said you preferred to communicate by phone and text message. You found it more immediate and interactive than emailing. Still fairly ambivalent about the computer but saw it as a necessary tool. The group had problems with emailing the questionnaire around as it changed formats. Will probably use disk for transporting separate sections of the report for final construction at someone's house. And you hadn't decided who's house at the last meeting. The idea was to use two computers at this point, one for the body of the report and the other for the in between pages like the contents page. This part of the report was seen to be the hardest. And you saw the computer as a very necessary part of the project and thought that it would be unmanageable without it. So, any comments on that? Any corrections or?

10.   Karen: I will just do the corrections. We did it three disciplines.

11.   Researcher: What was that?

12.   Kylie: The disciplines. The three disciplines that we picked our were Marketing…

13.   Karen: (interrupts) Management and Accounting.

14.   Kylie: And then three minor ones, which was Law and Economics?

15.   Karen: Yep.

16.   Researcher: Yeah.

17.   Kylie: And those were the first three ones, Marketing, Management, and Accounting. Marketing, the two people on that were Karen and Bryan. Then the Management the two people on that were Marcus and me. And then the third one, this is how it started at the stage.

18.   Karen: Yeah.

19.   Kylie: The third one was Accounting which was Andrew and Matt.

20.   Karen: And we were all going to do Law?

21.   Kylie: Yeah, and we were all going to do Law in relation to our disciplines.

22.   Karen: What about Accounting and Economics?

23.   Kylie: Economics? Have I put it around the right way?

24.   Researcher: Economics?

25.   Kylie: Ok, basically. Without really, not consciously, we all just sort of did our own thing. But as it turned out, well it just a bit, with that Accounting one that Matt did the accounting and Andrew did the operations side. So it kind of changed a wee bit towards the end.

26.   Karen: Andrew did all the prototyping.

27.   Researching: So Operations, prototyping and?

28.   Kylie: Yeah, making the prototype, finding all the like, sourcing the materials, sourcing pricing.

29.   Karen: Meeting people.

30.   Researcher: Meeting people?

31.   Kylie: Went round to all the people in Auckland and rang up people and found out what? Instead of using silicone we used soya bean and he found that out through calling up a president and so, he did a lot of actual contacting people.

32.   Researcher: A lot of work.

33.   Kylie: So, he kind of gave a bit of the Accounting and Marketing. Matthew took over that part anyway. He got his Dad to do it really.

34.   Researcher: Laughs.

35.   Kylie: Because they had an Accounting package called like Lotus 123 or something?

36.   Researcher: Yes, yes?

37.   Kylie: And um, he just put it in that and created problems.

38.   Researcher: What problems?

39.   Kylie: Well, because we sort of…

40. Karen: (interrupts) Were supposed to do that.

41. Kylie: Yeah, well apart from that. Like the students were supposed to do the Accounting.

42. Karen: It was supposed to be in Excel as well. Others were in Excel and ours stood out. People were thinking like…

43. Kylie: (interrupts) Because his Dad actually gave it.

44. Researcher: Was that a problem? Because it stood out?

45. Kylie: It wouldn't have been a problem if it had stood out if he knew what everything in the file meant.

46. Karen: It was also in a different font, like it had page numbers.

47. Kylie: And he didn't have it on disk.

48. Karen: Yeah, he didn't have it on disk.

49. Kylie: So, he did it at his Dad's work and printed it out all 50 pages. Printed it out and that was it. And this was before we had sort of decided, you know, done some things. Before we had put it on a main copy so, in our final report and Marcus was pretty much doing that, and he had to do like, a page break, to 50 pages so, he would get the numbers going through it.

50. Researcher: Uh huh?

51. Karen: There were no headers or footers on it like the rest of it.

52. Researcher: So, the font was wrong, the headers were wrong, and page numbers?

53. Kylie: Yeah, because what we had to do was, when I collected it together and printed it out, and then I had to feed his, like, photocopy his bits and then had to feed it through the printer. Like, stop printing after pages one to you know to page 76, and then print pages 76 to whatever, what pages were available. I just had to put them in to blank pages to make them come out right

54. Researcher: Ok. So, did you print page numbers on it or?

55. Karen and Kylie: Yeah.

56. Researcher: So, blank pages?

57. Karen: Blank pages.

58. Kylie: He had like, other funny headings at the top, which we, well, we had like, a header and a footer, as well as the page numbers and that kind of

overlapped with his stuff. And some of his stuff was on a horizontal so, it looked kind of messy. But apart from that though it was more what we were more worried about was, towards the end when we realised how much information there was is in the Accounting not, for our presentation whether we were going to be asked?

59.   Researcher: Hmmm.

60.   Kylie: So, that was all fine if Matthew could tell us beforehand what everything meant. But when we would ask things like, well why have you done that …

61.   Karen: (interrupts) Depreciation?

62.   Kylie: Depreciation as diminishing returns or something like that.

63.   Karen: He couldn't tell us.

64.   Researcher: He couldn't tell because his Dad had done it so he would go back to his Dad to ask. Would it become like that?

65.   Kylie: It wasn't even like that. He was kind of like dealing with a brick wall. It was like, you would ask him and then he would say…

66.   Karen: (interrupts) "Yeah, yeah, yeah, yeah, yeah."

67.   Kylie: "Oh, don't worry. Don't worry about it". And then it got to the point where we were asking him so many questions that he didn't know the answer to, or he would be looking up the answer that he would say, "Oh well, the questions are only like 2% of your overall mark, so I wouldn't really worry about it". But it kind of wasn't the point. It was like we really need to know if we are going to be asked them.

68.   Researcher: So, the rest of you weren't happy with the Accounting part?

69.   Kylie. Well, it came a, it wasn't, yeah the fact that the accounts had been done were a little wild as they weren't done the way we wanted them.

70.   Karen: Plus the fact that we didn't have them on disk.

71.   Kylie: And the fact that we had like marketing budgets and then Marcus and I were doing Management and we told him we needed things like, training budgets and bonuses budgets and then, the place that Andrew and I found we were going to have for our office, it needed to be refurbished because it was quite run down. And so it was like, we needed to put in like another, I don't know, ten grand just to do up the office and he wouldn't like, none of these costs anyway and he came back to us with after, and we could borrow up what 500, 000 or something?

72.   Karen: Yeah.

73. Kylie: Or 300,000 and we only borrowed 50,000.

74. Researcher: So, did they catch you in the presentation?

75. Kylie: Well, I think we were all very lucky in our presentation.

76. Karen: Except they caught Matt.

77. Kylie: Yeah, yeah.

78. Karen: Gave kind of a good answer actually but the rest of us didn't get asked Accounting questions.

79. Researcher: So, you just…

80. Kylie: (interrupts) No, they caught Marcus really.

81. Karen: Did they?

82. Kylie: Yeah, Marcus right at the end.

83. Karen: And they Matt as well.

84. Researcher: On Accounting questions?

85. Kylie and Karen: Yeah.

86. Kylie: But I think that we didn't have the Accounting guy in out presentation and so, I think that we kind of…

87. Researcher: Lucked out?

88. Kylie: Yeah, and yeah if we had had him we would just...

89. Karen: (interrupts) Yeah, but I think with the Marketing of the assignment, I think they will pull it to bits.

90. Kylie: Yeah.

91. Researcher: You haven't got it back yet?

92. Kylie: No.

93. Karen: But we all kind of like had our budgets but they don't add up.

94. Kylie: I would just like to say…

95. Karen: (interrupts) And they wouldn't change…

96. Kylie: (interrupts) Yeah, that was the thing. It wouldn't have mattered at all if we could just put it on disk and say, "Ok, that's fine". Because it if it's on disk.

97. Researcher: You can change it?

98. Karen: Yeah.

99. Kylie: And it would have all been on the same format because it was on Lotus. I mean, has Lotus at home?

100. Researcher: Right.

101. Kylie: And um, I remember one time I asked him about something and he just said, "you just put the number in and it just does it for you" and, I mean.

102. Karen: Sick.

103. Researcher: And so from the computer side the problem was that it was done in a different program and it wasn't on disk?

104. Karen and Kylie: Yeah.

105. Researcher: And so you couldn't change it and then that created problems?

106. Karen: Yeah.

107. Kylie: And when we were looking through the report afterwards there were just a few things we noticed just about…

108. Karen: (interrupts) Different sets of graphs.

109. Researcher: So, it was definitely a computer related problem because, it was not a problem having someone else do it?

110. Kylie and Karen: No.

111. Researcher: It was more that you couldn't modify it.

112. Kylie: Yeah, if he had it on disk then we are sure it would not have become a problem. If he had, because he turned out with these 50 pages and we were like, "fine where is your disk?" and he didn't have a disk and that was the thing. And just things like he had names and things wrong as well.

113. Karen: Yeah.

114. Researcher: And you couldn't change it.

115. Kylie: So, yeah, things like in all of the Management we had, I was in admin and then all of a sudden I was a shareholder. So, then in the Accounting it sort of goes on and on.

116. Karen: So, some of the figures were completely wrong.

117. Kylie: They were wrong. Like, it said we were going to, um, give dividends back after seven years when it should have been three, and things that we just couldn't change.

118. Karen: Yeah.

119. Kylie: And we sort of noticed and, you know.

120. Researcher: What about the rest of the report? That's the Accounting side, what about putting together the rest? So, that you had 50 pages that were blank?

121. Kylie: Yeah.

122. Researcher: What about the rest of it? How did that happen?

123. Karen: We all basically met at Bryan's place over three or four days.

124. Kylie: Yeah.

125. Karen: Like, took turns on the computers. Yeah, so we pretty much…

126. Researcher: So, how many days?

127. Karen: Four?

128. Kylie: Yeah, about four. Like sort of half day, half day, full day.

129. Karen: Full day.

130. Researcher: And how many computers?

131. Karen: Three laptops and two computers.

132. Kylie: There was another computer there but we didn't turn it on.

133. Researcher: And how did that work?

134. Kylie: Well, Marcus knew how to, um, do the formatting right at the end where you getting everything put together and then you just push some keys or something like that.

135. Karen: Took turns.

136. Kylie: And page numbers and yeah, so, we had one computer where we were collating everything together on it without any formatting.

137. Researcher: Right.

138. Kylie: So, Marcus was just sitting there like, the whole day. He was just sitting there and we were running through because we sort of did it like, an outline so we knew where everything was going and so, he just would sit and go, "Ok, Karen can we have your stuff?". And get her disk and put it in and we would copy and paste it over.

139. Karen: Yeah.

140. Researcher: So, he was running the master computer, the mother ship?

141. Karen and Kylie: Yeah.

142. Researcher: And he collected all the stuff and he was the expert in formatting?

143. Karen and Kylie: Yeah.

144. Researcher: So, formatting wasn't really a problem?

145. Kylie: Not on that computer was it?

146. Karen: No, it was just a different version of Word really.

147. Kylie: Yeah, because when we did all our work, we just didn't format it at all. It was like everyone would tell each other, "don't put it in, like put it in Times New Roman 12", or something like that.

148. Karen: Don't double space.

149. Kylie: Yeah, "don't double space, don't tab, don't put any bolds or underlines, and obviously do your punctuation and stuff", but…

150. Karen: (interrupts) Yeah.

151. Kylie: So, that when they went into the main document, there were no other things to stuff up.

152. Researcher: Ok, and while he was doing that, the rest of you were working on the?

153. Karen and Kylie: Laptops.

154. Kylie: And other computer and just…

155. Karen: (interrupts) Finishing work, proof reading.

156. Kylie: Yeah, editing people's work, rewriting people's work.

157. Researcher: So, were you working on your own piece of work or were you swapping around proof reading everyone else's?

158. Kylie: There was an element of swapping around and proof reading but there was also an element of after proof reading, not good enough and having to rewrite six times.

159. Karen: Yeah.

160. Researcher: So, the original person who wrote it would go back and fix it up afterwards?

161. Karen and Kylie: No.

162. Karen: Some we had to redo, quite a lot of Bryan's work.

163. Kylie: We had, how long? We had six pages to start off with?

164. Karen: Yeah.

165. Kylie: And um, that's before the like, the start of the report. So, we felt that...

166. Karen: (interrupts) Needed a bit added on.

167. Kylie: We found we, you know, it had to be quite substantial because it was the first thing that anyone was going to be reading. And it was six pages. We went through the six pages and it was, a lot of the stuff was providing the back up. Just for saying this statement and then saying how the statement had, no referencing or anything like that. So, we…

168. Karen: (interrupts) We just didn't know what it was based on.

169. Kylie: So, we, Karen and I, we would be proof reading it, and we felt that, well, we've got to, basically keep it in his style and keep um, some of his words out but, so we gave it back and said, "well, we've got to change things round a little bit". We just figure out for ourselves that if we gave it back to him it would just come back exactly the same.

170. Karen: Yeah.

171. Researcher: So, that was on Marketing was it?

172. Karen and Kylie: Yeah.

173. Researcher: And, um so you ended up rewriting part of that?

174. Karen: Yeah.

175. Kylie: Yeah, we ended up taking it down to three pages. Like, cutting out stuff, taking it down to three pages.

176. Karen: Three pages.

177. Kylie: Of his actual words and then like, backing up his assumptions and beefing it up.

178. Karen: Drawing it out.

179. Kylie: Yeah, and then moving it out until it was ten pages long.

180. Researcher: Ok. Was there any, from the sounds of it there weren't many problems from the computer side of it? Do you think? It was more…?

181. Kylie: (interrupts) No.

182. Karen: It was hard work, just with the final copy afterwards.

183. Kylie: Oh, yeah.

184. Karen: I found stuff, yeah, bits that were different fonts, had been underlined, tabs were wrong and stuff. It was just from the different versions of Word we used.

185. Kylie: Yeah, because we went from Bryan's house and saved it on a master disk, and we had like, two master disks, and um, then I took the disks and went into Dad's work and put it on his computer and printed it out. It all came up and we printed it out. Because Marcus had done all the formatting, I didn't want to change anything just in case it would stuff the whole thing up. So, just printed it out that way and then bound it and stuff and were just flicking through some things had become bold and there should have been some um…

186. Karen: (interrupts) I think there was one part that was a completely different font.

187. Researcher: So, you had to, this is after you?

188. Kylie: This was after it was all done and gone. So, we looked over it.

189. Researcher: You looked

190. Karen: And left it.

191. Kylie: Yeah, we kind of weighed up the mark that would be put on that, too much time and effort.

192. Karen: Yeah.

193.   Researcher: Ok, would you change anything about the way you did the report at the end?

194.   Kylie: Like the way we put it together?

195.   Researcher: Hmmm.

196.   Kylie: There was one point where the whole computer crashed eh?

197.   Karen: Yeah, a couple of times.

198.   Kylie: Marcus was really good. Marcus got really um, it was really good but he got really, um, sitting here in front of the computer for how many hours straight and he wasn't feeling a lot of support. So, he was getting a bit frustrated which was really granted but, I think, um, there was one point where it was good just having one person doing just for things like, there was one thing where I think what happened was that someone took their disk out of Marcus's computer and then we would just get a blue screen saying, "put the disk back in". He was like, "look don't do it, just let me do it!". So, he was really a bit known to shove the disk in. Putting it on and so, then did we save to the actual C drive on that last one?

199.   Karen: I think we did, yeah.

200.   Kylie: Yeah, I think we had the, it saved to the, I mean we must have because we put in other disks in there.

201.   Researcher: So, one expert, so to speak, doing the formatting and putting it together?

202.   Kylie: I know.

203.   Researcher: And they started to feel a bit, left out and a bit?

204.   Kylie: I think he was feeling, I think that he was just feeling that he…

205.   Karen: (interrupts) There were kind of three of us doing it and the other three…

206.   Kylie: Were doing computer games on the laptops.

207.   Researcher: Ahhh.

208.   Kylie: And because he did kind of choose his battles quite well. Like, when he had, um, a bit of an argument with Andrew, Marcus and Andrew just, Marcus was just sort of saying to Andrew, "Come on, help me out here" because I think we've been on at Bryan for quite a lot of the time and Marcus was really feeling, like saying something to Bryan. But near the end we were talking to him about telling him off all day so, he just said to Andrew, "look can you just help me out here?" and he just really needed to let off a bit of steam. And um, I think the thing that, I don't know if anyone, if it was Marcus annoying me, it

was just saying things like, "Oh well, you are not asking me to do anything, you are not asking me". Yeah it was like…

209. Karen: (interrupts) "Well, I've done everything now that I've been told to do" that there's no initiative to do anything more.

210. Kylie: Yeah, it wasn't like, I mean…

211. Researcher: No initiative?

212. Kylie: Karen and I were sitting there rewriting Marcus's thing and proof reading and….

213. Karen: (interrupts) Bryan's thing.

214. Kylie: Sorry, rewriting Bryan's thing and proof reading other things and they were all sitting there going, "Oh, well". You know? "I'm just using the computers to play games".

215. Researcher: So, there was a fair bit of argumentation and stress towards the end?

216. Karen: Towards the end there was heaps.

217. Kylie: Yep, and I think um, Marcus just said, "you know, I would prefer not to be sitting on a computer putting this all together but I am the one who started it and yeah".

218. Karen: No one else is willing to do it.

219. Researcher: And is that what happened towards the end? In the final proof reading? With your supervisor, when it all spilled over?

220. Kylie: That was the contribution, was really the…

221. Karen: That was horrible.

222. Kylie: The point was that Andrew had, no, not Andrew I mean Bryan had contributed basically three pages out of 147, 127, whatever.

223. Karen: And there was only five of us there.

224. Kylie: Yeah, because I was away last week.

225. Karen: Yeah and two of us, there's Bryan, kind of took away from the other two who were supporting him.

226. Researcher: Hmmm.

227. Karen: That's kind of nasty.

228.   Kylie: Yeah, because Andrew and Bryan were two good friends from school, which is fair enough, but Andrew's feeling like, going to take the friendship or whatever. But then Matthew and Bryan had become good friends over the course of the group project so then Matthew kind of like, "no I don't want to hurt his feelings".

229.   Researcher: So, these group projects can be pretty tough on um, friendships and relationships?

230.   Kylie: Oh yeah.

231.   Karen: Definitely. That's the bad thing about them. I think Bryan and Marcus I don't think…

232.   Kylie: I'm sure, oh, they won't talk to each other.

233.   Karen: They won't talk to each other again.

234.   Researcher: Who won't talk?

235.   Karen: Bryan and…

236.   Karen and Kylie: Bryan and Marcus.

237.   Kylie: Because, I think that if Andrew and Bryan hadn't been really good friends, or like, just met each other, then of course Andrew would have definitely said something I think.

238.   Karen: Yeah, but because they were friends…

239.   Kylie: Marcus was a bit more sort of 'sit on the fence' so he probably wouldn't have said anything regardless. But yeah, Andrew definitely would have said something.

240.   Karen: He said to me he would.

241.   Kylie: If he wasn't his friend so, that's interesting.

242.   Karen: He just didn't want to damage the friendship.

243.   Kylie: Which is understandable but its just frustrating when you get such an obvious kind of group.

244.   Researcher: And was that caused by the task in that you had a shared group project or was it more the way that you did it, put it together that caused the?

245.   Karen: (interrupts) It was just the task.

246. Kylie: I think that if Bryan had been given an individual assignment that said, "Do this essay" or "Do this project and you've got to have this, this, and this in it", he would have done it and probably got quite a good Marcus for it. He would have probably done it in the last weekend but he would have done it and got it in, and that's fine but, because this was like basically, basically it was to make a business up and he was doing Marketing.

247. Researcher: So, um, so people like that, they tend slack off, whereas if were they were doing and individual?

248. Kylie: If they were given a list of what to do like, I'm sure if we broke down, no actually that's not quite true actually because we were given an outline of things to do and he still didn't do it.

249. Researcher: Yeah, so he tended to freeload on the others?

250. Karen: Yeah.

251. Kylie: I think because, when you are working in a group, you are motivated to doing the work on time and making it a top priority. If you are doing it for yourself then it doesn't really matter if you do it a lot because no one else is going to worry.

252. Researcher: Right, but in a group setting its different?

253. Kylie: Right and he wasn't really aware of that.

254. Researcher: Ok, so words to describe what it was like.

255. Karen: Frustrating.

256. Kylie: Hmm, drawn out.

257. Researcher: Drawn out?

258. Kylie and Karen: Yeah

259. Researcher: And, um, did you have sufficient access to computers and stuff?

260. Kylie: Everybody had at least a computer each. Some people had two and then like, a lot of people had access to their parent's work computer.

261. Karen: My computer took ages. On the very last day of the presentation it all went "whoosh!".

262. Kylie: But I think that with just one assignment, that's your group assignment, if you don't care who, sort of, did what work.

263. Researcher: Right?

264. Kylie: And that's why I think that, on a group assignment, someone like Bryan, especially when you have friends in a group and they, and you can allow extra marks and he just bumps back up to a 100, it doesn't show properly who did what work.

265. Researcher: Those pressures don't come out in the final?

266. Kylie: Yeah, because he knows that if he didn't do any work it would have still gone through and he still would have got a good mark because everybody supported him being friends.

267. Researcher: But, overall do you think that these group projects are a good way to learn?

268. Kylie: I think that they are a good way to learn how a business operates because you are always going to get a slacker in business.

269. Karen: Yeah.

270. Kylie: You are always going to get people who go out and motivate themselves like Andrew. Just go out and do the project without being asked. You are always going to get, you know, the person who knows a bit more about technology and all that kind of stuff.

271. Researcher: Ok.

272. Kylie: So, that's how I think it was definitely worthwhile.

273. Researcher: Ok, well thank you very much.

274. Karen: You are welcome.

275. Researcher: Thanks for coming in.

Appendix C: Group three focus group transcriptions

Members: Alistair, Bryce, Hannah, Monica, Sandra, Rachel

First meeting: 23/3/01 11.30am All present

1.   Researcher: What I would like to do in this first meeting is just go round and get an idea of what experience you have had with computers before in groups. If you've got a lot of computer experience and got a computer at home you can talk about that, or just about whether you have used them in groups before and what you thought of using computers in a group, whether it was difficult or easy. So, where should we start? Lets start with Alistair.

2.   Alistair: My experience with computers? I have one at home.

3.   All: Laughter.

4.   Alistair: Just doing my ??? on that basis – that's basically all its used for at home really, etcetera, etcetera, except for research purposes and shit like that. Reasonable group last semester. Lots of space like, combined space like, sorted out our resources and went away and each did our own piece and then put it altogether on the same computer. That's how I remember it.

5.   Researcher: And that worked pretty smoothly?

6.   Alistair: Umm…

7.   All: Lots of laughter.

8.   Alistair: It worked alright. Just a couple of times when a lack of patience and, I don't know.

9.   Sandra: I don't think the computer was at fault. No, it wasn't the computer.

10.   Alistair: We all like to blame computers. Basically, in IM2 we had lectures and stuff, as well, and so, that's basically all I've had. No problems, not that I know of.

11.   Researcher: I was interested that you said you like to blame computers. I guess that that happens a lot in group projects?

12.   Alistair: Oh, yes.

13.   Sandra: (interrupts) Yes, yes.

14.   Alistair: We are working on them. Its not our fault.

15.   Researcher: Who else was in the group?

16.   Monica: Three? Sandra.

17. Researcher: Ok, Sandra?

18. Sandra: It was at my house, my computer…

19. Alistair: (interrupts) It was your fault.

20. All: Laughter.

21. Sandra: Yeah, we met at my house and my computer is very slow at home. It was taking a lot of information at the same time. But I come from IM2, obviously, and I did some computer studies at school, but I'm really bad at surfing the net, and it doesn't help that it's really slow so I try and encourage myself **not** to use it. I think that with working on the business project last year was that, um, just because my computer was too slow, it couldn't handle all the information. I mean we had so many pages.

22. Researcher: So, it was all put together on your computer?

23. Sandra: Yeah, on our computer, on Word. Yes, it was just one page after the other, even with the accounts, they were just transferred through emails and disks.

24. Monica Did we use email that much?

25. Sandra: No, not really, only at the end.

26. Monica: You would sit at home, do it on our computer, put in on disk, and take that disk through and do it that way. We hadn't got onto the whole emailing thing.

27. Hannah: We had a meeting before, decide what our tasks were and what we needed to have done by which day and meet at her house and say what we need.

28. Researcher: Ok, so Monica?

29. Monica: Yes, I've had quite a bit of experience with computers. I've got one at home. I've done a lot of work, basically I don't surf the net for personal use or anything most of the time, apart from using emails and that kind of stuff. Mostly, I use it for research like, Word, Excel, all that kind of thing, just to do my projects. So, basically I've just got my computer to do my school work and I'll try and keep off it at all other times because it drives me crazy.

30. Sandra: You are very good. She got us out of a lot of trouble.

31. Monica: My mother is a computer trainer. So, it's a lot of help when you might have problems. Its like, "I'm here and I don't know what I'm doing, so help me". So, that really helps out a lot.

32. Researcher: Good, Hannah?

33. Hannah: I wanted one last year, just cruise around on it. I'm probably not very good with all the functions and all the little nitty, I'm pretty straight forward, sort of one after the other, and so, like, when we were doing a really big project, doing a lot of cutting and pasting and all that sort of stuff, I found that really hard to follow. I got real lost like, where it's all fitting in and everything. I think I really need to clarify that a little bit better, like, it was actually literally going to come together.

34. Researcher: Cool, and the two outsiders, did you come from IM2?

35. Bryce and Rachel: No, Sport and Rec.

36. Bryce: I don't really use computers that much. Just for assignments and that. I don't like, get on, but I like playing around with it. Using programs like Word and Publisher and that. My old man used to be a graphics designer so, I just used to use his computers. But the Internet, I just use that just for the research.

37. Researcher: Cool, and Rachel?

38. Rachel: Yes, we've got computers at home and my dad likes computers so he does quite a bit of shopping and whatever. And I've always used them for school so, since I was quite small, and I've done courses through school and we use them at work heaps. That's about it.

39. Researcher: Great, and what's your plan for this project? What's it called?

40. Sandra: ABC Fitness.

41. Hannah: It's for the elderly, mobile fitness.

42. Researcher: Mobile fitness. And what's your plan for using computers for this project?

43. Sandra: Emailing and researching and then we've decided to go to Rachel's house because she's got two computers.

44. Hannah: (interrupts) And a bit more room…

45. Alistair: (interrupts) More physical space, working around two computers.

46. Researcher: Ok, that's good enough for now. We'll switch it off. Thank you.

Second meeting: 8/5/01 11.30am All present

1. Researcher: This is called a focus group where you have a group meeting and its kind of a research, its unusual, and the hardest thing is tracking who said what.

2.   Hannah: So, do you want us to say our names when we talk?

3.   Researcher: No, that's too, I mean…

4.   Hannah: (interrupts) I'm serious.

5.   Researcher: No, because you should be able to say whatever you like and not be worried about, doing anything formal like, "my name is John and I'm glad to be here". Ok, the purpose of the second meeting is, you have just finished your exams, and to touch base with your project. First of all, I've got some impressions from the first interview. They are my impressions. They are what I thought you guys said in the first meeting. So, I just want to give you a run down, a summary of what I thought you said and just to see if you agree with that and, if you don't, then feel free to disagree or make any points. Ok?

6.   Everyone: Hmmm.

7.   Researcher: So, from the first meeting I found out that four of you were in the same Business Research Report group last year?

8.   Hannah, Monica: Yes.

9.   Researcher: And Monica pretty much held together the computer side of things for that project. Would that be right? So these are impressions, in other words…

10.   Hannah: (interrupts) I wouldn't say "held together".

11.   Researcher: Not held together but, I mean, Monica's computer was used…

12.   Monica: (interrupts) No, it was Sandra's computer.

13.   Researcher: Sandra's computer?

14.   Monica: I think the main thing with that was that...

15.   Sandra: (interrupts) Three girls…

16.   Monica: Yeah, three girls came together. But I think that I was the one who probably had the most understanding with how to present it using all of those computer skills. Like how to generate the title page, how to use headings, that kind of thing. That's what, that was where that came in. I had an understanding of that more.

17.   Researcher: Right. That's what I meant. I didn't put it very well.

18.   General: Laughter.

19.   Researcher: But, by holding together I meant that you were…

20.   Alistair: (interrupts) Too lazy.

21.   Researcher: Kind of coordinated the presentation and final formatting of the report.

22.   Hannah: I wouldn't say solely.

23.   Monica: Yeah, not, especially because I was sick. That last day I was like..

24.   Alistair: (interrupts) It was a girl thing.

25.   Sandra: There was one, two, who were the other people?

26.   Alistair: That was it, just Michael and Chris. Can you imagine trying to keep track of it? I can't help it.

27.   Hannah: Yes, because he, no shit, no joke.

28.   Alistair: No shit?

29.   Researcher: I just write down the key words.

30.   Hannah: Ok, then go for that one. They did not really do much. They probably did about ten percent, if that.

31.   Researcher: Right.

32.   Monica: If that.

33.   Alistair: You weren't even there, how do you know?

34.   Hannah: Excuse me but she did more than you did and she was sick.

35.   Monica: I was sick and I sat at home on my bed writing out various contracts.

36.   Researcher: Can I ask why it happened that way?

37.   Hannah: Because they…

38.   Sandra: (interrupts) The boys stuck together and liked the home entertainment.

39.   Alistair: Just think, home entertainment…

40.   Bryce: (Alistair) You want to say more Alistair?

41.   Sandra: We are not angry Alistair. We are just saying the facts.

42.   Alistair: Yes, I know and I was just going to say something. We wanted a more edited project. The guys would have gone, " that's good" and left it, that's all that would have happened, trust me.

43.   Researcher: Say that again.

44.   Alistair: Us guys most likely would have gone " Oh Ok, sounds good, that will do".

45.   Hannah: That'll do.

46.   Alistair: But these people were gonna sit down and go through it, and methodically work everything out. That's the difference between us. Whereas we would just have gone, "sweet as". Because we wanted to go home.

47.   Monica: Sandra, Hannah and I are all very methodical people…

48.   Alistair: (interrupts) We wanted it done and out of there and they wanted to, you know?

49.   Hannah: We couldn't deal with "sweet as". It wasn't, "sweet as" and even when we handed it in it was still a mess.

50.   Monica: We are very much, in a way, perfectionists, in that we want everything especially when we are handing it in and its worth so much. We want, the presentation of that is so important.

51.   Sandra: Yeah, it's like its important to us at the time.

52.   Researcher: So perfectionists, more patience, that sort of thing, more tolerance?

53.   Hannah: Probably, yeah, we wanted to take the time.

54.   Sandra: But we are willing to give our time as well.

55.   Alistair: Groan.

56.   Researcher: Ok, that was the first impression. It wasn't particularly Monica, it was a group of the three of you pulling together the final formatting and that. That…

57.   Hannah: (interrupts) The skill thing.

58.   Researcher: That side of things the guys probably weren't interested in, but it doesn't mean, from my understanding you all did you sections of the report and it was that formatting part that…

59.   Hannah: (interrupts) Where the girls did…

60.   Monica: (interrupts) That was the problem. That we had all worked so separately on everything that, when it did come to do the formatting, it took so much more work because we had done everything separately. Even, because when you hand in the report, it can't be disjointed and you can't notice the differences in languages and everything else that people use. So, it was the whole thing of, yeah, getting it so that Michael's part fitted in with everything else and his style of writing was just so, completely different from what we had done, that you had to go through and basically rewrite the whole thing.

61.   Researcher: Michael was the other group member?

62.   Monica: He was, that was just one of the examples. In fact, all of ours, we had to basically change to some slight degree.

63.   Sandra: I think Michael's and Chris's were definitely different.

64.   Alistair: I didn't like it either.

65.   Hannah: His ideas were "sweet as" you know, he had a good brain. Its just when it came to writing it down it just did not make sense at all.

66.   Alistair: Ashree!!!

67.   Hannah: It was a joke. It was really hard to put together. And it was really sad because we knew he knew what he was talking about. He had done all this work and stuff.

68.   And he just couldn't get it down.

69.   Researcher: Ok, the other impressions I got is that you, the impression I got was that you looked at computers as kind of like a necessary evil. It's not something you would choose to go out and work on. It was a requirement. You had to do it. So?

70.   General: Hmmm.

71.   Sandra: We know that it is easy in the long run.

72.   Monica: Its like, yeah, I would much prefer to use a computer than hand in a hand written report.

73.   Hannah: 100 pages long!

74.   Alistair: Because it was hand typed.

75.   Monica: Maybe more of the things like, having to have headings done in this way and a generated Table of Contents and all of those kinds of things.

76.   Sandra: They sort of seem like those necessary evils at the time because it made it so difficult.

77. Alistair: Cutting and pasting and page breaks and, it was fantastic guys!!

78. Sandra: The graphs were …

79. Monica: (interrupts) It was because with Sandra, is that she doesn't have as much an understanding on how to use all the headings and all that sort of thing.

80. Alistair: Me neither.

81. Monica: So, that all of that would just be written and then the font changed and the size changed. And so, that, when it came to generate the Table of Contents they way they wanted, it meant going through and do all of those changes to everything so that you could generate it. And it was just "hell".

82. Researcher: So, it was…

83. Hannah: (interrupts) Hell!

84. Researcher: So it was Hell, but worthwhile?

85. Hannah: Yeah, if we had taken a bit more time and really got the benefit.

86. Alistair: A couple of days really.

87. Monica: We had a couple of days.

88. Alistair: I thought it was just the last night as I remember it.

89. Researcher: So, more time?

90. Alistair: Ahh, shit!

91. Hannah: Yep, we are going to spend a whole week doing four hours a night.

92. Alistair: Sure.

93. Monica: We are!!

94. Alistair: Let me write that down. "We are going to spend four hours a night".

95. Bryce: Busy.

96. Sandra: For the last week.

97. Monica: We will be camping on Sandra's floor.

98. Alistair: That will be cool, tent and everything.

99. Researcher: So, that's that project. Before we get onto this project, the two newcomers, right. I've got down here both from Sport and Rec., both with some experience with group work and computers. From that course, but we didn't really discover whether it was the same as the Business Research Report or how it was different.

100. Becky: It was done to a smaller degree, like we had…

101. Bryce: We didn't do any research

102. Becky: We did. We had like research labs for physiology. Where we had a lab and we had to hand in a group project the next week.

103. Bryce: They were tiny.

104. Becky: So, everyone had sort of like, well, like our group, we had three of us and we split up, we split our questions up. And then two days before we handed it in, we would all come with our disks and paste it all together. That was our major group work.

105. Researcher: So, you would all do your work on disk. Did you have the same problems as these guys are talking about?

106. Becky: Yes, we did have some problems, yeah but.

107. Sandra: (interrupts) But our report was huge.

108. Becky: These ones are huge. These ones were like three pages long.

109. Bryce: The same happened.

110. Researcher: But you still had the same problems essentially with different formatting and putting it together.

111. Hannah: Yeah, essentially.

112. Becky Yeah, trying to put it all together and paste it and change it.

113. Hannah: Imagine trying to do that with what, like, six different disciplines.

114. Researcher: How many were in the groups there?

115. Becky: There was about three or four.

116. Researcher: So, smaller numbers.

117. Bryce: Oh, a small exercise.

118. Becky: Yeah, it was because we had about four different labs. And that came over like about two months.

119. Researcher: So, lets get onto this project. Um, you have chosen mobile fitness for the elderly?

120. General: That's right.

121. Researcher: Um, and in the meeting last time with me you didn't really have the details. You were still waiting for the prelim report to come back. Um, and that's where you were at.

122. Monica: Everybody loves it.

123. General: Laughter.

124. Researcher: You were planning on using two computers at Rachel's house right?

125. General: Yes.

126. Researcher: For final editing, and you were also planning on using email extensively for communicating and sending information. I am really interested in finding out the progress on this and how it's working out with the computers.

127. Monica: Rachel and I have a confession to make. We left our log sheets at home.

128. Hannah. But I've used mine three times.

129. Researcher: The ones that you've filled in, I can collect, or you can keep them and I can collect them at the end. I think, I've given you enough sheets to keep going?

130. General: Yes.

131. Hannah: Well, the dates will be a bit stuffed then.

132. Researcher: That's Ok. Well, I can collect the ones that you have got. Because you are going to hand them into to me sometime anyway.

133. Hannah: Well, do you want to take this one and I'll keep this one to keep going with?

134. Researcher: Yes, that will be great.

135. Hannah: I'm lucky because I'm doing the survey so, I'm cranking.

136. Monica: I've just had no need to be on the computer so far.

137. Alistair and Bryce: Same.

138. Researcher: (reading from sheets) "3 hours, 1 hour, 20 minutes".

139. Hannah: This has been like, the whole survey has been basically like, for the past two weeks I've been on it most days and maybe an hour at a time.

140. Researcher: So, Hannah's doing the survey?

141. Bryce: I didn't know it was just for the Business Plan. I use it at work as well.

142. Researcher: OK, all I need to know today if you can just put a line through the non Business Plan stuff.

143. Bryce: I've used Publisher a couple of times.

144. Becky: (interrupts) And you have emailed a few times.

145. Researcher: So it looks like, so far, predominantly you are using the computer individually?

146. Monica (and others): Yeah.

147. Researcher: How have you divided up the Business Plan between the six of you?

148. Sandra: Subject strengths.

149. Alistair: And weaknesses.

150. Hannah: We were given a basic ..

151. Sandra: (interrupts) Overview..

152. Hannah: Business development like, structure sort of thing, that someone has taken and that I definitely need back. Um, yeah, and its basically outlined like, several like, all the main sections, and we've just divied them up.

153. Monica: Yeah, so, we were basically given a Business Plan structure and we have slightly moderated it.

154. Hannah: Modified?

155. Monica: That's what I mean, but not really. So, basically we have divided up…

156. Alistair: (interrupts) Stops now.

157. Monica: The sections, so, we thought that would be the best integration because this has already integrated it all and if we follow that then we don't have those sort of problems at all.

158. Sandra: Hannah's going to do Law, I'm going to do Marketing, Alistair going to do Accounting and then we are going to try to integrate it all. In that horrible way which is what we found with our last one.

159. Researcher: So you are not doing it by subject? You are doing it by…

160. Sandra: (interrupts) We are not doing it by subject. We are doing it by separates.

161. Alistair: Which is what makes…

162. Monica: (interrupts) Which is still to a degree, subject orientated.

163. Bryce: Yeah right.

164. Monica: But there is still crossovers. Its like, I'm doing the Management side and I talk about implications for share distribution, which is an Accountancy issue so, it's doing all that integration for us. So how we work on that one.

165. Researcher: And so, its all working quite well? At the moment you are at the stage where everyone is off doing their little bits and pieces.

166. Hannah: Like, today we've had quite a bit of interaction and it's working quite well.

167. Alistair: Trying to, yeah.

168. Hannah: The survey stuff is pretty much done.

169. Monica: We are trying to keep like, a lot more on top of what everybody else is doing.

170. Hannah: (interrupts) So, we don't end up like last time.

171. Monica: Yeah, where two days before its handed in you finally get what somebodies done and it's the first time you've ever seen it.

172. Hannah: I think we should actually do it.

173. Researcher: For communicating, Ok, so, you are off working by yourselves do you communicate by email, telephone?

174. Hannah: At uni.

175. Sandra: All of the above.

176. Monica: For organising this meeting, Sandra emailed me and then I emailed everybody else to organise this, but that's only because I could write out one email instead of phoning five people.

177. Alistair: You've got to remember me.

178. Monica: That's why I sent it twice. Plus I put on the bottom "please send this back to me" so I know you have received it and don't have to go calling you all the time. So, then once I receive it back I know.

179. Sandra: Did I send you one back

180. Monica: Yes, the only one who didn't send one was Bryce and then I though Rachel would have been talking to him anyway.

181. Researcher: So, do you think the hard part on the computer side is yet to come?

182. General: Yes.

183. Becky: It is.

184. Monica: That's when we want to throw the computer out the window.

185. Researcher: So, at this stage the computer the computer is used for doing things but then when you come to..

186. Hannah: (interrupts) For example, like, Monica brought this for us today just to show us like this, its changed, like this is the sort of stuff she's up to but without the computer, she could not have been able to print out five of these and made it that clear and obvious for us. And so, that's really handy.

187. Researcher: So, if you wanted to sum up the computer in group projects in a couple of words.

188. Hannah: They are a resource that can save time. You know that you can condense information. Legible for everybody, it's highly legible.

189. Sandra: Definitely legible.

190. Monica: Like, I find it so much easier to be able to do this and print everything. Yeah, it's a lot more legible. A lot easier to follow.

191. Alistair: Sometimes if you can cope with this. If you can't then it's a problem.

192. Researcher: Ok, well we will leave it there. One thing before you go I just need to meet with you guys one more time after its finished because I want the final thing looks like.

193. Hannah: We will probably be drunk!

194. General: Laughter.

195. Researcher: That's Ok, I just want to what the last bit of computer things are, putting it all together, and collect the sheets, and I've got a questionnaire.

Note: All present.

1.   Researcher: Right. Let's start this meeting. Ok, last time I spoke to you guys, I found out that the Topic was still mobile fitness for the elderly and its called "ABC fitness". You had not really specified whether it was a product, a service or what. So I wasn't really sure. You had divided the work up by disciplines and by the Business Plan structure. So, Hannah, for example, was doing Law and analysed the survey.

2.   General: Murmur.

3.   Researcher: This is from the…

4.   Hannah: (interrupts) That's changed.

5.   General: Laughter.

6.   Researcher: So, please tell me, as this was the last meeting, the state of play at the last meeting. So, Sandra Marketing, Alistair Accounting?

7.   Alistair: Changed.

8.   Researcher: Monica, Management, but with crossovers between for integration. So, that was the plan at the last meeting. Also you found that emailing was the easiest way to communicate because then everybody could be reached in one hit. You had agreed that the computer was a necessary evil. Particularly evil when it came to formatting and Table of Contents, but very necessary, because doing it manually is not a practical alternative It's a resource that can save time. Thought that the hardest part with computers was yet to come, when you had to integrate all of the individual work into one computer. As Monica said "that's when we want to throw the computer out the window".

9.   All: Laughter.

10.   Monica: Yeah.

11.   Researcher: And, at our last meeting you had not discussed their plans for bringing it all together yet. So, any comments on that? Any changes?

12.   Hannah: Yeah, I didn't do the Law.

13.   Monica: I don't think, like, although we ended up sort of doing disciplines, we didn't go, " Ok Sandra's going to do Marketing, I'm going to do Management". It was just that we looked at the Business Plan outline and followed the sections and the sections had quite a discipline…

14.   Hannah: (interrupts) Focus?

15. Monica: …focus, Anyway, so, it wasn't purposely done that way.

16. Researcher: Ok.

17. Monica: Does that make sense?

18. Researcher: So, you didn't divide it up by disciplines, you looked at the structure of the business plan?

19. Rachela: Yeah.

20. Hannah: We looked at several Business Plans to quite likely pick bits out of different plans. We had a look at three or four of those.

21. Rachela: Yeah.

22. Hannah: Because that one particular Business Plan didn't fit totally so you just picked out different bits.

23. Researcher: So, you had three or four different Business Plans?

24. Rachela: Yeah.

25. Hannah: Like we printed out the different structures.

26. Sandra: We had one that was given in class. One that had been done over the Internet, just the structure, the contents page. One from class.

27. Rachela: One from the Marketing class.

28. Researcher: So, one from Marketing?

29. Sandra: Yeah, one that the students had from last semester, from 93, or something so, they weren't that long.

30. Hannah: And we got a couple from Business on Line.

31. Sandra: Because I didn't like following the structure that we got given in class because I thought they would all be the same. So, we made a collective decision to integrate them.

32. Researcher: Integrate them more?

33. Sandra: Yep.

34. Researcher: Ok, so nobody did any real disciplines as such?

35. Hannah: Apart from Accounting.

36.   General: Yeah

37.   Researcher: Apart from Accounting so, Alistair was in charge of Accounting?

38.   Hannah: Although it wasn't really that, like the Stats was, like, a lot of work done in another discipline sort of over all, Statistics.

39.   Researcher: Ok, yeah so, where did you do it all? Did you work individually or did you al come together at someone's place as I saw in the log sheets?

40.   Hannah: We had our own like, things we were responsible for which we completed mostly at our own houses.

41.   Rachel: Hmmm, we did.

42.   Hannah: And then we all met at Rachel's house.

43.   Alistair: And played pool.

44.   Researcher: So, is that where the pool room is?

45.   Hannah and Sandra: Yeah.

46.   Alistair: Yes, came together.

47.   Researcher: Ok, and how long did that take?

48.   Alistair: (whistles).

49.   Sandra: Many hours.

50.   Hannah: A week, Monday to Monday.

51.   Rachel: That was our editing week, that we left for editing.

52.   Sandra: It did take that didn't it?

53.   Hannah: Yeah, because we left. We knew we needed a week for editing and it was pretty much ready to go by that Monday, like, 80% of it was ready to go.

54.   Alistair: Except the editing.

55.   Hannah: The week before.

56.   Researcher: Ok, so the content was complete up until that Monday?

57.   Monica and Hannah: Mostly.

58.   Researcher: And that was done individually?

59. General: Yeah.

60. Hannah. And then all sort of put on the computer Monday, Tuesday, Wednesday.

61. Rachel: And then we edited it.

62. Bryce: Adding and editing.

63. Researcher: Ok, and how many computers did you have to do it?

64. Rachel and Hannah: Two.

65. Rachel: But they weren't networked though.

66. Researcher: Ok, so two computers going pretty much full time?

67. General: No.

68. Hannah: About 70-30.

69. Sandra: Downstairs was...

70. Alistair: (interrupts) The downstairs one was going generally most of the time but the upstairs one was only used for the Accounting, occasionally other work.

71. Monica: Yes, basically because generally the editing would carry on, on the computer downstairs, and whoever needed to add things could just go upstairs, work on that and get that done.

72. Hannah: Bring it back down.

73. Monica: And the bulk of the process wasn't stopped.

74. Researcher: So the mother ship…

75. General: (interrupts) Yeah. (laughter)

76. Researcher: The mother ship was up, was downstairs?

77. Sandra: Downstairs.

78. Researcher: And just when you need to do individual bits you would take it upstairs

79. General: Yeah.

80. Researcher: By?

81.   Sandra: By disk.

82.   Researcher: By disk.

83.   Sandra: Disk.

84.   Monica: It was so much fun.

85.   Hannah: We ended up with about 10 to 15 disks that, we just didn't know what they were.

86.   Monica: Because, I would save them down onto the Hard Drive and then make the copy was still on the disk, but the computer would still want to work off the disk, even though it was on the Hard Drive. So, you would take the disk out and five minutes later when you went to try and move something or change something it would just go "nuts, forget this, I'm not doing it and close down".

87.   Rachel: It would asking, "please put this disk in" and it's like, what disk?

88.   Sandra: It would say, "Disk 000" and we had about 5.

89.   Monica: And, because the disks weren't named, you would have about five disks that you were throwing in until it finally spurted out something like, " Ok, I'll take this one".

90.   Sandra: And that took about an hour.

91.   General: Laughter.

92.   Hannah: At times it was like you were spending so much time just trying to find it.

93.   Monica: Our main problem with that was on the Friday was that Sandra and Rachel had spent all morning doing like two hours doing editing.

94.   Researcher: Which day was that?

95.   Monica: That was on Friday and the report was due on Tuesday.

96.   Bryce: Before it was due.

97.   Researcher: The Friday before the Monday?

98.   General: Yeah.

99.   Friday: That week of editing.

100.   Hannah: Yeah, that Friday.

101. Monica: Yeah, so, on that Friday their temper. It probably took a good two hours doing some editing, and taking the disks out…

102. Bryce: (interrupts) Intense.

103. Monica: And then the computer decided, "no, I want this disk". And they put in this disk and the computer started to…

104. Sandra: (interrupts) As I was going to save, it like, Save As, and press save, and it wanted the disk and I would say "Ahhhh!", because we had the timer save on but it did nothing.

105. Researcher: So you lost?

106. Sandra and Monica: Two hours.

107. Sandra: And, it's so cheeky to want to do that.

108. Sandra: Because I always press save but we were on such a roll and we were doing it so hard, cool because Monica was on her way and it was our best work

109. Rachel: But we had automatic save.

110. Sandra: But we lost it like that. But I was just like, "nope, I'm not going to do it again".

111. Bryce: Demoralising.

112. Monica: We did have backup disks but they didn't have up to date files working. So, it was after that that I went and started to back up files and I also changed the automatic save, it was set on 10 minutes after then, I saved it after every ten minutes.

113. Researcher: So, you started to do backups?

114. Monica: Extra cautious.

115. Researcher: Was that the only computer problem?

116. Hannah: Printing.

117. Researcher: Printing?

118. General: Yeah.

119. Alistair: Tables.

120. Hannah: Yeah, because the printing…

121. Researcher: (interrupts) And, Alistair what was it?

122. Alistair: Yeah, because when shifting stuff, when moving the tables across apparently its a problem from Excel.

123. Monica: Yeah, just cutting from Excel into Word, the size problems. Trying to get, especially because all of the accounts, they look perfect in Excel and then the page size in Excel would be different to that in Word. So, you would put it through and you've got half of …

124. Hannah: (interrupts) One year on…

125. Monica: ..one statement on one page and then half on the other and just trying to get it to fit. It was just horrible.

126. Hannah: The problem with the printing was that we had page numbers on the paper but, it might have said 69 on the thing but it was actually in reality 78.

127. Monica: Because the Table of Contents I did in Roman numerals.

128. Hannah: Roman numerals.

129. Researcher: Oh.

130. Monica: So then it was all like…

131. Hannah: (interrupts) About five pages behind.

132. Monica: Behind, yeah.

133. Hannah: So, when we would say, " Oooh, we need to reprint page 60", we would get page 50.

134. Researcher: Because the first few pages of the report were…

135. Hannah: (interrupts) Are not regarded.

136. Sandra: Not supplied as a page.

137. Hannah: Yeah.

138. Monica: So, we are looking on the computer screen saying, " Ok, this is page 50", or whatever.

139. Hannah: At the bottom of the page.

140. Monica: At the bottom of the page but then you've got on the toolbar down the bottom it says you are on page 69 of 120 and so, you get a bit confused on which one you are supposed to follow. It took a bit of working out.

141. General: Laughter.

142. Researcher: Ok, and that always took time, just working through it?

143. General: Yeah, just time.

144. Sandra: Kicking ourselves, wasting 50 pages.

145. Researcher: Time and effort.

146. Bryce: Yeah, identifying problems.

147. Hannah: It was also it was just frustrating. I mean, trying to look for a page that's got a bit of a blunder in it.

148. Researcher: Ok, Um, sounds like it was a real team effort. I was going to ask you about preferred communication methods, but it sounds to me as if in the last week you met

149. Monica: We all came.

150. Hannah: We were always there.

151. Rachel: From 9 o'clock in the morning I think.

152. Monica: Yeah.

153. Hannah: Basically everyday. And everyone was really like, even though like you might have had people dying to put things, it was quite good in that last week we all kind of knew where we were up to. But before that, because before that we weren't really, we were just kind of like, " oh I'm a geek". But in the last week we all sussed each other out.

154. Alistair: Wow.

155. Bryce: Yeah.

156. Researcher: And did you have sufficient computer facilities? Did you have sufficient machinery?

157. Hannah: Yep

158. Monica: Definitely.

159. Hannah: The one downstairs was really good.

160. Rachel: Yeah.

161. Hannah: It was really big and fast.

162. Monica: Yeah.

163. Hannah: And it meant we could all be in that room and all watch.

164. Alistair: Yeah.

165. Researcher: So the key was not how many computers, but having a good computer?

166. General: Yeah.

167. Hannah: You need a big, fast computer and Internet. I remember like with Sandra's one was a bit smaller.

168. Sandra: Yeah.

169. Hannah: And like, a little bit slower and mine is like that too. But if we had it, like getting up to 100, 120 pages..

170. Sandra: (interrupts) Yeah, and it "rrrrrr".

171. Hannah: It sort of didn't really like it but Rachel's computer is really big.

172. Researcher: Ok, um, so would you change anything about the project?

173. Alistair: Hmmm, not really.

174. Hannah: Maybe with the accounts because we were quite lucky in the presentation that we didn't really need to know them but, I think we were all a little bit in the dark about the accounts and stuff. Get a couple of us doing some of it.

175. Researcher: Ok, what about changes in the way you used – you did the report. Would you make any changes?

176. Monica: Shorten it.

177. Hannah: Label the disks.

178. General: Yeah.

179. Researcher: Label Disks?

180. Hannah: Seriously though because we had about 6 blank disks that looked the same.

181. Rachel: Because we would leave our disks there overnight while we were doing something else at our own house.

182. Monica: Hmmm.

183. Rachel: And then so you would bring a new disk in the morning.

184. Bryce: Chaos.

185. Alistair: It was, it was crazy.

186. Rachel: It was pretty hectic.

187. Researcher: Chaos?

188. Hannah: And we probably like, just with paper and stuff.

189. Sandra: We should have just saved on the one disk.

190. Rachel: Yeah, it was so big we should have just saved it on one big disk.

191. Researcher: So one blank disk?

192. General: Hmmm.

193. Researcher: Its almost getting too big for even a single disk though isn't it?

194. General: Yes.

195. Hannah: Because when we first printed it out it was really good I reckon to see it on paper.

196. Researcher: Right.

197. Monica: That's the thing. You can only do a certain amount of editing and everything else on the computer screen.

198. Hannah: It's a lot different.

199. Monica: (interrupts) I personally, I have to be able to see it on paper to be able to read it and edit fully. If it's on the computer screen I just can't follow it as well.

200. Bryce: Hmmm (agreeing).

201. Researcher: Ok, well if we can just follow that. Because you were saying you change some about, to do with bits of paper, and you were saying you really like to see, like to see the paper.

202. Hannah: Yeah, like all the pages together and you can say...

203. Sandra: (interrupts) We highlighted bits we wanted to go back to or reposition it in the Business Plan, and you can't see that on a screen when you see one page. When it's all laid out you can see the green bits and see section, whatever.

204. Researcher: So, how many times did you do that in that week? Print it out and all go over it?

205. Monica: Oh, we printed it out, the draft copies we printed out twice.

206. Hannah: If it was possible we might have even done more.

207. Monica: More.

208. Rachel: Yeah.

209. Hannah: Another one from our disks because it makes it really easy to, just gives a different point of view.

210. Monica: Yeah.

211. Researcher: So, that was easier than actually doing it on the screen?

212. General: Definitely.

213. Monica: Absolutely.

214. Rachel: Just to see the spaces.

215. General: Hmmm.

216. Researcher: Ok, what was it like to work in this group project?

217. Bryce: Sweet as.

218. General: Agreement.

219. Researcher: And the computer? It was cool? What do you think? Did it work for you?

220. General: Yeah.

221. Sandra: It was so much easier because we didn't have to print out the final copy.

222. Hannah: I guess we were quite lucky though.

223. Monica: If we could hand in a disk.

224. Researcher: Hand in a disk?

225. Sandra: Because we had to print out two copies of it.

226. Hannah: Which took three of us a couple of hours.

227. Monica: Because of the hours, because you've got to do it in a good quality print.

228. Hannah: Which takes a couple of seconds per page.

229. Monica: Yeah, which took us around two hours to print it out.

230. Hannah: We were still quite lucky that Rachel's had a really good setup, like..

231. Bryce: (interrupts) The pool table…

232. Sandra: To spread it out on it.

233. Alistair: The pool table was amazing.

234. Hannah: But, I just mean, if we were in a situation where we only had like one computer in a small room or something we couldn't…

235. General: Yeah.

236. Researcher: So, improved printing facilities?

237. Monica: Yeah, faster printer.

238. Bryce: No, it prints when it prints something but up the other way. Puts its on the track. It printed but it…

239. Hannah: (interrupts) It stacked it up itself.

240. Rachel: Kept them in order.

241. Bryce: The page numbers. So, you have to sort of take the top one off and put it on the bottom and then the next one.

242. Hannah: Yeah.

243. Rachel: They are cool like that eh?

244. Researcher: What kind of printer did you use?

245. Rachel: It's like a Canon Bubble jet printer.

246. Hannah: It's quite a good printer.

247. Rachel: It's a good printer.

248. Researcher: Yeah.

249. Hannah: Maybe we should have taken it somewhere else.

250. Rachel: Yeah, they are not fast like laser printers that do a 100 pages per minute kind of thing.

251. General: Laughter.

252. Researcher: Did you consider taking it to Trumps or somewhere like that?

253. Hannah: Yeah, but when you calculate the costs. We are not going to pay to....

254. Monica: (interrupts) And, then also, because on the top of each page we put our logo in colour and to print in colour and to get it printed somewhere in colour it's too expensive.

255. Sandra: We could have taken it to like, I was thinking of my friend where they do things like that all the time, but then we kind of ran out of time you know?

256. General: Yeah.

257. Sandra: You know? So…

258. Alistair: What? About by 10 o'clock it was ready.

259. Sandra: If it had been a day before we could have seriously thought about it again, like the options available.

260. Researcher: Great. Well that's about it. Sounds like it was?

261. Hannah: Pretty much sweet as I reckon.

262. General: Yeah.

263. Sandra: We passed.

264. Hannah: We had a really good group and we all worked, I reckon really well together.

265. Researcher: And so that made a big difference you think, having a really good group?

266. All: Yeah.

267. Sandra: It made all the difference.

268. Monica: Because, I think, that if we had been having arguments and stuff trying to be all in one place hovering over the computer would have made it really difficult.

269. Sandra: I heard of one group that just got so fed up with it that one guy ended up taking the disk and spending like 15 hours on it by himself, editing it all, because everyone was fighting and everyone was like, fed up.

270. Hannah: We were really lucky that we part of…

271. Sandra: (interrupts) That was actually Dennis. Imagine Dennis editing.

272. General: Groan.

273. Researcher: I've heard of similar things.

274. Alistair: Dennis from our class?

275. Sandra: You've just got to do it. Like, Monica and I went back to her house and did the Gantt chart and all the tricky things, the headings and things, And we thought, "Oh" but it just takes so long, like you just don't realize.

276. Researcher: The Gantt chart?

277. Monica: I was lucky because we had no idea what a Gantt chart was, and my mum's a computer trainer and works with Microsoft Project and I just happened to say to her, "is the Gantt chart out of Project?" and she went," yeah", and I said, "wonderful, can you show me how to do this?".

278. Sandra: We were in the dark without her.

279. Monica: I just had no idea.

280. Researcher: So, was that something that you specifically needed help with?

281. Monica: Yes.

282. Sandra: I didn't even know what it was.

283. Researcher: You did not have any…

284. Monica: (interrupts) Didn't have, no knowledge of it at all, and something they expected us to put in having no knowledge about it at all.

285. Alistair: You didn't have any knowledge?

286. Sandra: Unfair. It's not us.

287. Rachel: Imagine the people that didn't have someone like your mum. Like, I wouldn't know where to start finding it.

288. Researcher: Were there any um…

289. Bryce: (interrupts) Table of Contents and that, Headings.

290. Hannah: You call it, days like that, it's pretty sweet.

291. Bryce: Oh yeah, The Headings, the Table of Contents mainly.

292. Rachel: Bit of formatting, yeah

293. Alistair: I used my mother for the accounts.

294. Sandra: Could you reckon if we said, "Bryce Ok you've got to do it all over again can you change the headings". Would you be able to do it? and the new contents?

295. Rachel: I know that it's there.

296. Bryce: It's a learning experience. I wouldn't have a problem.

297. Sandra: Even though they are watching, I don't think they understand what's happened with the printed page and all that, you know? So…

298. Hannah: (interrupts) I don't think you knew all the problems.

299. Bryce: Oh, I don't know.

300. Monica: All the little tricks you pick up in the last…, definitely.

301. Researcher: This is wonderful stuff.

302. Hannah: See, I think.

303. Researcher: So, the Gantt chart and, for you, the Table of Contents were the problems?

304. Bryce: Right, before that, sweet as altogether. We were altogether.

305. Researcher: With all who?

306. Bryce: Yeah.

307. Monica: I think IT last semester made a huge difference.

308. Hannah: Ahhh! That's the pits.

309. Bryce: That's really bad.

310. Monica: That's where we learned to make headings and do things.

311. Hannah Even though we had the worst teacher in the world for IT, just..

312. Alistair: (interrupts) I learnt a hell of a lot more about Excel as well when I was doing my accounts. Easy briefings.

313. Monica: Where did that come from?

314. Alistair: It's finished, I think.

315. Researcher: Ok, the one area that you hadn't had explained to you was the Gantt chart.

316. General: Yes.

317. Researcher: Anything else?

318. Hannah : That was the biggy.

319. Monica: That was.

320. Researcher: Apart from that you had sufficient knowledge.

321. Hannah: Knowledge, yeah.

322. Monica: Yeah, or else knowing where to find knowledge. It was only by coincidence that I happened to say to mum, "Hey is Gantt chart part of Project?". Um, or else we wouldn't have even known where to look for that.

323. Researcher: Right, so you weren't given any instructions?

324. Monica: No.

325. Hannah: No, not really. But, I think if we had say rung up, say our old It Lecturer's or if we had spoken to then…

326. Alistair: (interrupts) All our problems..

327. Hannah: ..and said you know, "we just don't know what we are doing with this project thing. Do you want to give us an hour some day". I think they would have.

328. Researcher: Ok, well thank you.

329. Monica: No problem eh?

330. Hannah: Good luck.

331. Researcher: And if I can collect in any more log sheets or anything.

Appendix D: Group four focus group transcriptions

Members: Troy, Natasha, Neil, Cameron, Jay, Chris

<div align="center">

First meeting: 30th March, 11.30 AM

</div>

Absent: Cameron

1. Researcher: This interview, all its about is getting a baseline of your experience with computers and groups. So, really all I want to do is go round each of you and just find out what experience you've had with computers and groups and any negative or positive things you can remember about that. And if you weren't part of a group, for example, IM2 last semester, then just what basic experience you've got. And then after that we'll talk about this project and what your plans are for this project. And then that's it for this one. Ok? Let's start. Troy, would you like to talk about your experience with computers and groups?

2. Troy: I suppose the one and only time was last semester with the BRR and we did a lot of work individually on our computers and PC's at home and also on the University computers in the labs. We did use one person's PC to do a lot of our work at their house. A single PC, and we basically put all our disks together and wrote them all. Made one big document from them in the disk drive. Didn't cause too much problem. Had problems with the size in our large group working with a lot of work and operating systems and things and like, what you are doing, or something. Had a few issues there, but it was all right.

3. Researcher: OK, cool. Jay?

4. Jay: Yeah, we had the BRR last semester. Sort of the whole- emailing between each other and we often would go to either my place, or Matthew Smith's place, or had one computer and another group member had a laptop. So, that, sort of, with our group cut the tasks in two. It's quite hard to have six people huddling around a computer so, it was quite good being able to split it up in that way. The problems we did have was when the files do get quite big and we had to have Excel and a few other quite heavy documents. It was quite a huge project and trying to email to each other and to make sure everyone had a copy to proof it individually. And in the end when we had to try and get it printed we had to send it to someone's printer. So, the computer didn't get it printed and we just had all sorts of problems because it loses its…

5. Researcher: Formatting?

6. Jay: Yeah, so lost a few files and people were sending things all over the place. So, it sort didn't quite have the gear to, appropriate gear, I think, for something that size.

7. Researcher: Andrew?, sorry, Chris?

8.   Chris: The BRR probably was our main project. We had to use the computer a great deal more. Internet wise or email wise my group we didn't actually use it a lot, at all. That may have been because so many group members didn't actually have Internet access at home or didn't really achieve that sort of usage system. But what we remember of it was bringing disks everywhere and trying as we went away and worked on different disciplines. We don't have to do that now. One major problem we did have was transferring all the stuff into one file, press the save button to go onto disk and we didn't have the disk in the machine, we had the wrong disk in the machine, we kept swapping and changing. I watched it do it, and the whole thing just crashed. Ended up with this big coded thing on the screen. That really ruined the whole thing so, that took us quite a while.

9.   Researcher: Because it kept swapping the disks?

10.   Chris: Kept swapping the disks in and out without closing that file. Computer thought that disk was still in the machine and we would chuck a different disk in and it wouldn't register and then we would have major problems. That was quite a frustrating experience in itself. How to remedy that? Obviously it would be better if we were working closer as a group and hadn't gone to the same file at one stage rather than trying to collate the whole thing, or maybe used an email system so that you just have it straight into your file. It was not such a good experience but with this group we've already started to communicate with email.

11.   Researcher: So you are using email for this project rather than disks?

12.   Chris: Yeah, we have today but we haven't done any work obviously at this stage. We are at the stage, most of its just email for communicating, arranging the accounts, the prelim report, and email each other's registration of interest.

13.   Researcher: Ok. Natasha?

14.   Natasha: For our BRR group there was only three of us ended up being in the group. It wasn't very, the group dynamics… My stream had to do it all…. We mainly worked from one computer which had Excel, but I had Claris Works so it was a bit of a mission trying to clear email, which, it wouldn't download by itself so we had to come in here which was a central place where we could all check our email in the write up. It was all from Windows so we all got together, because there was only three of us. One computer was fine to convert it all. I don't really know how it could have been better.

15.   Researcher: Ok, Neil?

16.   Neil: I was in Jay's group, which really was good because we had access to two computers -a laptop computer, which Jay has covered. Prior to the BRR we had a problem mainly with access to a computer. At my home I had to use my father's computer and, like, his operating system was 95 and so it wasn't compatible with AUT so I had to just send, say a cover sheet or something from AUT to his place and I would get some kind of cryptic code. I couldn't

understand it. Perhaps if we had like, backing up for our BRR. It would have been good if we had access to a zip drive but it's just, you know, it doesn't get done.

17. Researcher: So, you and Jay were in the same group, and the rest of you were in the same…

18. Neil: (interrupts) In the first semester.

19. Researcher: So, what was the major problem, if you can think of a major problem, to do with group work and the BRR?

20. Chris: I would say group dynamics like, with my group. My group had a problem with distribution of work load.

21. Natasha: (interrupts) And with my group when you write.

22. Chris: Exactly.

23. Troy: And also I think like when there's, most likely, there's one computer or something. If you have a network or something and you are working on the same file in real time, I think that would really help, because quite often there are people sitting around while someone is typing in at the computer and like, you think of ideas and you can't get it down, then its gone by the time you get a go. I would love to have a room where you have stacks of PC's all networked and you could work in real time.

24. Researcher: In real time rather than sending it a day later or back and forth a few hours later?

25. Troy: Because, once you start sending it and transporting it there's the problem of files being misread and lost and the formatting and anyway you want it as simple as possible.

26. Jay: And just help if you, like, have one or two computers, you still have quite a big group, and you've got people who aren't as motivated and they tend to just sit back in the background and not contribute. They use that as an excuse not to do anything.

27. Chris: In my group a couple of girls got quite frustrated with computers. Didn't want any help and get on or anything. They didn't want to do anything like type up their section, transfer files or doing additional work like the table of contents and that sort of thing. They wanted to steer clear of it. The statistics side they left most of it.

28. Troy: With Minitab trying to incorporate, you know when its quite a new program for everybody, incorporating that was a little bit of trouble, you know, on the technical side of it.

29. Researcher: And what about Cameron? He's not here.

30.   Jay: He was in our group actually, my sister as well. So, he had the laptop.

31.   Researcher: Ok, the second thing is this project. What is your project about and what plan do you have so far to do it?

32.   Jay: At this stage we've decided to look at a Deli. Our angle on it is to have it late, open late, so that people have access to it after hours.

33.   Troy: And delivery.

34.   Jay: And also have a delivery service for good food and alcohol.

35.   Chris: And have Internet access for ordering.

36.   Researcher: So, Internet ordering for the Deli or Internet access at the Deli?

37.   Chris: At the Deli.

38.   Troy: People can place orders through on line – on line ordering.

39.   Researcher: And your plan for putting it together, so far?

40.   Natasha: Well, we've got to set up the questionnaire. Design it. And, like the prelim report is due back on Monday.

41.   Chris: Yes, we'll be pretty interested to see that and get some feedback. Obviously we need to research the market, because Auckland is pretty competitive. It's a bit of a cut throat industry so …

42.   Jay: (interrupts) We just want to see how viable it is.

43.   Troy: Yeah, because we really haven't planned past that have we? We've got the survey in mind but we haven't really planned until after we look at the prelim.

44.   Jay: We haven't really. We all have good ideas but none that we felt that we can run with.

45.   Natasha: We thought that we would have no front of house at all. An all Internet based Deli.

46.   Neil: (interrupts)Virtual.

47.   Natasha: But then, especially with the one idea that kept coming across was, a lot of people were saying that a really important thing was to have on line and off line presence.

48.   Chris: E commerce is heading towards e business for us.

49.   Troy: Yes, you need both don't you?

50.   Researcher: Great.

51.   Chris: So, we're heading, maybe while doing up the prelim, we all had our own preconceptions of the idea. The more we've done on it, the more we are feeling a bit more positive, anyway. Hopefully you know, all going well with the prelim report, a bit of feedback, I think we are ready to get on with it.

52.   Researcher: Cool, Ok well that's probably enough for now.

Second meeting. 13th May, 9.30 AM

1.   Researcher: Ok, what I have here is some impressions from the first meeting that I wrote down. So, I can go through what I found out and what my impressions were from the first meeting and you can feel free to comment, or say anything you want about that. So, I can talk about that first and then just talk more about the current project…. Um, and also Cam and Neil are not here which is a bit of a concern because you were saying they were the slackest in the group.

2.   Jay: Well they are not, they're not, they just…

3.   Chris: (interrupts) Not turning up.

4.   Researcher: They are not turning up?

5.   Nat: Not really interested in group sections.

6.   Researcher: And Cameron wasn't here for the first one either. So, for the last meeting, which is, we have one more meeting, if we could get those guys to come that would be really good. Get their view on things. Um, Ok this is what I found. Everybody in the group did the Business Research Report last semester. So, these are reflections from what was said in the last meeting. Um, most of you were in shared groups either in IM1 or IM2, and Neil, Jay and Cameron did the same Business Research Report?

7.   Jay and Chris: Yep.

8.   Researcher: And the rest were together in IM1, is that right?

9.   Troy and Chris: No.

10.   Jay: It was just Neil, Cameron and I that have been together the whole time.

11.   Researcher: So, the rest of you weren't doing a, did you do a group project together in IM1? Or were you just in the same stream?

12.   Natasha: Just in the same stream, Virginia's stream.

13.   Chris: And I wasn't in the same class with any of them.

14.   Troy: We did the same globalisation together, the presentation of that.

15.   Researcher: Oh ok, so you did a presentation but not a group project?

16.   Troy: No, not a project.

17.   Researcher: Ok.

18.   Jay: Uh, good morning! (Cameron arrives)

19.   Cameron: Neils coming as well.

20.   Researcher: Is he? Welcome, join us. We are just going through what I found from the first meeting. Um, just found that three of you were in the same group. In the same Business Research Report and the rest have done IM1 and IM2. So, no outsiders. Nobody from Sport and Rec. or anyone like that. So you've all had to do group projects before. Um, one major problem was identified with coordinating a big document within a group. Allly people worked on sections individually and then put them together using disks or email. Allly thought that the idea of one large one group working on one document was difficult and near impossible. As Jay said, "Its quite difficult to have six people huddling around a computer". Some of the group mentioned that it is easier to transfer files via email rather than disk due to technical reasons, ie: system crashing if using multiple disks, problems with disks going in and out. Others talked about the benefits of having a second computer, a laptop available. And Troy mentioned that an ideal solution would be to have people working on multiple networked computers in real time, rather than have everything on one, to avoid inefficiency, I think you said?

21.   Troy: I was making it up.

22.   All: Laughter.

23.   Researcher: You all mentioned difficulty with some of the more technical aspects of the use of computers, for example, Minitab and other Statistics work, and that some people were not really up to this. There's nobody here that you, I think you were talking about. People in groups in previous semesters. And also you talked about the importance of how group dynamics, and how, you know, if the group breaks down the project breaks down. I got the impression that this group is pretty knowledgeable and experienced with computers and serious about using them, but have experienced real practical problems in the past with using them in a group context. The major problem being the difficulty to work on a single document, or report together as a group and that this can lead to like a subgroup doing most of the work which is basically unfair. I also wrote down, now these are all impressions so you can comment. However, the group is willing to look at alternatives and can see the benefits of communicating via email. So, those are my impressions from the

first little meeting we had and so feel to comment or disagree or agree or add to that.

24.   Troy: No, that sounds like a reasonable…

25.   Chris: (interrupts) Summing up.

26.   Troy: Yep.

27.   Researcher: Well great.

28.   Chris: You got the approval there.

29.   Researcher: Well Yeah, last week for example, I had a group argue with me for half an hour.

30.   Jay: No that's great.

31.   Researcher: Well, the present project. Where are you up to with the present project?

32.   Natasha: We have decided to pair up. Essentially Jay and I are working on Marketing. Neil and Cam are going to do Accounting and IT.

33.   Researcher: Neil and Cam Accounting and IT?

34.   Natasha: Yes, and Troy and Chris are doing Human Resources.

35.   Troy: Human Resources and the Management side.

36.   Natasha: And as we do a little bit of work we will email it to Neil because he's got a pretty grunty computer.

37.   Jay: And then, when that parts done, we'll all sort of get together and work on it as a team, I suppose.

38.   Troy: Sort of not allowed to mix computers. Will have a "home" computer that's going to be the heart of everything. We'll send stuff to Neil's once we have got bits. So, just incorporate that into the one document.

39.   Nat: And then we'll send it to you once a week, for backup.

40.   Troy: Yeah, backup once a week to mine.

41.   Chris: I have sussed out a source for printing out just for reference at the end. My girlfriend's got a huge printer at her work. So, we can all get it done there.

42.   Jay: Oh, good.

43.   Nat: Yay.

44. Researcher: That's a good resource.

45. All: Laughter.

46. Nat: Oh, its painful trying to get it printed.

47. Researcher: So, Neil's computer, which is the best computer in the group, you will all be sending it to him by email?

48. Troy and Chris: Yep.

49. Researcher: So, working on it separately, completely separately, sending it to him.

50. Chris: Oh, that'll, Cam doing his on disk.

51. Researcher: So, Cam is going to do his on disk?

52. Chris: Yep.

53. Researcher: And the rest of you will email, or disk?

54. Chris: Yeah.

55. Nat: Not doing any formatting like, we will just be incorporating, like the, you are doing one bit. We will leave fonts and sizes and…

56. Troy: (interrupts) We will leave them. There's a problem with the Table of Contents, like in our BRR we also identified that once you kind of merged stuff that people just started to make it look pretty themselves and formatted headings and stuff and it was…

57. Jay: (interrupts) It was different...

58. Troy: The Table of Contents was quite a task to put behind in the BRR.

59. Chris: It was a nightmare.

60. Jay: It wasn't nice was it because Neil, Cam, and I did it all.

61. Cameron: Never mind.

62. Researcher: And is the topic the same? Um…

63. Nat: A café, Deli.

64. Chris: There have probably been changes to it probably since we last talked. We've gone away from the whole Internet sale thing.

65. Researcher: You've gone away from that?

66. Chris: Yeah, the eCommerce sort of thing. And we've gone away from the delivery.

67. Jay: Things we are looking at for the future.

68. Troy: (interrupts) But they will definitely be in our…

69. Jay: Our five year plan

70. Nat: We have to scrap the whole page altogether?

71. Chris: I wouldn't think so. We might sort of advertise our e cuisine guide. Some sort of Internet cuisine guide. And advertise that and we will definitely have our own address, but probably not our own site.

72. Nat: Because we are still trying to sort our on-line and off-line presence.

73. Troy: We have really simplified it, you know because it was a lot of work. We took a few things out just to make it a lot easier to put together as a project.

74. Researcher: So, you simplified it down, separated it into components, work on it independently, and then come together at the end?

75. Troy: We started to, yeah. We've only got a few, not really, well we haven't made any decisions but we've had a look at a few ideas and we are working on them, but we need to decide, discuss how much…

76. Chris: (interrupts) Of each section that is actually being covered.

77. Researcher: Do you think that this is a good idea? Doing a group project like this where, you know, you are all off doing your own separate things and then putting it together?

78. Jay: It's just simply the logistics of getting everyone together at once. Its near impossible, you know everyone's got work or, whatever, activities and its just, they are quite difficult to coordinate.

79. Troy: Yeah, I think it would work out good, you know, if we all got together and did it together but it's just that you simply have to give people something to do, basically. I mean, you know, off by themselves you know longer have to do this, or be part of the group.

80. Jay: You are not wasting time because the time is your own.

81. Chris: Yeah, I can do that, and that, sort of thing.

82. Researcher: So, this is a fairly efficient way of doing things?

83. Jay: At this stage, yeah.

84. Troy: Yeah.

85. Jay: Ask us in another week.

86. All: Laughter.

87. Researcher: What do you think the most difficult part of it is? This section or towards the end, or?

88. Chris: (interrupts) The start of it.

89. Nat: Yeah, the start of it.

90. Jay: Lifting our game really, after our exams

91. Chris: Definitely.

92. Jay: Change focus and realise like, "Oh, we've got deadlines coming up"

93. Troy: I like getting the focus eh? You know, because I'm a bit of unsure about our plans like everyone else is. We just want to know exactly what it is.

94. Chris: Yeah, even now it seems maybe we still need to clarify, like, 100%, what our business is again. Because we are saying now that maybe we are not going to have a website and maybe, Nat, but we still were which I am not too sure whether we are, or aren't. I don't. I thought we had gone away from the website thing?

95. Nat: Yes, it seems communication, or lack of.

96. Chris: Sorry?

97. Nat: We've gone away from the on-line ordering.

98. Chris: Yeah.

99. Troy: What about sending the site to Manukau? Is that still?

100. All: Laughter.

101. Troy: Hell of a week last week.

102. Chris: How much work are you going to pay the staff to generate some things? We were unsure as regards to what, how high a quality of service we were seeking, therefore, how were expected to pay for their service. To get our staff together and so, we were a bit unsure, you know, exactly where we were positioned and so what to pay our staff.

103. Jay: How much each gets paid and so on

104. Troy: Take away $20 pre week for donuts and so on.

105. Researcher: And how are the log sheets going?

106. Nat: Yep.

107. Chris: Mines fairly small.

108. Cameron: Its mainly emails and stuff.

109. Researcher: That's fine. I mean it doesn't matter if its small.

110. Chris: At the time we had the last meeting, obviously, especially after that we were working on the survey and what have you, and so there was a fair bit of communication going on. But after that, while the exams were going on, we haven't concentrated on the Business Plan at all. It's really been purely exam focussed. It's just over the last week, sort of slowly again.

111. Researcher: Well the exams will be a pretty big chunk of work. What percentage were the exams?

112. Chris, Troy, Jay: 30%

113. Researcher: And so, this Business Project will total about.

114. Cameron: 40 marks.

115. Troy: Total of 40%. The plans worth 30 and the presentations worth 10.

116. Cameron: So the prelim was worth 10 marks was it?

117. Troy: 5%

118. Researcher: OK, Cameron. You weren't here for the first interview so, maybe you can just talk about your experience last semester with the Business Research Report. Positive, negative.

119. Cameron: Overall, I would say it was positive, but there was a few negative aspects to it. But those negatives I would say solely related to members of the group.

120. Researcher: So, not the project itself but, more the?

121. Cameron: More the interaction, all that kind of thing. I was working with Jay and that was the saving grace. There was more, I can't say much for various reasons.

122. Researcher: I get the impression with these group projects that, it always comes down to, the key is to have a group of people, or some group of people, that tie it altogether at the end?

123. Jay: It's all to a degree though. I mean at this stage we are all quite separate. Three groups.

124. Researcher: All three groups working separately.

125. Chris: Hopefully by next week we will be one, be able to look at a reasonable amount of data in front of us and all go through it.

126. Nat: Sort of a research station.

127. Chris: Because we are doing ground work now which maybe we can do a little more efficiently rather than small groups but, hopefully sometime next week we will be back together.

128. Researcher: So, working on it separately, sending it to Neil's, and then come together at Neil's. Will you be coming together at Neil's or will doing it via email or?

129. Cameron: Yeah, we will be together at Neil's

130. Researcher: So, if you were redesigning this course, redesigning IM3. Would there be one thing you would change?

131. Troy: I think it's all right.

132. Jay: It is good.

133. Researcher: What's it like to work in a group? Is it a positive experience or is it a bit of a pain?

134. Troy: Positive experience, positive, but not easy. I mean you accept it, you know. You learn good skills, but you are not always happy doing it, but nothing worthwhile is, you know, you work on your time skills.

135. Chris: It's a huge jump though when you think the biggest group assignment we've had was the BRR, which was really not a big assignment. This Business report is huge, you know.

136. Researcher: Do you think it's unrealistic?

137. Chris: Oh no. I thinks it's, yeah, maybe the assignments in IM2 and IM1 should be more towards this.

138. Troy: But some of the weightings in IM3 are funny eh? I mean look at that essay, like, 20%. That's only 30% for this. You know?

139. Cameron: But that quite a lot of work, its all your own work. A couple of weekends. And this is going to be like…

140. Chris: (interrupts) You are able, through your individual effort of your essay, to make a good contribution to your marks. I guess you don't necessarily want a group thing to influence too much of your, I mean that's maybe why. It does seem, I mean, this is only a third more for so much work but you know.

141. Jay: I think a lot of other groups are having problems.

142. Chris: I mean I look at Dennis who just walked in there and every time he's been his group is not there. I am just wondering how the hell his group is going to get an assignment together. Its just really concerning.

143. Researcher: Does it have to be, isn't it something that could be done without you actually coming together face to face with? I mean, how much face to face do you need with this?

144. Nat: Particularly with Businesses.

145. Troy: Maybe not with the work but you need cohesion.

146. Jay: It's about communication really. I mean, you can communicate through email, but you do lose a lot with the written word.

147. Chris: (interrupts) And it takes time.

148. Jay: Yes, misunderstandings occur.

149. Chris: I mean, you have to wait for a reply. You can't get things done then and there. I think that, to get the ball rolling, you've got to be in a group face to face. You've got to set yourself objectives.

150. Troy: You need commitment too eh? You know you see the person, you see them, and you know, I've got to do, I've got to perform.

151. Researcher: Ok, well that's probably enough for now.

Meeting Three 5th June 12 noon DW

Absent Chris and Neil

1. Researcher: Ok, we are in the home straight because this is the third and final meeting. Thanks a lot for coming. I've got some notes from the last meeting that I just want to talk through just to check that I'm on the right track from the last meeting. And then I just want to find out about the remainder of the project, how that went, and then just a few other questions. So, from the last meeting this is what I found: The topic of project is still the same, a Café, but less web presence. No on-line ordering, probably just a web site. Chris mentioned that you have really "simplified it" down from the original idea to

make it easier. The group had decided to divide up the project into pairs: So, Jay and Nat on Marketing, Neil and Cam on Accounting and IT, and Troy and Chris on Human Resources and the Management side. The plan was to send everything to Neil's computer with backups once a week to Troy's, ie: use a "home" computer to avoid mix ups. Chris had a good source for printing. The strategy was for three groups to work separately and then come together as one in the following week. This is the last meeting, for final editing. As Jay pointed out this was chosen because of the logistics involved in getting everyone together. This wastes the least time. The group identified potential problems with incorporation into one document, in particular with the Table of Contents and with different formats so had decided to leave any formatting to the final report. You were all pretty positive about the concept of a group project involving computers. That it's not easy, but involves many different skills and is realistic. So that's from the last meeting. Any comments on that from the last meeting? Any places I've got it wrong?

2. Natasha: You got it pretty right. We ended up doing this as you said in the last meeting.

3. Researcher: So, you did it as planned?

4. Nat: Yeah, basically. It was a bit later than expected. But it did go pretty much as planned.

5. Researcher: Ok, so it went through Neil's computer?

6. Nat: All the formatting.

7. Researcher: And so, from the last meeting you were all going to work in three separate groups and then come together. Where did you do that?

8. Troy: Did it at Neil's. Sort of last week it got put together. That sort of, at that stage it was all on Neil's.

9. Researcher: Ok, last time you talked a lot about formatting issues. Did you have many problems this time?

10. Cam: Yep, did like one 15 hour day and a 12 hour day. It was a pain.

11. Researcher: So, you did one 15 hour day?

12. Cam: Yep.

13. Researcher: And one?

14. Cam: 12 hour day.

15. Jay: With lots of instructions.

16. Nat: With supplements.

17.   Cam: Developed quite an intimate relationship with the computer.

18.   Researcher: So, just you?

19.   Cam: Me and Neil, and dribs and drabs went elsewhere.

20.   Researcher: Sounds like it was not a positive experience?

21.   Cam: No, it was fine (laughter). We knew it was coming. We knew it was going to be like that.

22.   Jay: But it ended up being completely unfair, I mean Neil and Cam did most of the work and the rest just…

23.   Cam: (interrupts) It's just the way it worked out…

24.   Jay: I mean with editing its like, you can't have six people sitting around editing.

25.   Nat: No, and you can't have one person pick up where another one left off.

26.   Researcher: Ok, this is a really important part of the whole research is its unfairness. Can you see any other way around it or do you think its?

27.   Cam: (interrupts) Not really. I mean, I'm sure there would be but if you want a consistent report.

28.   Nat: Yeah.

29.   Jay: But if Neil and Cam maybe, or whoever, did all the final editing but didn't do anything else.

30.   Troy: But on Friday we…

31.   Cam: (interrupts) Gave it to Chris and to Troy. That got done over the weekend formatting and editing as well.

32.   Jay: Yes you were still here and taking over and doing the…

33.   Troy: (interrupts) Yeah, like Chris and I for the weekend sent it back and forth. You know we had two meetings at my house.

34.   Researcher: Can you go over that again? So, you took over some of the formatting?

35.   Troy: Well, after the …meltdown. Chris was there and so me and Chris took over from there.

36.   Nat: Yeah.

37.   Researcher: Ok, well let me delve into this further. After the "meltdown", what meltdown?

38.   Cam: It wasn't a meltdown.

39.   Troy: Well, it wasn't a meltdown, just needed a change of freshness or something perhaps.

40.   Cam: Yeah.

41.   Jay: Cam was exhausted.

42.   Cam: I couldn't even see straight.

43.   Researcher: This was after the 15 hours and the 12 hours?

44.   Jay: Friday night. It was Friday night wasn't it?

45.   Nat: And Neil had to go to work.

46.   Cam: Yeah, Neil had to go to work.

47.   Nat: It was five o'clock and so it was like…

48.   Jay: Email the troops in!

49.   Troy: Because Chris came round to my place Friday night and said he's had enough of this and so, yeah, just do the Table of contents and a bit of editing and add on the appendices. Chris did the whole formatting and just took it from there.

50.   Researcher: So was this still at Neil's place or had it moved?

51.   Troy: To my place.

52.   Researcher: So, you did the 15 hour plus the 12 hour at Neil's place?

53.   Cam: Yeah, that was Wednesday. A lot of time during the week and I just really wanted to have it done by Thursday and went through Friday because Thursday night it all went bung again didn't it?

54.   Troy: Yeah.

55.   Researcher: What went bung?

56.   Cam: Oh, just formatting. The software just kept doing things for no apparent reason whatsoever. We just love Microsoft (laughs).

57.   Researcher: So, the software?

58. Cam: (interrupts) Just kept changing things for no reason.

59. Jay: You would tab it and you would lose paragraphs. Its like…

60. Nat: (interrupts) It kept defaulting to things we didn't want.

61. Jay: You are not being sponsored by Microsoft are you?

62. Cam: You would just push tab and things would disappear. We thought we had it done by Thursday and by Friday, we started early on Friday again, which we didn't aim to do, and come Friday six o'clock, we are still sitting there and, its like…

63. Researcher: And so six PM, still sitting there?

64. Troy: But the funny thing is once it got to my PC everything went like "hmmm", but until, like, a day later, then it started doing the same thing. Once it gets transferred its, like, the Table of Contents took us half an hour literally, but then things started to do slowly the same thing. They just seem to go until, like, last night it was starting to change the file type and things automatically.

65. Researcher: The file type?

66. Troy: You know to a dat file and stuff and it was just when we were trying to print it out and when we opened it up it was a dat file and its just like?

67. Researcher: Where did you print it out? Chris had some source.

68. Troy: Yeah, it went to Chris's girlfriend. At her work.

69. Researcher: And that was ok?

70. Cam: Yeah, and like I had done a backup (shows it).

71. Researcher: All right. So, eventually when did you print it out? Sunday night, Monday?

72. Troy: Yeah, this morning. Chris did the final copy. I think it was printed it out around three or no, I think we finished it at five and we must have printed it out at about 7.30 this morning at his girlfriend's.

73. Researcher: His girlfriend's work. Ok, now how many face-to-face meetings did you have as a group? How was the communication going back and forward during all this process?

74. Nat: I put down eight.

75. Jay: I've got half a dozen.

76. Troy: I put down 20, but it' probably in hindsight more than anything.

77. Nat: That's probably segregated out, I mean, probably 20.

78. Researcher: 20 meetings face-to-face but…

79. Troy: (interrupts) Not all six, yeah.

80. Jay: Not all six, no.

81. Troy: There's a lot of peer meetings.

82. Jay: Bits.

83. Nat: And Jay's come to many meetings.

84. Researcher: What about other forms of communication, email, telephone, text messaging. Any idea of, going back and forward, which was the preferred?

85. Nat: Jay and I towards the end on the phone. Just the last bits and pieces. Just instead of email.

86. Troy: Also email towards the end. Like Chris and I emailed, just on-line.

87. Researcher: Did that make a difference being on line?

88. Troy: It did, because what we were doing was sending the document backwards and forwards like I would come back and find the whole document.

89. Researcher: Yep, so it was good for sending the document?

90. Troy: Right up until the end.

91. Researcher: Ok, given the issues you had with putting the project together, do you think it was, you were constrained by the task? Is that the main reason you did it like that? Because you were told to do, the project, the briefing?

92. All: (no reply).

93. Researcher: I mean, how much?

94. Nat: You mean the fact that we had divided it up?

95. Researcher: Yeah, the way that it ended up, the small groups and doing that. Was that the nature of the beast? Was that how you chose to do it?

96. Nat: We chose to that way.

97. Researcher: You chose to do it that way?

98.   Nat: Yeah, that's the only way to do it.

99.   Troy: Yeah, there's no other way.

100.   Nat: It all worked reasonably. We just, emailing it off to Cameron and Neil's computer. That was all pretty fine except for different versions, compatibility of computers and that sort of stuff.

101.   Researcher: I was just thinking to what extent, how the task is designed, you know, you are told to do this and how much that dictates how you go about doing it.

102.   Nat: We chose to do it that way.

103.   Troy: No one really told us what to do, I don't think. Like there's no sort of, no one said, "these are our recommended ways of doing it". I don't remember.

104.   Nat: No, it was up to us.

105.   Researcher: Ok. Access to computers and facilities. What do you think about the facilities that you had access to? Did you have enough or did you need more?

106.   Cam: We had lots of computers. It was strange. We had three laptops, and four PCs between us, as well. But it was the location. That was an issue eh? Everyone has access to a laptop, two laptops? But there was a problem created by the size of the file like we really did need a CD burner, it was drain. Also our email addresses. Like our hotmail mailboxes couldn't receive it because it was too big.

107.   Researcher: Too big?

108.   Jay: Hmmm.

109.   Troy: There's also that conflict you know because you need the group to be together but then you can't work together computer-wise with the whole group. So, you need the group but you also need the computer going at the same time.

110.   Jay: It's pretty much like this (hunches) with a laptop.

111.   Nat: But if they are all connected together.

112.   Troy: Yeah

113.   Researcher: So, ideally, if you name the resources that you could use what would be? Would it be a lab? Would it be a room like this? [1]

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[1] The group interview was held in a computer laboratory at AUT.

114. Troy: Yeah, networked.

115. Nat: Each with a laptop.

116. Jay: Yeah, definitely, connected to a mother ship, or online.

117. Researcher: Ok, so what was it like to do this project? I mean, if you were going to use some words what was it like? Listening to you before talking about the meltdown.

118. Cam: Challenging, I mean, it wasn't too traumatising.

119. Nat: Challenging.

120. Jay: In fact the meltdown was the worst.

121. Researcher: Challenging, not too traumatising?

122. Cam: Quite stressful when you're pushing towards a deadline and you really want to get it done and software is just doing things that it has not been told to do and it's randomly formatting things for you. You can't seem to get it together.

123. Nat: We also put pressure on ourselves because we all wanted to get it finished by Friday and although like, it wasn't 100 percent, it was, but still, it was good.

124. Troy: It was good.

125. Researcher: So, you felt pressured?

126. Cam: Yeah, that was something else.

127. Troy: Yeah, I mean that's, I've never had an assignment that's not like that you know? Always, assignments are going to be pressured.

128. Nat: Yeah.

129. Cam: Its more irritating because the work was actually done but the configuration wasn't.

130. Researcher: So, the work, the content work had been completed?

131. Nat: Yeah, that was good.

132. Researcher: Way back?

133. Cam: Not way back but there were still dribs and drabs coming in but the majority of the document had been done by Tuesday, Wednesday, minus a few bits.

134. Troy: There was still a wee bit to add in the weekend, editing and stuff like that.

135. Cam: For sure, yeah.

136. Troy: Just a few sections to integrate a bit more.

137. Researcher: Ok.

138. Nat: I enjoyed it. I mean it was the group.

139. Researcher: So, the group thing was enjoyable?

140. Cam: Yeah.

141. Nat: When we all came together it was fun.

142. Researcher: Working together was fun but not, the technical side was?

143. Nat: Just towards the end.

144. Troy: Yeah. I think it's better when you have it together in front of you and then you work on it. I mean, it's all together and you sort of, you know, improving it, rather than that initial, trying to get the stuff together. That's a pain in the arse, like trying to get everyone's stuff, you know? Like, once it's in one document, it seems like that's worthwhile. You can all work on it and you can see it and change it and it's not, you are not outside anything any more.

145. Researcher: So, the lead up to it when you were working individually is not as much, not as enjoyable?

146. Troy: It's not as enjoyable but also more I think, worrying.

147. Cam: That's when you are getting the master document.

148. Troy: Because you are worrying about, you know, is this going to work with the other person's stuff or, what is it that other people have got. You know, you don't know if you are on the right track, like, once you can see everything.

149. Cam: (interrupts) So much clearer once you've got everyone's files. There's all these different file names and stuff. Sometimes you would like to know what is the right one, which one is the most recent one.

150. Researcher: Ok, So, when it got together finally on Neil's computer, that's when you say the real group work started? In the last week or?

151. Troy: Well, probably not the whole week but, you know, it's still be good, I think, it's just impossible to have six people around a computer, as Jay said. But that was considered and shifts came in to work on it.

152. Nat: That was just the easiest way of doing it, the assignment. It was satisfying.

153. Researcher: Ok, I just have one last question. What did your view of the computer with group projects? How do you see them?

154. Jay: A useful tool but you need the right equipment.

155. Troy: I learned heaps too. Like, heaps of functions.

156. Jay: You are a wiz!!

157. Troy: On Word eh, I found heaps that I didn't know were there eh? And I just found another one the other day for editing and stuff. Like I was using comments and yeah, and there is heaps to try out next time, just in Word and Excel there's heaps of stuff that I didn't know about which is really useful.

158. Researcher: And that was part of the project, you found it was?

159. Troy: Yeah, I learned lots of stuff, picking up stuff from other people. Only like little tips and stuff, like I found a little overwrite button in Word. That started to do it sometimes and no one knew how.

160. Nat: Yeah.

161. Troy: (interrupts) But I worked out how to turn it off.

162. Researcher: Ok.

163. Troy: Oh yes, track changes.

164. Researcher: Track changes?

165. Troy: That was it. At the end, all the time, it was really useful to see what was happening when we were editing and that.

166. Nat: We were very efficient in terms of printing out, and doing printing and changing paragraphs around.

167. Researcher: So, it's very?

168. Nat: Efficient.

169. Researcher: Efficient?

170. Nat: You can delete, so it's easy.

171. Researcher: So, it's an efficient way of?

172. Nat: (interrupts) Yeah, doing a project?

173. Troy: Yeah, it was 27,000 words.

174. Nat: Yeah, it was pretty big.

175. Researcher: Ok, well any last comments on the machine? On the computer project?

176. Jay: Burn the computer. No, don't quote me on that one.

177. Cam: You definitely produce on it eh?. You can't really have it all done in..

178. Jay: (interrupts) Yeah.

179. Troy: And implement the most decent software and processing unit and hardware and stuff, eh?

180. Jay: You really need to say that to you when you sign up for the course. That you need to computer generate reports.

181. Troy: And have good expectations for filing around and all that sort of stuff.

182. Researcher: At home?

183. Troy: If you are disadvantaged in that way it will really make the course a struggle.

184. Jay: Just the whole thing.

185. Nat: Did they show us the WinZip thing last semester?

186. Jay and Troy: No.

187. Nat: Maybe just, go through all that sort of thing.

188. Jay and Troy: Yeah.

189. Nat: Just to make it easier because it is quite a huge, and it's not realistic to use the lab computers at AUT.

190. Troy: Yeah it's a pity because they are fast and stuff but just where they are at.

191. Jay: Yeah, and trying to book a room and you know, you've got to get into town and parking is a nightmare.

192. Researcher: So, you didn't end up using AUT's computers facilities much at all?

193. Camp: I didn't, not once.

194. Troy: I…

195. Jay: (interrupts) I mentioned that I used it a little bit.

196. Nat: I used them quite a bit because I've got Macintosh software at home. I've got ClarisWorks, which is of course different. So, I was in here doing quite a bit of work and then, which isn't Mac compatible, and then save it as a text file and I would take it home.

197. Jay: But even then you would have problems.

198. Nat: But even then I would have problems because mine isn't quite.

199. Cam: It couldn't read it.

200. Researcher: It couldn't read it?

201. Nat: And so, then I would back and save it as. But it was fine, like, it went across later.

202. Jay: But everyone has to be compatible. We don't think much of Microsoft as a program. You don't work for Microsoft.

203. Researcher: No, well, Ok, thank you very much.

204. Jay: A pleasure, hope it been of use.

Meeting Four 7th June 12 noon

Note: with Neil and Chris only

1. Researcher: Ok, I just want to cover what we did in the meeting with the other four members and go over some of the points that we raised. The first thing I did is I talked about what I discovered in the last meeting. Just that you were still doing a café, but with less web presence– no on-line ordering, probably just a web site. I think you (Chris) mentioned that you have really "simplified it" from the original idea. And the idea at that stage was to divide it up into pairs: Jay and Nat on Marketing, Neil and Cam on Accounting and IT, and Troy and Chris on Human Resources and the Management side. The plan was to send everything to Neil's house, to Neil's computer with backups once a week to Troy's, ie: use a "home" computer to avoid mix ups. Chris had a good source for printing. The strategy was for three groups to work separately and then come together as one, for final editing. Jay pointed out this was chosen because of the logistics in getting everyone together – it wasted the least time. And you identified some potential problems with using one document, in

particular the Table of Contents and with different formats so you had decided to leave any formatting to the final report. But in the last meeting, in the second meeting the group were all fairly positive about the whole idea. So that was from the last full meeting. Any comments or?

2.   Chris: That's a good summary, actually. And actually listening to that now, listening to what we said at that stage, I think it sounds like we actually stuck to that pretty well.

3.   Researcher: Ok, so how did the report come together following from that meeting? I heard the rest of the group members but from your two perspectives'?

4.   Neil: We spent a lot of hours on it in the last six days. Ten hours last night, formatting the whole thing and finally doing the accounting stuff as well.

5.   Researcher: Who's we?

6.   Neil: Me. Cam, and Chris and Troy.

7.   Researcher: Yeah, that pretty much matches what Cameron said in the meeting.

8.   Neil: It got very, very sort of tedious. Just sort of little formatting of many little things because our operating skills of Microsoft are just, Microsoft, things jumping around.

9.   Researcher: I think Cameron talked about having a bit of a blow out at one stage.

10.   Neil: Yeah.

11.   Researcher: What happened there?

12.   Neil: He just sort of, you know, sitting at the computer for five hours straight, say, at a time. And then highlighting something and making it go bold and then having the whole document go bold or something. Causes you to blow out basically.

13.   Researcher: And this was at your place?

14.   Neil: This was at my place and then, on my keyboard there was this..

15.   Chris: (interrupts) A Power button, a delete button, usually where the delete button is.

16.   Researcher: Owww!

17.   Neil: So, we hit that one a few times and had to redo a few things.

18.　　Researcher: So, what happened after this blow out? Did you guys pass it on or did you stick with it?

19.　　Neil: It was just sort of Cameron, like, he would have had enough and it was sort of time for him to go and get a cigarette and play pool or something. I would just sit down and do it all.

20.　　Researcher: And then at one stage it got passed over to a different computer. Is that right?

21.　　Chris: That wasn't until sort of like Friday. That was, pretty much, like to Neil and Cam's credit, like, they really did the bulk of getting the documents together. They did all of that, like getting everybody's individual work and putting into one thing, getting the formatting done and all that. By the time that myself and Troy came in, approximately about the Wednesday, like, got that together and it was really just a matter of going through, and tidying up a lot of mistakes, and formatting problems, and things like that. By the Friday, we were hoping actually to have it done by the Thursday, was actually a hell of a day. It was these guys intension to have it done by the Wednesday, which at the end, like, if they hadn't done that, if they hadn't gone in with the intension of actually having it done by the Wednesday, I would say we would have struggled to produce the final document that we did. Um, but it comes right, eh? We worked on the Table of Contents pretty much most of the day, and just simply tidied up bits. At that stage it was like the clock, Neil had to go to work and Cam had had fully enough, cause obviously had had a long week with it. It was a real, like, I know, just from the few hours that I had to spend on trying to do some of that formatting, that Cam had been doing, it was really frustrating. It was really quite testing, um, just some of the things the computer was doing. So, they had had enough of it by now and so, from that point I, sort of, took it on board and I liased with Troy. On the Friday night we had pretty much sorted all the problems with the Table of Contents. Got that pretty much in line and from there we were felt we were quite happy from the Friday through to the Monday to use that time and actually editing and making the best of the document that we had, you know? So, going through, making sure that everything did fit together, the integration of it and just, yeah, making it the best we could really.

22.　　Researcher: Was it, do you think it was a fair way of doing it?

23.　　Chris: I think it was the most logical way of doing it. I know Cam, like during mid week he was sort of like "just keep the girls away". You know, it was just easier not to have the girls there and I'm the same, you know what I mean. When they came over like there's nothing they could do and that's not their fault. That's probably as much us taking control as it is them not really knowing what they are doing.

24.　　Researcher: So, you made an effort to keep them away because it was just easier?

25. Chris: Well, I didn't personally but, come the Friday when I sort of took it that effort from me was that everyone likes to have their weekends and was planning on having their weekends and, yeah, it's a lot easier to work in two's in that respect and coordinate like that, rather than try and work with any more people. So, we just didn't really need anyone else at that stage because we weren't actually writing anything, well, we did rewrite a lot of stuff, but it was just really, we weren't changing the facts of the document, the facts that people had left, we just changed the way it was written.

26. Researcher: Ok, and um how did you communicate? In the questionnaire I talked about different communication methods, phone, fax, text message, email.

27. Neil: Is this from, how far back?

28. Researcher: In the last stages, in the last week or so.

29. Neil: Telephone and email mainly eh?

30. Chris: But we got together, I met up, I went to, because we were supposed to be, the idea was to be meeting at Jay's place everyday for this last week. But obviously she didn't have the computer we were using so, I went around there Monday and there was only Cam and Jay there, and then I went round there on Tuesday and it was only Cam and that.

31. Researcher: So, that didn't work out.

32. Chris: So, that didn't work. We were, everybody was still actually finishing bits and pieces, as well. Individual stuff that we were supposed to be doing. I don't think Cam and Neil got final copies until Tuesday or Wednesday.

33. Neil: I hadn't finished, balanced the accounts until Thursday.

34. Chris: So, pretty much, it was by Wednesday that everything went to Neil's and then there was no more. That was it.

35. Researcher: Ok.

36. Chris: But, yeah, like, email and telephone. At that stage we started communicating pretty much daily.

37. Researcher: Do you think you would have done it that way regardless of what the task was? I mean the way you divided and conquered. It was the most efficient way of doing it?

38. Neil: Oh, yes. It was the most efficient, time efficient way of doing it because like, Jay said in the first meeting, it's too difficult having six people sitting around one computer. But then again, on the on the other hand, I think it would have been easier to say, instead of people doing their own individual part on their own computers and then emailing it and format from there, put it

together from there, it might have been easier to have to just have everyone, you know, time slots on one computer and just plug it straight in.

39. Chris: The other thing I was sort of thinking, was using, actually having, use the AUT computers. They are all logged in on the same network, they are all in the same format, and they are all the same settings, so it would be really easy to transfer documents in that respect.

40. Researcher: Ok, getting on to that, did you have sufficient facilities do you think? Talking about computer facilities.

41. Chris: I think that we had the individual facilities, like everyone had everything they felt they needed.

42. Neil I mean, a couple of times in my room, it was as big as this room, we had four of us there and three computers, I mean Nat was on her laptop, which was pretty good.

43. Researcher: So, computers weren't, numbers of computers weren't a problem?

44. Neil: No, but I couldn't get them all there all the time.

45. Researcher: And you mentioned about compatibility?

46. Chris: Yeah, I mean like the way Troy's work would come out in Arial, size 12, and Nat was on Mac and different margin settings and whatever things may be.

47. Researcher: Ok, So what was it like to work on this project? If were to explain what it was like.

48. Neil: Well, I was talking to one of my flatmates who is now doing Professional Studies and who doesn't talk to anyone in their group any more and doesn't get along with them. So, from that point of view we are all still pretty much friendly.

49. Researcher: All right and your view of the computer in group projects. What is your view of the?

50. Neil: (interrupts) Good.

51. Researcher: Good?

52. Neil: I can't say it's bad. It's hard work.

53. Chris: I would say that. You definitely couldn't do without it. I would struggle to really total up how many hours I've had my own computer on and then considering how long Neil's has been on pretty much for the last week to, at least, three o'clock in the morning. On Monday night I was up all night and I couldn't have done without it. Like, this final weekend with Troy and myself

were sort of working on it we had a policy of one person at a time working on the master document. With backups. I would send a copy to Troy saying, "this, this and here's the master document, you have it and feel free to make any changes and then send it back to me". And that's how we transferred. So, we would take shifts, like, I had to work on Sunday so, I worked on it all day Saturday and through Saturday night and then sent it to him Sunday morning. He worked through it on Sunday and then gave it back to me, and we did got together as well at certain times. That was really good so, yeah, computers are essential because obviously you couldn't fit it all onto a disk. It wouldn't fit onto a disk.

54.   Researcher: A very necessary machine?

55.   Chris: I mean, of course it has its frustrations and things, but you couldn't possibly have done it any other way. You couldn't have written it. It's 29,000 words. You couldn't have written it. But then I thought that the Table of Contents and things is something we really don't get to do until an assignment like this so we need a lot of practice. It is pretty simple I guess.

56.   Neil: We did have a problem, I mean I think it's my fault because the first thing I did when I opened the Business Plan document was I changed all the settings and the styles and everything, the headings and then, I think, one of the tabs it says, "press enter", and I did that so, every time I pushed enter I got two, and when we went to generate the Table of Contents we would have one and then two and then normal text and then you would have a gap which was really annoying.

57.   Chris: I think that, like, compared to what I imagine most groups would have gone through I think we did really well. It was good to know that we actually had those last few days that myself and Troy could just go through some of the editing. We weren't still trying to write the document. That was great to have that. We still had our hiccups even in that time we had problems. The computer would do funny things. I had made changes to the master document and send them to Troy and the next time it came back to me only some of those changes had reverted back and they weren't there any more you know and which is absolutely incomprehendable how it happened. But, um, because you know the organisation and especially, like, with Neil and Camp getting most of it done earlier on in that week, it worked out pretty well. I think the group did very well. Some of the stuff, like, looking at the report, I have my doubts still, some of the work that was actually put into it but I think it looks good.

58.   Researcher: Good, well, great. Well, thank you very much.

Appendix E: Questionnaire responses

Notes: The students' responses are listed in the following tables question by question in group order. Spelling mistakes and any special symbols have been reproduced as close as possible to the hand written form. In some places crossed out words have been listed where they have been thought to be relevant. For ease of reading the table for each question starts on a new page.

1.   Please explain how your group decided to manage the project.

Student (group)	Written response.
Rob (1)	Allocating different tasks + sections to different members, based on their areas of expertise. We had regular meetings + updates on what we were all doing in order to try to keep everyone else on task.
Melissa (1)	1) set up norms –rules to abide by 2) allocated sections to people 3) set deadlines 4) once rough copies had been finished decided on a location to compile assignment 5) organised times for people to format sections. Formatting was led by one person to ensure consistency - Email used frequently for information sharing
Suzanne (1)	We decided to allocate sections to each person to work on and complete on their own. Then everyone was to bring it together onto one computer – format it, get other members to proof read it and understand it.
Tarah (1)	By allocating tasks to each person → or pair. At the end we all added to these tasks if incomplete.
Kurt (1)	By allocating tasks, then with regular meetings we kept up to date with one another's progress, and at the end came together & put the assignment together.
Sam (1)	The project was managed by meeting face to face (@peoples houses) and by emailing information back and forth. Each person was allocated a section(s) and contributed to the whole.
Andrew (2)	The group allocated different tasks and subprojects to each group member. It was then up to that particular group member to manage the work themselves.
Matt (2)	We delegated work to people and told them when it should be done by.
Kylie (2)	We had 6 people in our group and 3 main Disciplines in the project: Marketing, Mgmt and Acctg. ∴ we allocated 2 people per discipline. Then the other Smaller Subjects: Law and Economics were completed by each member relating specifically to their Main allocated discipline. We separated and did our work as the pairs with a group meeting every now and then at the beginning as progress reports then very frequent group meets towards the end to put the pairs' respective work together.
Karen (2)	We split the work up into disciplines (marketing, management, accounting) and assigned two people to each one. We would all go away and do our own work, then meet together to discuss problems, help each

	other, type up work and put whole business plan together.
Alistair (3)	It was generally divided by discipline with different people be allocated certain sections – i.e. Alistair – Accounting.
Bryce (3)	- Divided the disciplines up, e.g. Accounting, management, health, etc.. - We all helped each other on some areas which required a little more effort, eg Accounting, operations.
Sandra (3)	We divided research & implementation by disciplines topicly – e.g. Management with Operations & External environment.
Mandy (3)	Working from a business plan outline we divided up the sections and each tackled our own individually. Then meeting together we worked out where there were cross overs in information and for rid of any double ups. All computer work as a group was carried out at Rachels.
Rachel (3)	WE divided the group into separate subjects. Suzanne – Rachel: Mktg. Hooly – Survey – Mktg Analysis. Mandy – Mgmt. Bryce – Health. Alistair – Accounting. We then ~~came together and had~~ stated that we would have it finished br a certain time, then leave one week for editing.
Hannah (3)	We allocated sections rather that "subjects" to assist in the integration of these subjects. We also felt by doing it this way that when it cam etime to do our presentation, we would have a better understanding of each subject. We used several business plans to create one which suited our particular service.
Troy (4)	Assign areas, then integrate and format together, then back to small team to do final edit and format & printing.
Natasha (4)	Split up according to subject strengths/ weaknesses. Each person/ couple was responsible for their own work and managing their own time. We came together 2 x weekly to ascertain progress, express concerns, etc..
Jay (4)	Initially divided the tasks up into accounting, IT, marketing, management/ Law with two per topic. Went away and did research then emailed final copy to main computer (Neil W.) for collating then later as a group to proof and format.
Cameron (4)	Delegation of tasks shared between subgroups of two, and e-mailing completed work to Master file on Neils P.C. Regular meetings held to manage and monitor progress.
Chris (4)	* Delegated specific tasks to group members. * Placed onto one main document. * Any task not accounted for or not completed were given to another group member. *. Formatted and edited final document.
Neil (4)	Our group delegated parts of the project to pairs. From here we all completed our portions, whilst having regular meetings to keep each other informed and on task. Once the individual parts were completed e-mail was usually used to put the business plan together, however on occasions disks were also used. The project was all kept on Neils computer and emailed out to back-up. The formatting and spell checking etc.. was completed in a group.

2.   Why did your group choose this particular approach?

Student (group)	Written response:
Rob(1)	It kept us organised, split up the assignment into manageable sections.
Melissa (1)	It is easier to work individually due to time constraints then as a group at the end. - email is fast, efficient form of information sharing.
Suzanne (1)	Simple to divide up sections. Easier to work individually for as long as possible.
Tarah (1)	Because of geographic locations and timing.
Kurt (1)	Due to the geographic locations around Auckland.
Sam (1)	Some group members had expertise in specialised areas & were obviously selected for those sections respectively.
Andrew (2)	It would be easier. By not having a leader or manager to monitor the group's work. It let everyone be their own manager or leader.
Matt (2)	It was a solid way to check progress.
Kylie (2)	This approach would mean that for the major subjects there were two people working or supporting each other of the minor subjects would be covered in the process of doing the major disciplines. This also meant that work wasn't repeated and the people that felt comfortable in certain subjects and uncomfortable in others would do the work of their respective subjects.
Karen (2)	Because this seemed like the best way to evenly distribute the work amongst group members.
Alistair (3)	Because we thought we could harness all aspects and get a better marks if people were doing their strengths.
Bryce (3)	Because each of us could comfortably cover one discipline which worked out good. E.g. Mandy was comfortable with Law, Andrew was comfortable with Accounting etc..
Suzanne (3)	To be time efficient – work on our strengths. This approach allowed us to cross over into areas that we weren't all that comfortable but it was shared, so we could communicate ideas. E.g. Marketing: Rachel – price, Suzanne – promotion – Still both of our strengths but the same topic, this increased the chance of getting the most info. & knowledge on that topic.
Mandy (3)	We didn't want to be discipline focused as this leads to no integration - from the business plan outline we could see there was integration so followed this.
Rachel (3)	So we did not waste time. So everyone had a part to do.
Hannah (3)	- Assist in the presentation - Used several business plans to get a more varied approach & to use the better parts from each plan. Not one specific plan was right for us, so we used a variety.
Troy (4)	Best of available options. Tried & tested.
Natasha (4)	With 6 of us, all with differing lives/ commitment outside AUT, this approach allowed every person to contribute according to their schedules.
Jay (4)	Time frame. Most found easier to work on own or in twos rather than as a large group crowded around a computer.

Cameron (4)	This was chosen to create ease and efficiency, as only so much can be achieved in full group meetings. It also helped w/ geographies.
Chris (4)	* Seemed the easiest way in which to get the ball rolling * Didn't require as much group contact. People were able to work on specific sections alone. * Thought it would be quicker.
Neil (4)	Because it seemed the most time efficient method and productive where people got to specialise in their chosen fields.

3. How many face-to-face meetings did your group have for this project?

Student (group)	Written response.
Rob (1)	100
Melissa (1)	20+
Suzanne (1)	Many 20 -30
Tarah (1)	No response
Kurt (1)	Every Monday over the semester and every day over the last two weeks.
Sam (1)	15
Andrew (2)	12 or more.
Matt (2)	15+
Kylie (2)	Whole group approx. 10 with the initial meetings lasting approx. 1½ - 2 hrs of the meets towards the end being half to all day meets!
Karen (2)	About 10 (at a guess) other than class time.
Alistair (3)	~~11~~ 1 - 100
Bryce (3)	10 – 15
Suzanne (3)	10 – 15
Mandy (3)	5 – 10
Rachel (3)	10 – 15 meetings.
Hannah (3)	About 10 or 12.
Troy (4)	$\cong 20$
Natasha (4)	7 – 10
Jay (4)	Around half a dozen (unsure)
Cameron (4)	Between 10 –15 full group, and around 40 partial attendence.
Chris (4)	6 – 12?? Not including smaller group meetings. E.g. 1-3 people.
Neil (4)	Between 15 –20 meetings out of AUT

4. How else did your group communicate for the purposes of the project?

Student (group)	Written response.
Rob (1)	Telephone, email, SMS
Melissa (1)	e-mail, cell phones, telephone, text messaging
Suzanne (1)	E-mail, Telephone
Tarah (1)	Email, telephone, txt messages
Kurt (1)	Email, telephone, text messages
Sam (1)	Email, during class, text messaging, phone & fax.
Andrew (2)	Telephone.
Matt (2)	By email, by phone, fax.
Kylie (2)	Telephone, emails → this stopped after we had a stuff up with a document sent via email. Didn't trust it after that. Mobile phones & pair meetings or in 3's.
Karen (2)	Mainly through telephone, mobile and text messaging. Some communication was dine by e-mail but not much.
Alistair (3)	Email, txt message, phone, fax
Bryce (3)	Email, phone.
Sandra (3)	e-mail – Telephone. – text message
Mandy (3)	e-mail, phone, text messaging.
Rachel (3)	Phone, e- mail sometimes.
Hannah (3)	Email, text messages, ph. Calls.
Troy (4)	Email Phone
Natasha (4)	e-mail phone
Jay (4)	Email, telephone
Cameron (4)	E-mail and phone
Chris (4)	e- mail, phone.
Neil (4)	E-mail was the main form of communication + telephone.

5.   What was your preferred form of communication?
       (meetings/ phone/ emails/ text messaging/ other – please specify)

Student (group)	Written response.
Rob (1)	Meetings
Melissa (1)	- meetings - telephone - email – for text only
Suzanne (1)	Email, meetings
Tarah (1)	Meetings.
Kurt (1)	Meetings
Sam (1)	Email (circled)
Andrew (2)	Phone, text messaging.
Matt (2)	Phone (circled)
Kylie (2)	Meetings was the best in allowing information to come together yet also to gauge reaction or focus when an idea of conflict was brought up.
Karen (2)	Meetings and phone.
Alistair (3)	~~meetings~~ email
Bryce (3)	Normally organised meetings when we were together.
Sandra (3)	phone (circled) then meetings (arrowed with the explanation) If phone conversation didn't "cut the cake"
Mandy (3)	Meetings
Rachel (3)	Meetings (arrowed) phone and email (circled)
Hannah (3)	Depends for what purpose, e.g. text mess. Or email fine to organise meeting times. Meetings all together were best for discussion or editing.
Troy (4)	email then phone/ meetings
Natasha (4)	phone
Jay (4)	Meetings as face to face all in same room. Less room for misinterpretation.
Cameron (4)	E-mail.
Chris (4)	Meetings and email (circled) Quite hard to get group of 6 together each time, so email was effective.
Neil (4)	Email.

6. Why did you prefer this method of communication?

Student (group)	Written response.
Rob (1)	More group orientated, can include more people.
Melissa (1)	Meetings are good because its easy to ask questions which are limited on email. Quick responses in meetings, quicker decisions.
Suzanne (1)	E-mail was quick and easy. Meetings everyone could be present to hear ideas.
Tarah (1)	As it was face to face and not delayed.
Kurt (1)	Physical presence, in regard to seeing each other & the work.
Sam (1)	~~You can~~ I was able to rely on questions being answered as timely replies weren't important in the early stages of the project.
Andrew (2)	Easier and quicker
Matt (2)	It was quick, easy and fast.
Kylie (2)	Previously stated. Also you are more motivated if there's one or is someone else there.
Karen (2)	Because we could all openly speak our minds and get an instant response. Also quicker.
Alistair (3)	Because I didn't have to leave the comfort of my house and I could still get work done.
Bryce (3)	Easy.
Sandra (3)	Cuts travelling time, its time efficient – cost less i.e. no petrol.
Mandy (3)	Fact to face, communication is easier when you can see the person, more personal.
Rachel (3)	Because you could actually see where everyone was at. It sorted out problems very easily.
Hannah (3)	Because we all had input & was <u>instant</u>. Didn't have to wait for reply or relay any messages to other members.
Troy (4)	Wasn't time specific and could transfer greater quantities of data/ info.
Natasha (4)	Without having to actually sort out a meeting time, phoning was a great way to get in touch and voice a problem or ask for feedback – faster than e-mail.
Jay (4)	As above.
Cameron (4)	To the point, clear with minimal complication. Also provides Hardcopy of communication.
Chris (4)	Everybody gets to view the communication of important details.
Neil (4)	Because attachments of the plan were possible.

7.   How did your group use computer technology to assemble the final report?

Student (group)	Written response.
Rob (1)	All aspects of the report were.
Melissa (1)	Home PC to compile all of assignment, format it and print it out.
Suzanne (1)	E-mail. Copy/ pasting Formatting functions
Tarah (1)	Emailed all to one computer by which we then formatted and printed on that computer.
Kurt (1)	Email to Tarah, then as a group using Word & Excel put the assignment together.
Sam (1)	Scanning; copy paste; choosing fonts & styles, formatting routine headers/ footer, page numbers. _____ It was a case of emailing everyone's work to one house and to print immediately after formatting.
Andrew (2)	We were able to put the project together on one PC using computer disks as the transporter from one PC to another.
Matt (2)	We used 3 laptops and 1 PC, to edit and file.
Kylie (2)	We had one room, which was quite large with couches as well as 3 computers and then we brought our own laptops as – well totaling 6 (six) computers – one each. There was one computer that the final project was being put on to but while that was happening editing & rewriting was being done on the other computers (one each).
Karen (2)	We all met at Bryan's over 3 or 4 days with 3 laptops & 2 PCs, all working together to finish each others work, proof-read, and join saved documents (on disk) together. One main PC was used to assemble the final report into one document.
Alistair (3)	We had people edit and the rest threw in ideas. We all used separate saved to disk and the culminated on 1.
Bryce (3)	Word – we combined everyone's work from separate disks to one final product. Normally we did our own work on home PC then combined them all onto Rachel's computer.
Sandra (3)	Cross assembled our separate workings onto 1 computer after using our personal PC.
Mandy (3)	All using home PC then using disks to put all the material onto one computer. Never used AUT computers.
Rachel (3)	We brought it to Rachel's place on disks and pasted all info. Onto one document.
Hannah (3)	Editing, collating, graphs, printing.
Troy (4)	Editing, formatting, emailing, printing.
Natasha (4)	All separate documents were sent via email to Neil's computer. There it was assembled and formatted then sent to Chris for printing.
Jay (4)	Emailed information to main computer or information of diskette, cut and copied plus excel and page maker. Table of contents was used to

	paginate and outline each heading.
Cameron (4)	Lots of emailing, with 2 –3 terminals operating in the meeting rooms at one time, meaning lots of cutting and pasting to create efficiency. Emailing report all regularly to Back Up.
Chris (4)	The final document was made on Neil's P.C. The computer was used to cut, paste each individual piece of work into one document.
Neil (4)	Very difficultly Emails or disk were used to bring everything together, then cut and paste. - with a doc. This size it's never as simple as it should be.

8.　　What other purposes were computers used for by your group for the project?

Student (group)	Written response.
Rob (1)	Research + presentation.
Melissa (1)	- Research - E-mailing - Printing - Creating charts/ graphs
Suzanne(1)	Communication. Creation of Graphs.
Tarah (1)	No response
Kurt (1)	Designing logo, headers, letterheads, business cards.
Sam (1)	Graphic Art Printing Emailing for info (company websites) Searching www for evidence to back-up statements made.
Andrew (2)	Word.
Matt (2)	Editing, collating, formatting.
Kylie (2)	Computers were used for looking up on the net, writing the initial discipline reports, email or something to use when printing. Saved final report on disk and printed @ different places.
Karen (2)	Looking up info. On the internet Occasionally emailing each other or other people (companies) for information. Typing work, graphs etc…
Alistair (3)	Email, doing all the accounting work.
Bryce (3)	Internet – email – Research Law (Brookers online) – Excel – Accounting tables Publisher – designing logo.
Sandra (3)	Graphics – emailing.
Mandy (3)	Communication – e-mail. Internet – finding information.
Rachel (3)	To contact business for info, quotes or statistics.
Hannah (3)	Email.
Troy (4)	Word & excel docs Communication Research from the web
Natasha (4)	*. the internet – research/ statistics *. Typing *. E-mail communication to gp. Members.
Jay (4)	*. Research – internet *. Accounting reports, number crunching *. Pagemaker for design/ layout
Cameron (4)	Research & communicating. Creation of various files using a range of software.
Chris (4)	Individual work + communication.
Neil (4)	Production of graphs, charts for final report. Design of the logo.

9.   What access did you have to computer facilities for the project?

Student (group)	Written response.
Rob (1)	Home Work University Basically 24/ 7.
Melissa (1)	- Home PC - AUT PC - Each others PCs
Suzanne (1)	Each member had a home PC. University Computers. Printers, scanners at home.
Tarah (1)	Everyone had computers at home. AUT PCs also.
Kurt (1)	Home PC. Tarah's PC.
Sam (1)	No restriction to access. Everyone had a PC with Internet connection + email. Home/ work/ Uni/ friends
Andrew (2)	None. Did not use AUT facilities. We had Five computers going when pulling the assignment together. 3 laptops 2 PC's
Matt (2)	Easy access to 3 laptops, 1 PC.
Kylie (2)	Everyone in the group had a computer @ home. I had access to my dad's work one as well which had a fast printer ∴Handy for final printing. Some others had more than one computer @ home and some also would use their parents work computer for software programs as well.
Karen (2)	We all had a computer & internet access at home. For the final few days we had 3 laptops and two PCs in one room so we could all work at the same time.
Alistair (3)	All had own personal computers.
Bryce (3)	We all had own personal computers.
Sandra (3)	Access to home computers.
Mandy (3)	All used own personal computers.
Rachel (3)	We all had our own personal computers.
Hannah (3)	Own PC, and used Bek's house (PC) together.
Troy (4)	Comp. Labs Own P.C.'s Members laptops
Natasha (4)	*. At home *. AUT library *. Other gp. Members houses (Jay's/ Neil's)
Jay (4)	Used my home computer which isn't very good, slow & old.
Cameron (4)	3 laptops, and 3 P.C.'s (all @ different locations)

Chris (4)	*. My home P.C. *. my girlfriend's work P.C. and printer *. Neil's P.C. *. Troy's P.C.
Neil (4)	I recently just purchased a new computer which I always had access to.

10.   Did your group have sufficient computer facilities?
        (Describe any other resources needed)

Student (group)	Written response.
Rob (1)	Yes, all members have a comp.
Melissa (1)	Yes.
Suzanne (1)	Yes.
Tarah (1)	Yes
Kurt (1)	Yes
Sam (1)	There are Never sufficient resources.
Andrew (2)	/
Matt (2)	No response
Kylie (2)	Yes absolute sufficient computer resources. The software was the glitch with everyone having different versions of windows.
Karen (2)	Yes, good software and readily available computer.
Alistair (3)	Yes
Bryce (3)	Yes
Sandra (3)	Yes – Finding the Gantt Chart programme would have been very difficult without Mandy's Mums occupation.
Mandy (3)	Yes.
Rachel (3)	Yes.
Hannah (3)	Yes.
Troy (4)	Could of done with more laptops.
Natasha (4)	Yes.
Jay (4)	Sufficient but not really adequate for project of this size.
Cameron (4)	Maybe more powerful Laptops, and a means of transferring to Bus. Plan besides E-mail (i.e. CD Writer or Zip drive) as regular disks had a limited capacity.
Chris (4)	Yes. But it would be nice to have computers on a joint network.
Neil (4)	Yes – On occasions we would have 3 computers (including 2 laptops) with 4 people present. Very productive.

11.   Do you think that computer technology is well suited to group projects?
        (Why/ why not?)

Student (group)	Written response.
Rob (1)	Yes – even though it can provide frustrations, the benefits still outweigh them. Large scale formatting can be performed + a proffessional look can be given to the project overall.
Melissa (1)	Yes – reports need to look professional Computers aid in this situation.
Suzanne (1)	Yes – quick, formal (presentation) convenient (e-mail).
Tarah (1)	Yes – communication purposes.
Kurt (1)	~~Yes, we~~ No, as any business plan progresses a computer did not our business plan, for a website.
Sam (1)	YES/ NO. It is easy enough to enter the data – the difficulty comes when arranging, formatting & editing everyone's ideas - content.
Andrew (2)	Allocation of work and putting together everyone's work.
Matt (2)	No response.
Kylie (2)	Yes, because we save things on disk or copy disks to give everyone a copies instead of writing things out again. The different software is the big glitch $\therefore$ group project have to all be allocated on one final computer.
Karen (2)	Yes because the work has to be professionally presented and it couldn't be done without computer technology.
Alistair (3)	Yes, because it makes everything look very professional and a good piece of work, which is pleasing to the eye.
Bryce (3)	Yes -
Sandra (3)	Yes. It allows for consistency among (different individual work)
Mandy (3)	Yes when joining all work together using a computer and putting it into one document is a lot easier than if it was hand written.
Rachel (3)	Yes – Because since we did everything seperately then came together it would have looked very different and would not have been well integrated.
Hannah (3)	Yes. May need better software to merge data to ensure consistency e.g. Works → Word, Excel.
Troy (4)	Yes. If understood all that was available. Ie some great features in Word would have been utilised.
Natasha (4)	Yes – it enables work to be proof-read and corrected efficiently + neatly. Allows documents to be brought together effectively.
Jay (4)	Yes, because it gives a professional touch but as students we are personally under resourced as can not put a lot of money into good quality hardware & feel that using MS Word for large scale projects/ documents is not suited but it is the preferred software of AUT & is what most people have & use.
Cameron (4)	Yes, as productivity tools enhance the process of learning, & create useful skills, however do provide frustrating difficulties.
Chris (4)	Yes. It would be impossible to do a project of this size without computers. Especially integrating all work.
Neil (4)	Yes – It is a skill that is needed + demanded in the workplace.

12.   Describe any problems or issues that arose in your group during the project.

Student (group)	Written response.
Rob (1)	Hard to make sure that all members are doing their work fully + properly if the PC is at their home.
Melissa (1)	- Not all members turned up to meetings. - Deadlines not met. - Sometimes communication lacked.
Suzanne (1)	Not everyone turning up to meetings to hear or share ideas.
Tarah (1)	People not communicating with each other. People not turning up to meetings and class.
Kurt (1)	People rather than technical.
Sam (1)	- files too large for hotmail to accept +1MB. - Unreliable Internet connection.
Andrew (2)	Conflict was very evident between group members towards the end of the project. Especially when allocation of marks were being assessed.
Matt (2)	No response.
Kylie (2)	People not doing any work. Mis-communication. Non-communication. Emails distorting document. Time. Final formatting changed on computer we printed from ∴ changing fonts, sizes, Bold, spacings.
Karen (2)	Differnet versions of Microsoft Word caused problems with our final report which we did not realise until after we had handed it in. e.g. diff. Font, tab spacing etc.. Running out of time towards the project. Not everyone contributing same amount of work.
Alistair (3)	- a couple of conflicts over work however resolved quickly. - Disk swapping computer panic with large info. To take in. - Printing of such a large document meant took a long time plus if there was a mistake pg no.s were out. - Converting Excel to Word screwed up our document – huge mission.
Bryce (3)	- conflict when editing. - Swapping disks over in computer - Changing from one document to another. E.g. Publisher to Word - Pool table caused chaos - Cold house
Sandra (3)	- using disks as means to transport copies of BRR to take home – always wanted the disks that someone had taken home. - Changing graphs from Excel to Word is still a tricky one if your not skilled with computers.
Mandy (3)	Computers caused problems when using disks would save it onto the hard drive but the computer would still want the disk crashing the computer.

	A few communication problems and people getting too caught up with minor details. Cutting from excel into word and trying to get things to fit. Printing from page numbers and table of contents was not numbered computer got confused.
Rachel (3)	Problems with all the disks.
Hannah (3)	- Printing & confusion over page numbers - Disks & saving became a problem – we had about a dozen disks all over the place and often the computer wanted a disk we couldn't find etc… - Merging data from Excel to Word often became a problem. - Some conflict arose over reluctance of input where the writer felt it was, and the readers (other group members) did not.
Troy (4)	Combining different members sections & formatting. Coordinating time for meetings. Needed to fully work out approach before commencing.
Natasha (4)	*. Meeting times: coordination of these to fit in with eachothers schedules. *. Motivation issues: exams over and a long assignment still to complete – doing it!! *. ~~team cohesiveness – all members were not always hap~~ *. Co-ordinating separate documents compatible with others' software.
Jay (4)	*. Lack of understanding of what project was *. Time – never able to meet for long or at a time that suited everyone *. Everyone to individual/ independent - group cohesion never eventuated.
Cameron (4)	The inability of some software to transfigure ot even read other files. The size of the file & difficulties moving it.
Chris (4)	Some difficulty/ frustrations in formatting etc..
Neil (4)	People preferring to work on their own, rather than in a group. - other than that everything was fine. - Anger management with frustrating Microsoft.

13.   What issues (if any) related specifically to the use of computers?

Student (group)	Written response.
Rob (1)	- previous.
Melissa (1)	- work wasn't done on time or sent on time. Wrong email addresses. - Technical hitches in attachments.
Suzanne (1)	Not getting job completed due to computer crashes/ freezing.
Tarah (1)	No response.
Kurt (1)	There is six people & only 1 computer at any location.
Sam (1)	Not fast enough.
Andrew (2)	None.
Matt (2)	No response
Kylie (2)	Email: - Distributing document - Not getting any Formatting: - Different versions of software. Changing final report.
Karen (2)	Different versions of microsoft word. Computers crashing or losing work.
Alistair (3)	See above.
Bryce (3)	See above
Sandra (3)	↑
Mandy (3)	As above
Rachel (3)	See question 12.
Hannah (3)	See above.
Troy (4)	Transferring doc's i.e. word doc turning into .dot files. Change of formats.
Natasha (4)	- software compatible to everyone's differing computers + and their software.
Jay (4)	Not able to meet together at once & work on project – all needed own hardware to work on – laptops would have been ideal.
Cameron (4)	Location issues when file became larger. Inefficiency arising form the restraints resulting from the Bus. Plan size and lack of larger capacity P.C.s.
Chris (4)	Refer 12. Some members had different format settings on their computers e.g. font size/ type.
Neil (4)	Formatting, numbering, generating TOC can be incredible tedeacy.

14. What changes (if any) would you make if you had to do the project again?

Student (group)	Written response.
Rob (1)	Perhaps organise the group a little better to lay down strict rules.
Melissa (1)	- Not to assume everyone is hardworking - Enforce importance of deadlines.
Suzanne (1)	- Pick group members more carefully - Prepare to cover other areas than that assigned to you in case someone doesn't pull their weight.
Tarah (1)	-
Kurt (1)	-
Sam (1)	Recognise that more interpersonal communication is extremely important 4 the project to work.
Andrew (2)	Make or appoint a leader.
Matt (2)	No response.
Kylie (2)	Make more rigid times to meet:- creating a routine instead of last minute organisation. Have better software or a standardised software package. Voice typing:- faster than us typing.
Karen (2)	More group meetings regularly right from the start to ensure work is getting done. Allow more time to have project finished by.
Alistair (3)	NA
Bryce (3)	---------------------------------- NONE
Sandra (3)	Organisation of transportation of copies better. (I don't know if u can though)
Mandy (3)	None.
Rachel (3)	When we had short meeting in the last week we could have spent a little longer there instead of spending 12 hours on the last day.
Hannah (3)	Maybe fairer allocation of workload. May get more people on the accounts to ensure better overall understanding.
Troy (4)	Tighter schedules. Need to integrate all contributions into one doc. Earlier. Lot of work to do after put together.
Natasha (4)	*. Changing structure of semester: Perhaps instead of exams the business plan should be developed in place of these as a practical means of bringing together the semesters work.
Jay (4)	*. different topic *. More time to discuss topic/ project *. Less individuality/ more time on group work. *. More face to face meetings. *. Less people to work on large report.
Cameron (4)	Better computers & maybe more involvement from the group.
Chris (4)	Got work onto the main computer sooner. Would have allowed more time editing etc..
Neil (4)	Instead of email parts of the project to the home document – Input (type) everything into one document i.e. take turns on the one computer. This should reduce formatting time.

15.   What is your opinion of group projects that require a single, computer
        generated report?

Student (group)	Written response.
Rob (1)	It can be hard to compile all info. But at least it gives a professional look to the work.
Melissa (1)	It is very timely but leads to a professional looking document. - teaches you new skills.
Suzanne (1)	Difficult to get product finished on time. Only one person can be at computer to format the final copy – everyone else has to stand around and watch!!
Tarah (1)	Makes a report look professional but when formatting and printing only one person can use it at a time.
Kurt (1)	I agree, as if divided it would be difficult to put the assignment together to appear as if it was written by one person rather than a group.
Sam (1)	V. difficult to combine the content so that it flows and sounds the same – difference in ideas & concepts, writing styles.
Andrew (2)	This assignment use a computer generated report. It was good and easy to put together the work.
Matt (2)	No response
Kylie (2)	Our different major subjects that we did in pairs did not relate very well to each other. This is emphasised when it is put in one final project. The other issue would be the definition of who did what work is not showed well in a single project as it all comes together as true "group" work.
Karen (2)	Good as long as everyone has access to a computer at home (preferably with net access). All work needs to be saved on disk as well as hardrive preferably with a back up disk. All computers used should have the same format (programs). If one main computer is being used for the final report, it needs to be able to handle the size of the document.
Alistair (3)	Good, because you learn a lot about processes and have to use computers more.
Bryce (3)	Good – Get everyone together as a group to discuss issues. - can all be done at once. - No problems because everyone is there to discuss.
Sandra (3)	I think it's great if your group is motivated and wants to be in group work. You have to have patience.
Mandy (3)	They work well but required a lot of work and time.
Rachel (3)	Very good – integrated - looks good.
Hannah (3)	Think they are a good experience, but how often does this happen in real life business
Troy (4)	Challenging. Smaller groups would make it easier. Good for learning functions available form software i.e Word.
Natasha (4)	Creates pressure and stress as these never go smoothly. A document this size is a challenge to format + reproduce as one whole – the challenge is good but there are a lot of aspects that never go your

	way through using computer.
Jay (4)	Great concept, excellent experience but difficult to produce the goods as not many people have hardware or a location suitable for six people to work on a large report.
Cameron (4)	Beneficial in the sense of learning interaction skills, however does bring about efficiency issues.
Chris (4)	I think they present a good challenge. Its not easy, especially the co-ordination of all persons involved. But the final output of the project is worth the effort (something to be proud of)
Neil (4)	Can only be a good thing.

Appendix F: Log sheet listings

Group One: Melissa

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
16/3	11 am 1 pm	10 mins 10 mins	AUT PC Home PC	Internet Internet	To view competitors website	Kurt, Suzy, Melissa
23/3	10.30am	5 mins	Home PC	Internet	Look for other competitors	Melissa
24/3	4.3o pm	5 mins	Home	Internet	Check email	Melissa
25/3	6 pm	5 mins	Home	Internet	Check email	Melissa
27/3	6 pm	5 mins	Home	Internet	Check email	Melissa
28/3	4 pm	10 mins	Home	Internet	Check email	Melissa
1/4	1 pm	1 hr	Home	Internet	Research Info. on Business Plans	Melissa
2/4	1.30 pm	10 mins	Home	Word	Type up minutes	Melissa
3/4	4 pm	1 hr	Home	Word Internet	Typing Assignment, email	Melissa
5/4	3 pm	5 min	Home	Internet	email	Melissa
10/4	10 am	1	Home	Internet	Research cost of website.	Melissa
12/4	11.30am	5 min	Home	Internet	email	Melissa
15/4	10 am	30 min	Home	Word Internet	Typing email	Melissa
18/4	5.30 pm	5 min	Home	Internet	email	Melissa
23/4	2 pm	5 min	Home	Internet	email	Melissa
24/4	10 am	15 min	Home	Internet	email	Melissa
30/4	2.30 pm 3.30 pm	5 min 5 min	Home	Internet	email	Melissa
1/5	3 pm	35 min	Home	Word	Typing	Melissa
6/5	10.30 pm	1	Home	Internet Word	Email Typing	Melissa
7/5	1 pm	30 min	Home	Internet Word	Research /email Typing	Melissa
9/5	5.30 pm	15 min	Home	Internet	Email	Melissa
11/5	11 am	15 min	Home	Internet	Email	Melissa
13/5	3.30 pm	20 min	Home	Word		Melissa
15/5	2 pm	1	Home	Word Internet	Typing Email& research	Melissa

16/5	5 pm	20 min	Home	Internet	Email	Melissa
17/5	1 pm	1	Home	Internet	Email & research	Melissa
19/5	12 pm	1 hr 40 min	Home PC	Word Internet	Typing Research/ email	Melissa
20/5	4.30 pm	10 min	Home	Internet	Email	Melissa
21/5	5 pm	10 min	Home PC	Internet	Email	Melissa
22/5	10.30 pm	10 min	Home PC	Internet	Email	Melissa
23/5	12.00	30 min	Tarah's computer	Word	Reading	Melissa
28/5	10 pm 5 pm	20 mins 1 hr	Home PC	Excel Word	Charts. Fixing up section	Melissa
29/5	5 pm	1	Home PC	Excel	Producing charts	Melissa
30/5	11 am	2 hrs	Tarahs PC	Word	Fixing up section	Melissa
31/5	5 pm	30 mins	Home PC	Excel	Fixing up section	Melissa
1/6	12 pm	30 mins	Home PC	Word	Typing	Melissa
1/6	8.30 pm	10	Home PC	Internet	Email	Melissa
2/6	2.30pm	1	Tarah's PC	Word	.	Melissa/ Suzy
2/6	4 pm	2	Tarah's PC	Word	Proof reading adding info. Formatting	Melissa/ Tarah
2/6	9 am	1	Home PC	Excel	Charts	Melissa
2/6	6 pm	0.5	Tarah's PC	Excel	Gantt chart	Melissa/ Tarah

Group One: Tarah

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
26/3	9.30 am	30 mins	AUT PC	Word	Prelim report	Everyone
27/3	7.30 am	15 mins	Home PC	Explorer	email	Sam/ me
28/3	5.30 pm	10 mins	Home PC	Explorer	email	Tarah
4/4	4.30 pm	30 mins	Home PC	Explorer	research	Tarah
5/4	3 pm	1.5 hrs	Home PC	Explorer	research	Tarah
6/4	10 am	15 mins	Home PC	Word	Minutes of meeting	Tarah
7/4	10 am	15 mins	Home PC	Word Explorer	Biz Plan components email	Tarah/ Melissa
8/4	2 pm	30 mins	Home PC	Explorer	Email research	Tarah/ Melissa
9/4	4 pm	30 mins	Home PC	Word	Minutes SWOT	Tarah
17/4	4 pm	15 mins	Internet Cafe	Explorer	Email	Tarah
22/4	6 pm	30 mins	Home PC	Explorer	Email	Tarah
24/4	2 pm	1 hr	Home PC	Explorer	Research	Tarah
2/5	2 pm	1.5 hrs	Home PC	Word Explorer	Minutes/ survey Email	Tarah
7/5	3 pm	15 mins	Home PC	Word	Minutes	Tarah
10/5	1.30 pm	1 hr	Home PC	Word Explorer	Survey Email	Tarah
12/5	11 am	30 mins	Home PC	Explorer	Research	Tarah
15/5	2 pm	15 mins	Home PC	Explorer	Email	Tarah
16/5	3.30 pm	1.5 hrs	Home PC	Word Explorer	Email	Tarah
17/5	12 pm	1	Home PC		Email	Tarah
19/5	10 am	10 mins	Home PC	Explorer	Email	Tarah
20/5	12 pm	1	Home PC	Explorer Word	Email Typing	Tarah
21/5	2 pm	20 mins	Home PC	Explorer	Email	Tarah
22/5	4 pm	10 mins	Home PC	Explorer	Email	Tarah
23/5	10 am	30 mins	Home PC	Word	Typing	Tarah

24/5	2 pm	15 mins	Home PC	Explorer	Email	Tarah
25/5	10 am	2	Home PC	Explorer Word	Email Formatting	Tarah
26/5	10 am	15 mins	Home PC	Explorer	Email	Tarah
27/5	12 pm	15 mins	Home PC	Explorer	Email	Tarah
28/5	4 pm	15 mins	Home PC	Explorer	Email	Tarah
29/5	11 am	15 mins	Home PC	Explorer	Email	Tarah
30/5	11 am	2	Home PC	Word	Formatting	Tarah/ Melissa
31/5	4 pm	30 mins	Home PC	Explorer Word	Email Formatting	Tarah
1/6	9 am	30 mins	Home PC	Explorer Word	Email Formatting	Tarah
2/6	9 am 4 pm 6 pm	2 2 30 mins	Home PC	Explorer Word Excel	Email Formatting Gantt Chart	Tarah Tarah/ Melissa Tarah/ Melissa

NB: group work can be seen on Sandra's log sheets.

Group One: Suzanne

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
2/4	5.30 pm	15 mins	Home PC	Internet	Group Assignment	Myself (Suzy)
¾	8.30 pm	20 mins	Home PC	Internet	Check email	Myself
4/4	5.45 pm	10 mins	Home PC	Internet	Check email	Myself
8/4	12 pm 8.30 pm	25 mins 20 mins	Home PC Home PC	Word Internet	Group Assignment Email	Me
10/4	3 pm	30 mins	Home PC	Word	Assignment	Myself
13/4	2.30 pm	30 mins	Home PC	Internet	Assignment	Myself
17/4	2 pm 4.30 pm	1 hr 10 mins	Sam's PC (group member) Home PC	Internet	Check email Research	Sam
19/4	5.30 pm	20 mins	Home PC	Internet	Check email	Myself
20/4	4.30 pm	15 mins	Home PC	Internet	Write email	Myself
21/4	2 pm	25 mins	Home PC	Internet	Check email Assignment	Myself
25/4	10 am	20 mins	Home PC	Internet	Check email	Myself
7/5	4 pm	30 mins	Home PC	Internet	Research & email	Myself
13/5	1.30 pm	1 hr	Home PC	Internet + Word	Email, Assignment	Myself
14/5	1 pm	1 hr	Home PC	Word	Business Plan	Myself
15/5	8.30 pm	20 mins	Home PC	Internet	Surveys from email	Myself
16/5	3.30 pm	1 hr	Friend's PC	Word	Business Plan	Myself
17/5	6 pm	30 mins	Home PC	Word	Business Plan	Myself
19/5	12 pm	2	Home PC	Word	Typing Assignment	Suzy
20/5	11.30 am 3 pm	1.5 2	Home PC Home PC	Word Word	Typing Assignment	Suzy Suzy
23/5	12 pm	2.5	Tarah's home PC	Word	Typing Assignment	Suzy, Tarah, Kurt
28/5	10.30 am	4	Tarah's home PC	Word	Typing, Formatting	Suzy, Tarah, Kurt, Melissa, Rob, Sam
29/5	2.30 pm	1	Home PC	Word	Typing Assignment	Suzy

30/5	11 am 1 pm 6 pm	2 1.5 1	Tarah's home PC Home PC	Word, Excel Word	Typing Typing Typing	Suzy, Tarah, Kurt, Melissa, Rob, Sam
31/5	11 am	2	Tarah's home PC	Word	Typing, Formatting	Suzy, Tarah, Kurt, Melissa, Rob, Sam
1/6	10 am	9 3	Tarah's home PC	Word Word	Typing, Formatting	Suzy, Tarah, Kurt, Melissa, Sam
2/6	3 pm 4 pm	1 2	Tarah's home PC	Word, Internet Word, Explorer	Typing, proof reading, formatting	Suzy, Tarah, Kurt, Melissa
3/6	1 pm 7 pm	5 5	Tarah's home PC	Word, Explorer Word, Explorer	Formatting, Proof reading, Printing	Suzy, Tarah, Kurt, Melissa, Rob, Sam
4/6	1.30 pm	20 mins	Sam's Home PC	Word	Typing	Kurt

Group One: Rob

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
28/3	1400	½	Home Comp	Internet Explorer - Hotmail	Exchange grp details + information	Me + myself + I
4/4	1530	¼	Home Comp	Internet Explorer - Hotmail	information	Me
10/4	1400	1	Home Comp	Internet Explorer Word	Compiling research from various websites	Me
11/4	1300	1	Home Comp	Word (Microsoft)	Writing Notes	Me
25/4	1500	½	Home Comp	Internet Explorer Word	Downloading Questionnaire + making changes	Me
3/5	1200	1	Home Comp	Internet Explorer Adobe	Visiting IRD + National Bank websites	Me
5/5	1300	½	Home Comp	Internet Explorer Word	Downloading Final Questionnaire	Me
8/5	1400	2	Home Comp	Microsoft Excel	Making up templates for Questionnaire	Me
10/5	1200	2	Home Comp	Excel	Data entry of initial surveys	Myself + Sam.
14/5	1300	2	Home Comp	Excel	Final Entry, Pivot Table Reports, Summaries	Me
	1600	½	Home Comp	Excel, Outlook	Sending info. To other group members form survey	Me

Group One: Kurt

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
26/3	2.52pm	20 min	Home PC	Word 2000	Survey Questions	- (solo)[1]
4/4	2 pm	1 hr	Home PC	Internet Explorer, Zfree	Testing options	-
5/4	1.30 pm 2.36 pm	50min	Home PC	Internet Explorer, Zfree – stats, NZ Website	To find stats re:NZ students	-
7/4	7.34 pm	20 min	Home PC	Internet Explorer, Zfree – email	Email group	-
10/4	1.30 pm	2	Home PC	Internet Explorer, Zfree – searching	Find information – for leasing options and for info regarding NZ economy	-
12/4	1.07 pm	5 min	Home PC	Internet Explorer, Zfree-email	Email group	-
15/4	12.45pm	20 min	Home PC	Internet Explorer, Zfree- email	Email group	-
17/4	8.45pm	10 min	Home PC	Internet Explorer, Zfree-email	Email group	-
18/4	9.10pm	1	Home PC	Microsoft paint	Session 1000	-
20/4	8.30	10 min	Home PC	Email	Email	-
3/5	10 pm	20 min	Home PC	Email	Email	-
6/5	4.54pm	20 min	Home PC	INTERNET	EMAIL	-
7/5	1.22pm	3 hr	Home PC	INTERNET & Microsoft Paint	Logo and research	-
8/5	1.22pm 8.47	10 min 10 min	Home PC	INTERNET	EMAIL	-

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[1] Notes in parentheses are my interpretation of the data.

9/5	9 am 9.40pm	3.5 hrs 10min	Home PC	Internet	Information re: -leasing computer – property Email	-
10/5	12.32pm 10pm	1 hr 15min	Home PC	MS paint Internet	-email -design for project -email	-
11/5	12.30pm 9.40pm	1hr 10min	Home PC	Internet Explorer	-email -housing option -email	-
12/5	1.40pm 5.45pm	2 15min	Home PC	MS paint Internet – hotmail	Design logo email	-
13/5	4pm	1	Home PC	Word MS 2000	Typing project	-
14/5	12.40pm 9.55pm	10 min 10min	Home PC	Microsoft Explorer – hotmail	Email	-
15/5	3.15pm	2	Home PC	Microsoft Explorer – websites searching, using yahoo	Find housing for assignment	-
16/5	2.30pm	3	Home PC	Internet Explorer – MSN Messenger	- chat	-
17/5	12.05pm	1	Home PC	MS 2000 – Word	Typing up section	-
19/5	12.30	1	Home PC	Email- Internet Explorer MS Word	Sending sections to main Typing	-
20/5	11am	3	Home PC	Corel Draw -email	Design – headers, business card. Check email	-
21/5	10am	10 mins	Home PC	Email	Check email	-
23/5	1.30pm	1.5	Tarah's PC	Word	Proof reading	Suzy, Kurt and Tarah
24/5	12.30pm	10min	Home PC	Explorer	email	-
25/5	10 am	15min	Home PC	Explorer	email	-

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26/5	9.45pm	25min	Home PC	Explorer	email	-
27/5	10.10pm	10min	Home PC	Explorer	email	-
28/5	11am	3.5	Tarah's PC	Word	Typing, formatting	Suzy, Kurt, Tarah, Melissa, Rob, Sam
29/5	10pm	10min	Home PC	Explorer	email	-
30/5	11am	4	Tarah's PC	Word, Excel	Typing, formatting	Tarah, Suzy, Melissa and Kurt
31/5	11am	2	Tarah's PC	Word	Typing, formatting	Tarah, Suzy, Melissa, Rob, Kurt, Sam
1/6	10am	9hrs 3hrs	Tarah's PC	Word	Typing, formatting	Whole crowd
2/6	6pm	5	Tarah's PC	Word, Internet Explorer	Formatting, proof reading	Tarah, Kurt, Rob
3/6	1pm	11	Tarah's PC	Word, Excel	Formatting, proof reading	Group
5/6	3pm	2	MD PC	EXCEL	Accounts	Rob, Kurt

Group Two: Marcus

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
10/4	4 pm	2	Home, Internet Explorer	←	Look up Business Plan websites	Me
12/4	1pm	3	Home, Internet	Internet Explorer 5.0	Look up Business Plan websites	Me
20/4	11pm	20min	Home, Hotmail	Internet Explorer	Reading email from group	Me
22/4	11am	1	Home, Internet	Internet Explorer	Reading email from group	Me
25/4	10pm	30min	Microsoft Word 95	→	Typing Work	Me & Kylie
27/4	6.30pm	2	Microsoft Word 95	→	Typing Work	Me
1/5	2pm	2	Microsoft Word 95	→	Typing Work	Me
4/5	2pm	30 min	Microsoft Word 95	→	Typing Work	Me
10/5	1pm	1	Microsoft Word 95	→	Typing Work	Me
16/5	9am	3	Home, Internet & Word	Microsoft internet explorer, Word 95	Writing report with Kylie	Me & Kylie
22/5	5pm	3	Home, Windows	Microsoft Word 95	Typing work. Group meeting	Me, Kylie, Karen
24/5	2pm	2	Home, Windows	Microsoft Word 95	Typing work	Me
25/5	7pm	1	Home, Windows	Microsoft Word 95	Typing work	Me
27/5	5pm	30 min	Home, Windows	Microsoft Word 95	Typing work	Me & Kylie
29/5	9am	2	Karen's House, Windows	Word	Group meeting	Whole group – me, Karen, Kylie, Bryan , Matt, Drew

1/6	11.30am	7	Bryan's House, 3x laptops, 2x PC's Windows 95 & 98	Word 95 & 98	Putting work together, finishing sections of work	Whole group – me, Karen, Kylie, Bryan , Matt, Drew
2/6	9am	6	Bryan's House, 3x laptops, 2x PC's Windows 95 & 98	Word 95 & 98	Putting work together, finishing sections of work	Whole group – me, Karen, Kylie, Bryan , Matt, Drew
3/6	9am	11	Bryan's House, 3x laptops, 2x PC's Windows 95 & 98	Word 95 & 98	Putting work together, finishing sections of work	Whole group – me, Karen, Kylie, Bryan , Matt, Drew
4/6	9am	3	Bryan's House, 3x laptops, 2x PC's Windows 95 & 98	Word 95 & 98	Putting work together, finishing sections of work	Whole group – me, Karen, Kylie, Bryan , Matt, Drew
8/6	4pm	1	Home, Windows	Microsoft Word 95	Typing presentation work	Myself
11/6	10am	1	Home, Windows	Microsoft Word 95	Typing presentation work	Myself

Group Two: Karen

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
15/4	7pm	1	Home	Internet Communicator 4.7	To look up info about silicon product	Myself
27/4	11pm	0.5	Home www.hotmail.com	Internet Communicator 4.7	To email group	To Kylie, Marcus, Andrew, Matthew, Bryan – internet froze didn't get sent.
7/5	1pm	1	Home www.hotmail.com	Internet Communicator 4.7	Open email of group survey and print summary	myself
8/5	8pm	2	Home Windows 95	MS Word version 6	Typing parts work	myself
9/5	10pm	1.5	Home Windows 95	MS Word	Typing work	myself
10/5	4pm	2	Home www.nzstats.govt.co.nz	Internet communicator	Looking up stats & info for Marketing	myself
16/5	1pm	30mins	Home Windows 95	Word	Typing work	myself
18/5	11pm	1	Home Windows 95	Word	Typing work	myself
19/5	10am	3	Home Windows 95	Word	Typing work	myself
20/5	1pm	1	Home Windows 95	Word	Typing work	myself
22/5	5pm	3	Marcus's, Windows 98	Word	Typing work	myself
23/5	2pm	2	Home	Word	Typing work	myself
25/5	9pm	5	Home	Word	Typing work	myself
29/5	9am	1	Home	Word	Typing work	Whole group
1/6	11am	8	Bryan's house	Word	Typing work and putting together Business Plan	Whole group

2/6	9am	6	Windows 95 & 98	Word	Typing work and putting together Business Plan	Whole group
3/6	9am	10	Windows 95 & 98	Word	Typing work and putting together Business Plan	Me & Kylie
4/6	9am	3	Windows 95 & 98	Word	Typing for presentation	Me
9/6	4pm	1	My house	Word	Typing for presentation	Me
10/6	2pm	20mins	Kylie's house	Word	Typing for presentation	Me & Kylie
11/6	10am	10mins	AUT. Windows 98	Excell	Graphs for presentation	Me & Matthew

Group Two: Kylie

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
20/3	10.30pm	0.3	Home PC	Explorer/ hotmail	Business Plan ideas	By myself to rest of group
21/3	9am	0.2	Work PC	Outlook	Business Plan ideas	By myself to rest of group
31/3	4pm	1.5	Bryan's house	Word	Print off our preliminary report off disk	Me on computer by myself. Rest of group there.
18/4	1pm	2	Home	Explorer All the web.com	Look up statistics	Me by self. Rest of group in same room.
20/4	11am	0.2	Home	Hotmail	Update to group	Me -> rest of group
11/5	12pm	3	Home	Explorer All the web.com	Look up manufactures	Me on computer by myself. Rest of group there
16/5	9am	3	Marcus's house	I was on laptop (word) Marcus & I on web at same time -> explorer	Write report and look up info.	Marcus & Kylie

Group Two: Matthew

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? -People
7/5	11am	½ hr	www.hotmail.com home 'general' computer	Internet Explorer MS Word	To open and print emailed survey for B-Plan	Myself
12/5	7.30pm	1	home 'general' computer	MS Word	To plan financial structure and objectives and print out	Myself
13/5	1pm	½ hr	www.hotmail.com home 'general' computer	Internet Explorer	Check email	Myself
21/5	10am 1pm	5 min 1hr	AUT library home 'general' computer ww.ird.co.nz	MS Excel MS Word Internet Explorer	Open disk file and print out survey analysis. To rewrite our financial plan to find depreciation rates	Myself

Group Three: Alistair

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? -People
22/3	3.30	15mins	Home PC	Email on Internet	To email a part of the preliminary report for Mandy	Myself
24/3	6.30	20mins	Home PC	Email on Internet	Part of Preliminary report for Sandra	Myself
4/4	4.30	1	Home PC	Tried to set up mock accounts (Excel)	To see what work I could get done	Myself
25/4	1.00	1	Home PC	Sent email	Trying to get all costs	Myself
9/5	2.00	20m	Home PC	email	Sent to Mandy confirming meeting	Myself
11/5	5.30 10.00	30m 2 hrs	Home PC	Internet email Excel	Send to Mandy and Bryce Accounting info Working on Accounting stuff	Me
14/5	2.30	30min	Home PC	Internet email	Send accounts to Bryce and other stuff	Me
15/5	2.30	1	Home PC	Excel	Input more accounting data	Me
17/5	11.00	2	Home PC	Excel	Accounting Data	Me
29/5	9.00	3	PC at Rachel's house	Excel	Accounting input	Me, Bryce
30/5	11.00	3	Home PC	Excel	Accounting input	Me
31/5	9.30	3	PC at Rachel's house	Excel – Accounting input	To get statements	Me, Bryce
1/6	11.00 7.30	2 3	PC at home	Excel	Accounting data	Me
2/6	9.00	5.5	PC at home	Excel	Accounting data	Me
3/6	2.00 7.30	1 2	PC at Rachel's house	Excel Word	Accounting Notes to accounting ratio.	Me
8/6	11.30	½	PC at home	Excel, Powerpoint	Graphs	Me

Group Three: Rachel

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
10/4	2.30pm	45mins	At home Downstairs computer	Internet	Need stats of population in NZ	www.stats.govt.nz (self)
12/4	4.15pm	1	My comp-at-home	Internet	And info for old peoples facilities fitness. Sent email	Hillary commission
16/4	2pm	10min	My comp-at-home	Hotmail – Internet	To check email	From Hillary comm.. + govt agency
26/4	8pm	1	My comp-at-home	Word	Typing up Mktg info	-
1/5	1pm 1.30pm	20min 10min	At home Downstairs computer	Internet Internet – email	Looking for web page company for design Send email to UDC concerning email.	-
9/5	2.15pm	10min	At home Downstairs computer	Hotmail - Internet	Sent email to mkting teachers	
11/5	2pm 4pm	10mins 2hrs	Downstairs My comp-upstairs	Hotmail – internet Word	Read email from mktg teacher Typing up info	
14/5	8pm	30min	My comp-US	Internet	Surfed forinfo Hillary Commision	
18/5	3pm	45min	My comp-US	Internet	Stats NZ info.	
21/5	7pm	1.5	My comp-US	Word	Typed up info	
22/5	6.30pm	50min	Bryce's Comp.	Publisher	Helping to design logo	(With Bryce)
24/5	1.20pm	10min 2hrs	Home –DS	Hotmail	Email rcvd from Hannah. Survey analysis put into Word. Typing up info.	Rachel, Sandra
28/5	9am	4	Rachel's PC	Word	Editing	All
29/5	9am	5	Rachel's PC	Word	editing	All

Group Three: Bryce

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
19/3	3pm	20 min	Home PC	Internet-email	Contact AUT lecturers for info	Personal
26/3	3pm	20min	Home PC	Internet-email	Hotmail	Personal
28/3	2pm 9pm	10 min 20 min	Home PC	Internet-Internet-BOL	Email AUT lecturers Info for presentations	Personal
3/4	1pm	1hr	Home PC	Publisher	Business Logo	Personal
10/4	9pm	10min	Home PC	Internet-email	Personal email	Personal
13/4	7.30pm	10min	Home PC	Internet-Hotmail	Email other members	Personal
2/5	10.30am	30min	Home PC	Internet-Brokers Law partner	Law	Personal
3/5	10pm	30min	Home PC	Internet-Hotmail-BOL	Email - chart	Personal
8/5	1pm	10min	Home PC	Internet	ASB Bank + banking	Personal
13/5	9am	2	Home PC	Word	Type up programs	Personal
14/5	11am	1.5	Home PC	Internet-Brookers	Law for OSH	Personal
16/5	1pm	1	Rachel's PC	Word	Programs etc	Personal
17/5	11am	½	Rachel's PC	Excel	Shareholders contribution	Personal
20/5	8pm	1	Home PC	Internet-email	ASB bank for info on Business lending	Personal
21/5	11am	2	Rachel's PC	Internet-email	Gather info on business lending	Personal

23/5	2pm	½	Rachel's PC	Word	Type up shareholder equity, Debt finance	Personal
25/5	9.30am	1.5	Home PC	Internet	Look for Law on Health and Safety on Brookers	Personal
28/5	9	3	PC at Rachel's House	Excel	Accounting input	Personal, Alistair
31/5	9.30	3	PC at Rachel's house	Excel	Accounting input	Personal, Alistair

Group Three: Mandy

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
21/3	10.30am	1hr	Home personal computer	Word	Begin writing Preliminary Report	Myself
23/3	1.30pm	½ hr	Home PC	Word email	Finish Preliminary Report and send to Sandra	Myself and Sandra
8/5	2pm	10min	Home PC	Email	Notify others of meeting on Thurs.	Myself, Sandra, Rachel, Hannah, Bryce, Al (recipients).
8/5	3pm	1.5	Home PC	Word	To work on my part of the assignment	Myself
14/5	2.30pm	30 min	Home PC	Works spreadsheet Word	Look at Alistair's Accounting Analysis	Myself
15/5	3.15pm	5min	Home PC	Internet Messenger	Tell Bryce to arrive at 8am on Thursday	Myself, Bryce (recipient)
15/5	3.20pm	5min	Home PC	Internet Messenger	Tell Sandra to arrive at 8am on Thursday	Myself, Sandra (recipient)
21/5	2.30pm	2.5	Home PC	Word	Work on Business Plan	Myself
22/5	2pm	2	Home PC	Word, Internet, email	Work on Business Plan. Use AUT library. Email lecturers and group.	Myself, all group members, John Clifton.
23/5	9.30am	5min	Home PC	email	Check for replies	Myself
24/5	12	7hrs	Home PC	Word, Internet	Business plan. AUT site to use Brookers Law.	Myself

26/5	12pm	6	Home PC	Word, Internet	Write business plan. Look up job descriptions.	Myself
28/5	4pm	2	Home PC	Word, Internet	Write Business plan. Brookers web site.	Myself
30/5	6pm	45min	Home PC	Word, Internet	Write Bus. Plan. Brookers Law site.	Myself
2/6	12pm	4hrs	Home PC	Word	Edit B. Plan	Myself

Group Three: Hannah

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
22/3	8pm	30mins	Home PC Printer	Internet Explorer (IE)	Legal Research	Alone
23/3	2pm	30min	Home PC Printer	IE, Word	Legal Research/ Prelim Report	Alone
25/3	7pm	10min	Home PC Printer	IE, Outlook Express	Check emails and Bus. On line	Alone
28/3	8am 8pm	3hrs 1hr	Home PC Printer	IE, Word, Outlook	Check emails, BOL, Research Health, Elderly (Management Case Study)	Alone
30/3	1pm	30min	Home PC Printer	IE, Word, Outlook	Check email	Alone
31/3	12noon	2	Home PC Printer	Word, BOL, Excel, IE, Outlook	Check email, Survey, get sample Bus Plans	Alone
2/4	8pm	1.5hr	Home PC Printer	Word, BOL, Excel, IE, Outlook	Email, do group review	Alone/ BOL discussion
4/4	9am	3	Home PC Printer	Word, BOL, Excel, IE, Outlook	Email, Survey, get rest home info off white pages	Alone
5/4	6pm	2	Home PC Printer	Word, Powerpoint, IE, Outlook	Email, survey, review presentation	Alone
31/5	9am	4	Rachel's PC	Word, Excel, Pub	Editing	All
1/6	9am	6	Rachel's PC	Word, Excel, Pub	Editing	All
3/6	10am	10	Rachel's PC	Word, Excel, Pub	Editing/ printing	All
4/6	10am	12	Rachel's PC	Word, Excel, Pub	Editing + Printing	All

Group Three: Sandra

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
20/3	1.30	½ hr	Home	World wide web	Research (elderly fitness)	1 person - myself
21/3	5.30	8min	Home	Word 95	Group norms	1 person - myself
22/3	12.35	5min	Friends (sisters)	Explorer	Check group emails	1 person - myself
23/3	1pm	10min	Home	Word 95	Writing preliminary report	1 person - myself
25/3	7.10	½ hr	Friend's house	Word 98	Writing report	1 person - myself
9/4	12.30	½ hr	Sisters	Hotmail	Sending, checking, replying	1 person - myself
9/5	6.00	½ hr	Sisters	Word 95 Explorer	Writing report draft in bullet. Also checked group emails -> Mandy meetings for future	1 person - myself

Group Four: Cameron

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
5/3	18.00	15min	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5	Communicate w/ lecturer to inform of group formation.	To: L Webster CC: Nat, Neil, Jay, Troy & Chris
6/3	20.00	45min	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5	Forward registration of interest.	To: L. Webster
7/3	22.00	15min	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5	Forward ideas for Bus. Plan to colleagues & download their work.	To: Nat, Neil, Jay, Troy and Chris.
15/3	15.00	30min	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5	Inform group members of proposed meeting and required preparation.	To: Nat, Neil, Jay, Troy and Chris.
20/3	22.00	2	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5	Prepare my contribution for the preliminary report. Forward to group members.	To: Nat, Neil, Jay, Troy and Chris.
22/3	21.00	1	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5	Email group members re: amendments & meeting the next day. Also receive email from Jay re: Wednesday's work	To: Nat, Neil, Jay, Troy and Chris.
23/3	16.00	1	As above	As above	Email group members final draft of report for their appraisal.	To: Nat, Neil, Jay, Troy and Chris.

25/3	16.00	1	As above	As above	Download suggestions. Make amendments. Print final report.	To: Neil, Jay. (recipients)
27/4	2100	0.5	Residence Toshiba 480cdt laptop w/ modem	Microsoft Internet Explorer 5.5 & Microsoft Word 97	Clear email & download work from group.	Troy, Neil (recipients)
8/5	1600	2	Residence as above	MS Explorer 5.5, MS Word 97, MS Excel	Clear email. Download files from group.	Neil, Nat, Troy (recipients)
10/5	2000	1	Residence as above	MS Explorer 5.5, MS Word	Clear email. Forward components of assignment to group.	Jay, Neil, Troy (recipients)
11/5	1500	1	Residence as above	MS Explorer 5.5, MS Word 97,	Download files from Chris. Clear email.	Chris (recipient)
13/5	1800	1	Residence as above	MS Explorer 5.5, MS Word 97,	Send Neil files & propose meeting to work.	Neil (recipient)
14/5	0900	4	Neil's place and Neil's computer	Ms Word, MS Excel MS Explorer	Download files from group & begin formatting Master Doc	Chris, Troy, Neil, Jay & Nat
15/5	1200	3	Neil's place and Neil's computer	Ms Word, MS Excel MS Explorer	Download files from group & begin formatting Master Doc	Neil
17/5	1000	5	Neil's place and Neil's computer	Ms Word, MS Excel MS Explorer	Continue with formatting and adding sections of Business P.	Jay, Neil

18/5	0900	4	Neil's place and Neil's computer	Ms Word, MS Excel MS Explorer	Continue w/work forward email advising group of goals, tasks & deadlines.	Chris, Troy, Jay, Neil, Nat
22/5	2000	1	Residence Toshiba 480cdt laptop w/ modem	MS Word MS Explorer	Create file & email	Neil
24/5	1000	4	Neil's place. (my laptop) & Neil's computer	MS Word MS Explorer MS Excel	Continue putting assignment together	Neil
25/5	1000	6	Neil's place. Toshiba 480cdt laptop & Neil's computer	MS Word MS Explorer MS Excel	Continue putting assignment together. Email out backup work.	Neil, Nat, Jay, Troy, Chris.
28/5	1000	6	Neil's place. Toshiba 480cdt laptop & Neil's computer	MS Word MS Explorer MS Excel	Continue putting assignment together. Email out backup work.	Neil
29/5	1000	5	Neil's place. Toshiba 480cdt laptop & Neil's computer	MS Word MS Explorer MS Excel	Continue putting assignment together. Email out backup work.	Neil
30/5	0900	15	Neil's place. Toshiba 480cdt laptop	MS Word MS Excel MS Publisher MS Explorer	Create files format & compile master download work email backup	Neil, Jay, Nat, Troy & Chris
31/5	1000	10	As above	As above	Email progress. Download queries & as above	Neil, Jay, Chris & Troy.
1/6	1000	8	As above	As above	Formatting & compiling & emailing	Neil, Jay, Chris, Troy

Group Four: Jay

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
23/3	11.30am	1hr	AUT Wellesley campus Laptop	Microsoft Word	Writing preliminary report	Everyone
24/3	4pm	30min	Home – computer	Microsoft Word	Review preliminary report	Myself
4/4	9am	5mins	Home – computer	Microsoft Outlook	Notice of mtg. Re: Bus. Report of Friday	Everyone (recipients)
9/4	10.15	5mins	Home – computer	Microsoft Outlook	Inform of meeting held last Sat & request for email address	Chris (recipient)
9/4	10.20	5mins	Home – computer	Microsoft Outlook	Request to meet for sign off of Business Plan Survey	Chris, John Clifton, Geoff Perkins (recipients)
10/4	10am	5mins	Home – computer	Microsoft Outlook	More info for Bus Questionnaire sign off	Lynne Webster (recipients)
10/4	3pm	½ hr	Home – computer	MS Word	Edit questionnaire email re : survey	Myself
11/4	9.05 9.30 10.00	5 mins	Home – computer	Microsoft Outlook	Sign off	Chris (recipients)
9/5	6.00	20min	Home – computer	MS Word	Type notes from today's meeting for Business Plan .	Group
	6.50	5mins	Home – computer	MS Outlook	Email above	Neil (recipient)

13/5	4.30	1hour	Home - computer	MS Word	Typed notes for BRR	Myself & Natasha
15/5	3.25	2mins	Home - computer	MS Outlook	Email notes	Troy (recipient)
16/5	3.30	1	Home – computer	MS Word	Typed notes	Myself
17/5	10.30	1	Home - computer	Internet	Research	Myself
18/5	11.20	1	Home - computer	Internet	Research	Myself
22/5	2pm	2	Home - computer	MS Excel	Costings	Myself
23/5	11.00	5 mins	Home - computer	MS Outlook	Email costings	Neil (recipient)
24/5	9.30	2	Home - computer	Internet Explorer MS Outlook MS Word	Research, check email, type notes	Myself
27/5	2pm 4pm	1 1	Home - computer	MS Word MS Word	Type notes & edit notes	Myself
28/5	10am	2 1	Home - computer	MS Word MS Word	Type & edit notes	Myself and Cameron
29/5	1pm	2	Home - computer	MS Word	Type & edit notes.	Myself
30/5	9.40	2min	Home - computer	MS Outlook	Send notes via email	Chris (recipient)
30/5	2.00	1hr		MS Word	Notes.	--
30/5	3.00	2mins		MS Outlook	Email notes	Neil + Cameron (recipients)
31/5	2.00	2	Cameron's computer	MS Word	Editing	Group
1/6	2.00	1	Neil's computer	MS Word	editing	Group

Group Four: Natasha

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
21/3	4.30pm	1.5	Personal Jay's house laptop (Apple) ibook	Claris Works 6.0	To <u>type</u> up gp. thoughts on budgetary req. for prelim report	Jay, Chris, Neil, Troy, Cam, + I
22/3	2pm	0.5	Personal - mine house apple ibook laptop	Netscape Nav. 4.5	<u>Emails</u>: check them + reply *waiting for copy of draft of prelim report.	Myself
24/3	1.30pm	0.5	AUT Library PC	Internet Explorer	Clear <u>email</u> from Cam re: final copy of prelim report to read over + check	Myself
28/3	9.30pm	¼ hr	Home Apple ibook	Netscape Nav. 4.5	Check <u>email</u> for one from John re: Friday meeting.	Myself
5/4	3.30pm	¼ hr	Home Apple ibook	Netscape Nav. 4.5	Clear emails re: gp. meetings in holidays.	Me
12/5	11am	1/6 hr	Home Apple ibook	Netscape Nav. 4.5	Cleared Troy's email + document on timeline.	Me
15/5	11.30	2	AUT Library PC	Microsoft Word	Type up Mktg info – <u>segments.</u>	Me
16/5	10.30	1.5	AUT Library PC	Microsoft Word	Type up info – placing strategy.	Me
17/5	1pm	2	AUT Library	Microsoft Word	Type up mktg – place strategy.	Me
17/5	2pm	¼ hr	AUT Library	Internet Explorer	Email Alison (lecturer) re: mktg. Check emails	Me
18/5	10am	2	AUT Library	Microsoft Word	Type up mktg pricing strategy Print out place + price strategy for checking.	Me

20/5	1pm	½ hr	Home Apple ibook	Netscape Nav. 4.5	Check emails from gp. – send one confirming meeting time for next week.	Me
21/5	6.30pm	¼ hr	Jay's house Apple ibook	Microsoft Office	Loading onto a Mac a compatible Office version (so I can work form home + send/receive emails via Word)	Jay, Bob (Jay's husband) + I
22/5	9am	3	Home Apple ibook	Claris Works, Netscape Navigator	Type up bibliography Type up ideas for future strategies Internet search Restaurant Associates Colmar Brunton, AC McNielson sites.	Me
23/5	11am 5pm	2 ½ hr	Home Apple ibook Jay's – my apple ibook	Microsoft Word Netscape Nav.	Confirming Mktg objectives + stats w group.	Me
24/5	9am	1	My house Apple ibook	Microsoft Word	Organizing info from last night into document Adding stats research to document	Cam, Jay, Chris, Troy & I
25/5	1pm	2	Home Apple ibook	Microsoft Word	Tidying up positioning pricing strategy Proof reading mkt segments/ target markets Added Internet sites to bibliography	Me
28/5	10am	2	Home Apple ibook	Microsoft Word	More typing/ proof reading/ tidying	Me

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29/5	11am	2	Jay's - Apple ibook	Microsoft Word	To bring together combined information Also to check each others work	Jay & I
29/5	4.30pm	1	Jay's - Apple ibook	Microsoft Word 98	Met with boys to discuss each others. Made changes + integrated relevant info.	Jay, Cam, Neil & I
30/5	8am	2	My house Apple ibook	Microsoft Word Netscape	Final adjustments to my work Email work -> Neil/ Cam	Me
30/5	4pm	1	Home – apple ibook	Microsoft Word 98	Had to change files + save under older (95) word document (Cam couldn't read mine)	Me
31/5	10am	6	Neil's house	Microsoft Word 97	Typing up bibliography + reference list Assisting in formatting	Jay & I
1/6	2pm	4	Neil's house	Microsoft Word Explorer	More formatting Email document -> Troy/ Chris for final detailing	Neil, Cam, Jay & I

Group Four: Chris

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
2/4	7.03pm	10min	My home PC	Outlook Express	Small Message to group members	Sent to all group members (individual)
2/4	9.30pm	2.5hrs	My home PC	Microsoft Word	Typed a survey questionnaire. Sent it to the group	Sent to all group members (individual)
3/4	11am	15min	My home PC	Outlook Express Microsoft Word	Retrieved mail from Troy	(individual)
7/5	10pm	2	My home PC	Excel + Outlook Express	Made Gantt chart on excel. Emailed to group	Sent to all group members
15/5	7.30pm	2	My home PC	Powerpoint/ Excel, Word + outlook	Made organizational structure using P.P.	(individual)
16/5	10am	12	Home PC	Word/ Excel/ Powerpoint/ Outlook	Individual work	(individual)
17/5	10am	12	Home PC	Word/ Excel/ Powerpoint/ Outlook	Individual work	Myself
18/5	10am	12	Home PC	Word/ Excel/ Powerpoint/ Outlook	Individual work	Myself
20/5	1pm	7	Home PC	Word/ Excel/ Powerpoint/ Outlook	Individual work	Myself

21-25/5	10	14	Home PC	Word/ Excel/ Powerpoint/ Outlook	Various Tasks	Myself
28/5	11am	9	Home PC	Word and Outlook Express	Writing/ editing draft document	Myself
29/5	2pm	12	Home PC	Word/ Excel	Completing individual work	Myself
30/5	9am	5	Home PC	Word + Outlook Express	Typed job descriptions for appendices.	Emailed final copies to group
30/5	5pm	4.5	Neil's place	Word	Formatting Business Plan	Neil, Cam, Troy, Jay, Chris
31/5	9am	5	Home PC	Word	Writing/ editing sections	Myself
31/5	5pm	4.5	Neil's place	Word	Formatting main document	Troy, Neil + Chris
1/6	10am	7	Neil's place	Word	Formatting + Table of Contents	Neil, Cam, Chris
1/6	5.30pm	3.5	Troy's Place	Word	Formatting + Table of Contents	Troy, Chris
2/6	10am	18	Home PC	Word	Editing main document	Chris
4/6	11am	3	Troy's place	Word	Editing main document	Troy, Chris
4/6	8pm	10	Home PC	Word	Editing/ printing	Chris
5/6	9am	1	My girlfriends work computer	Word	Printing final copy	Chris

Group Four: Troy

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
5/3	12.47	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Cameron (recipient)
6/3	9.57	1m	Home 200mhz IBM	Outlook Express	Send files(Word)	Cameron (recipient)
6/3	18.28	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Group (source)
11/3	16.38	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Chris (recipient)
20/3	14.39	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Neil (recipient)
20/3	14.39	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Jay (recipient)
21/3	21.37	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Cameron (recipient)
23/3	16.24	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Cameron (recipient)
24/3	1300	1h	Jay's house Apple laptop	Mac spreadsheet	Financial statements	Group
3/4	20.30	1m	Home 200mhz IBM	Outlook Express	Send files(Word)	Group (recipient)
13/5	17.00	1m	Home 200mhz IBM	Outlook Express	Send files(Word)	Group (recipient)
14/5	16.00	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Chris (recipient)
15/5	19.00	1m	Home 200mhz IBM	Outlook Express	Receive files(Word)	Chris (recipient)
23/5	17.00	1hr	Jay's house – her PC	Word	Bus Plan work	Chris Myself
27/5	4.10	(4)	Home PC	Word, Excel	Exchanging and editing of files	Cam, Neil Chris
28/5 -> 1/6		(20)	Neil's Place	Excel Word	Formatting Editing	All
2/6 -> 5/6		(30)	My PC sending & receiving from Chris	Word Outlook Express	Emailing doc + editing	Chris Myself

Group Four: Neil

When Date:	Time	Duration (hrs)	Where? Location & Hardware	What? Software program	Why? - Purpose	Who? - People
1/3	1.48pm	30mins	Home-computer	Microsoft Word	Registration of interest	Neil (solo)
6/3	2.14pm	5mins	Home	Download from Microsoft Word	Different business ideas	Cam+ Neil
6/3	3.04pm	5mins	Home	Download from Microsoft Word	Different business ideas	Cam + Neil
13/3	11.18pm	5mins	Home	Download from Microsoft Word	Different business ideas	Troy + Neil (recipients)
23/3	11.30am	1hr	AUT Wellesley campus - laptop	Microsoft Word	Writing Prelim report	Everyone
1/4	10am	2hours	Home-computer	Microsoft Word	Survey	Neil (solo)
10/4	3.30pm	2hours	Home-computer	Microsoft Excel	Survey results on charts/ tables	Neil (solo)
10/4	5.30pm	30min	Home-computer	Hotmail	Email results to other group members	Neil (solo)
8/5	4pm	3hours	Home-computer	Microsoft Excel	Match performance statements	Neil + Cam
8/5	8.30pm	1hours	Home-computer	Microsoft Word	Structuring Business Plan	Neil (solo)
9/5	1pm	1.5hour	Home-computer	Microsoft Word	Copy work into Business Plan	Neil + Cam
18/5	10.30	4 hrs	Laptop – Cam's house	Excel + Word	Financial statements + notes	Cam + Neil
22/5	1pm	2 hrs	Home-computer	Excel + Word	Financial statements + notes	Neil (solo)

22/5	10am	1 hr	Home-computer	Hotmail + Excel	Download loan scheme	Neil (solo)
24/5	9am	12hrs	Home-computer	Excel + Word	Developing Business Plan + financial statements	Neil + Cam
28/5	10am	10hours	Home-computer	Excel + Word	Developing Business Plan + financial statements	Neil + Cam
29/5	10am	10hours	Home-computer	Excel + Word	Developing Business Plan + financial statements	Neil + Cam
30/5	10am	10hours	Home-computer	Excel + Word	Formatting doc. Excel copying to Word	Neil, Cam, Chris, Troy
31/5	10am	10hours	Home-computer	Excel + Word	Formatting doc. Excel copying to Word	Neil, Cam, Chris, Troy
1/6	10am	10hours	Home-computer	Excel + Word	Spell checking, grammar etc..	Neil, Cam, Chris, Troy
3/6	1am	1 hour	Home-computer	Email - hotmail	Downloading	Neil (solo)

Appendix G: Log sheet analysis

Table G1: Group Activity by estimate of frequency of computer use

Source group (page)	solo	pair	Sub gp.	Whole gp.	Total	email	web	Word Proc.	Sprd. Sht.	grap hics	Other (BOL)	Total
ONE												
1 Melissa	23	0	1	0	24	17	6	8	0	0	0	31
2 Melissa	14	3	0	0	17	7	2	7	5	0	0	21
3 Tarah	20	3	0	1	24	15	5	10	0	0	0	30
4 Tarah	9	3	0	0	12	9	0	5	1	0	0	15
5 Suzanne	20	1	1	1	23	11	4	12	0	0	0	27
6 Suzanne	0	1	2	3	6	2	0	10	1	0	0	13
7 Rob	10	1	0	0	11	5	2	4	4	1	0	16
8 Kurt	14	0	0	0	14	8	4	1	0	2	0	15
9 Kurt	14	0	1	0	15	11	4	4	0	3	0	22
10 Kurt	3	1	1	5	10	3	0	6	1	0	0	10
Subtotals	127	13	6	10	156	88	27	67	12	6	0	200
Percentages	81%	8%	4%	6%	100%	44%	14%	34%	6%	3%	0%	100%
TWO												
11 Marcus	10	3	1	1	15	2	2	11	0	0	0	15
12 Marcus	2	0	0	4	6	0	0	6	0	0	0	6
13 Karen	13	0	0	2	15	2	2	11	0	0	0	15
14 Karen	2	3	0	1	6	0	0	5	1	0	0	6
15 Kylie	3	1	0	3	7	3	3	2	0	0	0	8
16 Matthew	4	0	0	0	4	2	1	3	0	0	0	6
Subtotals	34	7	1	11	53	9	8	38	1	0	0	56
Percentages	64%	13%	2%	21%	100%	16%	14%	68%	2%	0%	0%	100%
THREE												
17 Alistair	14	2	0	0	16	6	0	1	11	1	0	19
18 Rachel	10	2	0	2	14	5	4	5	0	1	0	15
19 Bryce	15	0	0	0	15	5	6	2	1	0	1	15
20 Bryce	2	2	0	0	4	0	1	1	2	0	0	4
21 Mandy	9	1	0	1	11	6	1	6	1	0	0	14
22 Mandy	4	0	0	0	4	0	3	4	0	0	0	7
23 Hannah	9	0	0	4	13	7	4	11	7	4	4	37
24 Sandra	7	0	0	0	7	3	1	4	0	0	0	8
Subtotals	70	7	0	7	84	32	20	34	22	6	5	119
Percentages	83%	8%	0%	8%	100%	27%	17%	29%	18%	5%	4%	100%

Source (page)	Group	solo	pair	Sub Gp.	Whole gp.	Total	email	web	Word Proc.	Sprd. Sht.	graph ics	Other (BOL)	Total
	FOUR												
25	Cameron	7	0	0	0	7	7	0	0	0	0	0	7
26	Cameron	6	1	1	1	9	8	0	8	4	0	0	20
27	Cameron	0	4	2	3	9	7	0	9	8	1	0	25
28	Jay	8	0	0	2	10	7	0	4	0	0	0	11
29	Jay	13	2	0	2	17	5	3	11	1	0	0	20
30	Natasha	9	0	0	1	10	6	5	0	0	0	0	11
31	Natasha	5	0	2	0	7	2	1	6	0	0	0	9
32	Natasha	2	2	2	0	6	2	0	6	0	0	0	8
33	Chris	9	0	0	0	9	4	0	7	6	5	0	22
34	Chris	7	2	2	1	12	3	0	13	2	1	0	19
35	Troy	12	2	1	2	17	14	0	4	3	0	0	21
36	Neil	6	5	0	1	12	1	3	7	4	0	0	15
37	Neil	2	3	3	0	8	1	1	6	7	0	0	15
Subtotals		86	21	13	13	133	67	13	81	35	7	0	203
Percentages		65%	16%	10%	10%	100%	33%	6%	40%	17%	3%	0%	100%
Grand totals		317	48	20	41	426	196	68	220	70	19	5	578
Percentages		74%	11%	5%	10%	100%	34%	12%	38%	12%	3%	1%	100%

Table G2: Group activity by estimate of time in hours of computer use.

Source (page)	Group	solo	pair	Sub Gp.	whole gp.	Total	email	web	Word Proc.	Sprd. Sht.	graph ics	Other (BOL)	Total
	ONE												
1	Melissa	8.8	0	0.33	0	9.13	2.33	3	3.5	0	0	0	8.83
2	Melissa	10.5	3.5	0	0	14	1.5	2	8.5	3.3	0	0	15.3
3	Tarah	13	1	0	0.5	14.5	4.15	3.75	6	0	0	0	13.9
4	Tarah	6.25	4.5	0	0	10.75	4	0	6.25	0.5	0	0	10.75
5	Suzanne	14.85	1.15	2.5	4	22.5	3	2	17.5	0	0	0	22.5
6	Suzanne	0	0.33	15	16.5	31.83	0.5	0	26.5	1	0	0	28
7	Rob	9.25	2	0	0	11.25	2	2	2.25	6.25	0.5	0	13
8	Kurt	10	0	0	0	10	2.15	6	0.33	0	2	0	10.48
9	Kurt	20	0	1.5	0	21.5	3.5	9.5	4	0	4.5	0	21.5
10	Kurt	0.75	2	5	32	39.75	0.75	0	30	2	0	0	32.75
Subtotals		93.4	14.48	24.33	53	185.21	23.88	28.25	104.83	13.05	7	0	177.01
Percentages		50%	8%	13%	29%	100%	13%	16%	59%	7%	4%	0%	100%

Source (page) / Group	solo	pair	Sub Gp.	whole gp.	Total	email	Web	Word Proc.	Sprd. Sht.	graphics	Other (BOL)	Total
TWO												
Marcus	16	4	3	2	25	1.33	5	17.5	0	0	0	23.83
Marcus	2	0	0	27	29	0	0	29	0	0	0	29
Karen	23.5	0	0	9	32.5	1.5	3	28	0	0	0	32.5
Karen	4	0.75	0	6	10.75	0	0	20.33	0.15	0	0	20.48
Kylie	0.7	3	0	6.5	10.2	0.7	6	3.5	0	0	0	10.2
Matthew	3	0	0	0	3	0.75	1	1.5	0	0	0	3.25
Subtotals	49.2	7.75	3	50.5	110.45	4.28	15	99.83	0.15	0	0	119.26
Percent.	45%	7%	3%	46%	100%	4%	13%	84%	0%	0%	0%	100%
THREE												
Alistair	26	6	0	0	32	3	0	2	27	0.25	0	32.25
Rachel	8.5	3	0	9	20.5	0.85	2.75	13.5	0	0.85	0	17.95
Bryce	11.75	0	0	0	11.75	1.75	5	3	0.5	1	0.33	11.58
Bryce	2	6	0	0	8	0	1.5	0.5	6	0	0	8
Mandy	13.5	0.5	0	2	16	0.5	3	11.25	0.5	0	0	15.25
Mandy	12.75	0	0	0	12.75	0	3.5	10.5	0	0	0	14
Hannah	14	0	0	32	46	2.33	4	27.5	9	6	1	49.83
Sandra	2.33	0	0	0	2.33	0.85	0.5	1	0	0	0	2.35
Subtotals	90.83	15.5	0	43	149.33	9.28	20.25	69.25	43	8.1	1.33	151.21
Percent.	61%	10%	0%	29%	100%	6%	13%	46%	28%	5%	1%	100%
FOUR												
Cameron	5.75	0	0	0	5.75	5.75	0	0	0	0	0	5.75
Cameron	6.5	3	5	4	18.5	4.5	0	8.5	5	0	0	18
Cameron	0	16	18	25	59	2	0	39	11	2	0	54
Jay	1.5	0	0	1.33	2.83	1	0	2.5	0	0	0	3.5
Jay	12.5	4	0	3	19.5	0.5	3	14	2	0	0	19.5
Natasha	9.5	0	0	1.5	11	2	0	9	0	0	0	11
Natasha	10	0	1.25	0	11.25	1	1.5	8.75	0	0	0	11.25
Natasha	3	8	5	0	16	0.5	0	15	0	0	0	15.5
Chris	50	0	0	0	50	1	0	40	15	7	0	63
Chris	74	6.5	11.5	4.5	96.5	3	0	88.5	5	2	0	98.5
Troy	0.25	30	4	20	54.25	0.25	0	50	7	0	0	57.25
Neil	8	9	0	1	18	0.5	0.25	10	8	0	0	18.75
Neil	2	32	30	0	64	1	1	43	20	0	0	65
Subtotals	183	108.5	74.75	60.33	426.58	23	5.75	328.25	73	11	0	441
Percent.	43%	25%	18%	14%	100%	5%	1%	74%	17%	2%	0%	100%
Grand totals	416.43	146.23	102.08	206.83	871.57	60.44	69.25	602.16	129.2	26.1	1.33	888.48
Percent.	48%	17%	12%	24%	100%	7%	8%	68%	15%	3%	0%	100%

Appendix H: Final member check

Original Message sent by email

From: "John Raven" <john.raven@HCT.AC.AE>
To: <list of 22 email addresses went here>
Sent: Saturday, February 09, 2002 10:19 PM
Subject: follow up to IM3 research- please reply
> Hi,
>
> You may remember last year a study which you all took part in as part of
> the IM3 Business Development Plan. It may be ancient history now but
> believe it or not I am still working on the report and am close to
> finishing it. Before I do that I would like to obtain any reaction to
> the following four points that came out of the study. Even if you have
> nothing to say and think they are fine then please hit reply anyway.
> Also please pass this on to any other participants - I only have the
> email addresses from last year and they may be outdated.
>
> SUMMARY OF FINDINGS
>
> 1. All the groups divided the project into components to be completed
> individually, or in subgroups and then combined them together at the end
> on one central computer. This strategy was due to the nature of the task
> and the constraints of using computers.
> 2. In some groups the final editing was carried out as a group around a
> computer, in other cases by a subgroup. This phase was the most
> stressful for all groups due largely to the problems involved in
> combining separate files into one cohesive report. Difficulties in
> formatting and printing, for example, were cited.
> 3. There was some inequity of workload and in some cases this led to
> tension amongst group members. In some groups there was a gender split,
> for example, while in other groups there were few issues with
> participants accepting the division of labour.
> 4. In general, the computer was seen as a necessary, but not an easy
> tool for constructing the group project, requiring careful management
> and good group communication.
>>

> Thanks for your help.

Transmission Failures

1. sarahdean+AEA-hotmail.como on Sat, 9 Feb 2002 13:22:38 +-0400
   The e-mail system was unable to deliver the message, but did not
report a specific reason. Check the address and try again. If it still
fails, contact your system administrator.
2. marissagovorko+AEA-hotmail.com on Sat, 9 Feb 2002 13:22:53 +-0400
   Your mail system could not find a way to successfully communicate
3. taniayungnickel+AEA-hotmail.com on Sat, 9 Feb 2002 13:22:53 +-0400
   Your mail system could not find a way to successfully communicate
4. asthompson+AEA-hotmail.com on Sat, 9 Feb 2002 13:22:53 +-0400
   Your mail system could not find a way to successfully communicate
5. mickeyj7+AEA-hotmail.com on Sat, 9 Feb 2002 13:22:53 +-0400
   Your mail system could not find a way to successfully communicate

No email addresses for: Karen or Marcus

Replies Received:

1. Hi John,

The 4 points outlined below seem to be fairly true and relevant to my
experience (as far as my memory goes).

All the best with your report.

Troy (group 4)

2. Hi John

Yes I agree with each of these points. Hope the rest goes well.
Mandy (group 3)

3. From: Kurt (group 1)

replied in the questions.

>From: John Raven
>To:
>Subject: follow up to IM3 research- please reply
>Date: Sat, 09 Feb 2002 13:19:00 +0400
>
>Hi,
>
>You may remember last year a study which you all took part in as part of
>the IM3 Business Development Plan. It may be ancient history now but

>believe it or not I am still working on the report and am close to
>finishing it. Before I do that I would like to obtain any reaction to
>the following four points that came out of the study. Even if you have
>nothing to say and think they are fine then please hit reply anyway.
>Also please pass this on to any other participants - I only have the
>email addresses from last year and they may be outdated.
>

>SUMMARY OF FINDINGS
>
>1. All the groups divided the project into components to be completed
>individually, or in subgroups and then combined them together at the end
>on one central computer. This strategy was due to the nature of the task
>and the constraints of using computers.

> yes this is correct as if the group was to try to complete the assignement together on
one computer the assignment would not
get done as only one person can type etc

>2. In some groups the final editing was carried out as a group around a
>computer, in other cases by a subgroup. This phase was the most
>stressful for all groups due largely to the problems involved in
>combining separate files into one cohesive report. Difficulties in
>formatting and printing, for example, were cited.

yes also as at this stage it was often left to one or two people

>3. There was some inequity of workload and in some cases this led to
>tension amongst group members. In some groups there was a gender split,
>for example, while in other groups there were few issues with
>participants accepting the division of labour.

> yeah typical of all groups as some had different time allocation for each assignment

>4. In general, the computer was seen as a necessary, but not an easy
>tool for constructing the group project, requiring careful management
>and good group communication.
>
> yes definitly, computers always seem to go wrong when u are preparing large
documents and when this occurs it can be very
hazardous to the assignment and i feel about 3 to 4 days has to be left to edit and put
assignemtns together on the computer
>Thanks for your help.
>

4. Hi John,

good to see you're working hard on that report. it all sounds pretty good, and relates to our my group experience. the only point i would mention is that -

when our groups met and then decided to delegate work to individual memebers or sub-groups, no consideration was given to the various computers people had access to, and the various formats used or preferred. this made life pretty interesting trying to format a final document... ....when all the pieces to the puzzle were different. ie. in an ideal world, all group members would have used computers with the same operating program and the same format setup, possibly all linked together for reference purposes.then it would be smooth sailing placing it all together as one document.

just a thought
chris (group 4)

5. From: Alistair (group 3)

seems good to me.

6. Subject:
     Re: follow up to IM3 research- please reply
   Date:
     Sun, 17 Feb 2002 23:08:34
   From:
     "Natasha"
    To:
     john.raven@hct.ac.ae

Hi John,

Yes I agree with the 4 points but would just add to point no. 2 that this was done to maintain consistency throughout the assignment (which for us meant assigning just one person in charge of editing).

Best of luck, Natasha (group 4)

7. Hey John,
Thankyou for the feedback. The points you had made seem relevant to my group and the way in which we carried out the project. So good luck with your report and I would be interested in any further developments.

Hanah (group 3)

8. Hi john sorry it's taken so long to reply.

I agree with everything here, but I think it was important to note, that the last comment, "it was not an easy tool" for a group to use was because on the most part, a lack of real knowledge of computers, could we have used better process, different programs?

Thanks

Hope all goes well

Sandra (group 3)

9. Thats pretty much it john!!!!

good luck!................

Matthew (group two)

AUCKLAND UNIVERSITY OF TECHNOLOGY
Faculty of Business

IM3

INTEGRATED MODULE THREE

476030

Semester One 2001

Managing the Organisation

ASSESSMENT

Table Of Contents

ASSESSMENT PROGRAMME

The table below outlines the assessment structure of Module Three.

Due Date		Units	Item	Weighting	Effort
Week	**Date**				
5	Monday 19 March, 12.00pm	One	Integrated Essay	20%	Individual
8	Saturday 28 April,	Two, Three	Case Study Exams (Marketing / Accounting)	30%	Individual
9	Saturday 5 May		(Law / Management)		
2	Team session Friday 2 March		Business Plan: a) Registration of Interest.	0%	Individual
6	Monday 26 March, 12.00pm noon	Two	b) Preliminary Report	5%	Group
14	Monday 5 June, 12.00pm noon	One, Two, Three, Four	c) Written Business Plan	30%	Group
15	Monday 11, Tuesday 12 & Wednesday 13 June	One, Two, Three, Four	d) Presentation	10%	Individual/Group
15	Wednesday 13 June 5:00pm		e) Contribution to Syndicate	+/-10% of Biz Plan mark	Individual
15	Friday 15 June By appointment		f) Exit Interview	Compulsory	Individual
15	TBA	One, Two, Three	Written Discipline Exam*	Pass/Fail	Individual
3 – 7	TBA (in Team sessions)		Review Presentation	5%	Group

NOTE:
- The dates and times listed above are to be strictly observed.
- See the Module Three Assessment Handbook for more detailed information on each assessment item.
- All assignments <u>must</u> have a cover sheet.
- Each assignment should be word processed on A4 paper and stapled in the top left hand corner. Please <u>do not</u> put assignments in folders (except for the Business Plan).

*This exam will only be completed by those of you who <u>do not</u> gain a minimum of 45% in Management, Law, Marketing or Accounting in the case study exam.

Passing Requirements

To pass the Module you must meet the following criteria:

1. **Attain an average of 50% in those components of the assessment programme that you complete as an individual (i.e. essay, case study exams and business plan presentation [individual component])**

AND

1. **Attain an average of 50% overall in the assessment programme**

   These marks will be calculated on a weighted basis. For example, a pass in an assessment weighted at 20% of the final grade is worth more than a pass in an assessment carrying a 5% weighting.

AND

2. **Attain a minimum of 45% in Management, Law, Marketing and Accounting in the case study exams**

Reassessment

If you do not fulfil one or more of the discipline criteria in 3. above, you will be given an opportunity to meet the standard in a written discipline exam. In this assessment you will be asked specific discipline questions based on the entire semesters work. The primary purpose of this is to provide you with a second opportunity to demonstrate competence in those areas you have shown a weakness. A pass in this exam will result in your Case Study marking recorded as 45%.

NOTE:
- If you fail one of these written exams you may be eligible for a conditional pass in Integrated Module Three.
- If you fail two or more written exams you will have to repeat Module Three.

Conditional Pass Policy

If a student fails a *single* discipline requirement, a *conditional* pass in Integrated Module 3 will be awarded. The student may proceed to Professional Studies, but will also be required to complete further study, typically a paper in the failed discipline within a specified time limit, in order to demonstrate competency. The student will not be credited with Integrated Module 3 until further study has been successfully completed.

Grade Worksheet

1. INDIVIDUAL ASSESSMENT

	Mark out of 100	**x**	**Weighting**	**=**	**Weighted mark**
					+
Integrated Essay =	/100	x	0.20	=	
					+
Case Study =	/100	x	0.30	=	
					+
Business Plan Presentation = (_____ / 60 ÷ 0.6) ⇒	/100	x	0.06	=	

↘

Please note that Contribution to Group is excluded from these calculations as it involves peer and self assessment.

=

÷

0.56

=

Individual Total =

Grades:

Mark out of 100	Grade	Meaning
90-100	A+	Rare, exceptional, flawless, exceeds expectations
85-89	A Pass with distinction	Outstanding
80-84	A-	Excellent
75-79	B+	Very good
70-74	B Pass with merit	Good
65-69	B-	Good overall, but some flaws
60-64	C+	Shows promise but not consistent
55-59	C	Satisfactory
50-54	C-	Barely adequate
0-49	D	Poor, does not meet the minimum criteria

Standard Hand-in Guidelines

All assignments must be handed in with the standard Integrated Studies Module Three Cover Sheet.

Your assignment should be stapled together in the top left hand corner. Alternatively, you may use spiral binding for your assignments - however this is not necessary.

Other forms of binding or folders (e.g. plastic sleeves) are not acceptable.

All assignments should be placed in the assignment box identified for your Module and/or that particular piece of assessment. Assignment boxes are located in the entrance foyer to Integrated Business Studies, 8th Floor, WX Building (3 Wakefield Street).

Remember it is your responsibility to ensure your assignments are handed in to the right place at the right time.

Please ensure that you keep a copy of assignments that you hand in.

Late Assignment Policy

Rationale:
A policy on late assignments has been developed in Module Three to ensure:
- You are treated with fairness and consistency.
- You develop a realistic appreciation of the responsibilities and demands of the workplace.
- Lecturers can manage the marking of assessments in an efficient manner.

Definition:
'Late Assessments' means assessments for Integrated Module Three which are placed in the assignment box on level 8 of 3 Wakefield Street (or handed directly to a member of the Integrated Modules teaching team with a request to note the date and time of receipt on the cover of the assessment) after the time stated in this handbook.

Policy:
Late work is strongly discouraged in Integrated Module Three. However, late work will be accepted subject to the following penalty:
- A flat 10% mark for assessments being received within 24 hours of the due date;
- A further 10% mark penalty per 24 hour period thereafter.

For example, an assessment which gains a mark of 75% will be recorded as 55% (75, -10, -10) if received up to 48 hours late.

Exclusions:
This policy does not apply to assessments which are handed in late following the granting of an extension by the Module Co-ordinator

To be granted an extension you must:
   a) talk to the **Module Co-ordinator** before the assignment is due,
   b) be seeking an extension based on aegrotat or compassionate grounds

TEAM SESSIONS

Purpose:
Throughout the semester team sessions are designed to:-

1. develop your capabilities.
2. improve your understanding of the integrated nature of business operations.

In team sessions you are required to:

1. integrate the material presented in the week
2. reflect on your learning.
3. present your views on course readings and business issues.
4. demonstrate your critical thinking capabilities.
5. demonstrate your presentation skills.

TEAM ASSESSMENT
REVIEW PRESENTATION

Due Date: Weeks 3 -7
(A schedule of more specific times will be handed out in team sessions)

Marks: 100 marks

Weighting: 5% of the module

Type: Group assessment

Groups of up to six students will present a review of the week. In this review the theme of the week is to be explored and presented from an **integrated perspective**. An integrated perspective will demonstrate your understanding of the complex interrelationship between issues and disciplines.

Students may find it helpful to focus this review around a topical issue, business case study or a specific article to demonstrate how the theme of the week relates to this. Your group will be expected to show how issues that emerge impact on one another and apply your understanding of disciplines to show this.

You will be questioned about your presentation. Student groups will be assigned by your team advisor.

THE ASSESSMENT TASK

Each group has **3 tasks** to complete for this assessment:

1. Complete a 20 minute presentation reviewing the theme of the week from an integrated perspective.

2. Produce evidence to support your presentation.

3. Answer questions prepared by a designated group of fellow students.

1.   Review Presentation

Your group's presentation and handout will be assessed using the marking criteria in the appendices. The mark awarded to the group will be distributed evenly and will be recorded as each individual's mark for this assessment. The presentation must be of a high standard. Visuals must be used and be clear and effective.

2.   Planning Evidence

This will include evidence of online discussion using AUT's designated system (BOL – Business Online) and a mindmap or trigger articles.

3.   Questioning

Answer questions prepared by a questioning group.

INTEGRATED ESSAY

Due Date: Monday 19 March   12:00 pm noon

Marks: 100 marks

Weighting: 20% of the module

Type: Individual

Length: 2000 - 2500 words

**Capabilities and
Skills assessed:**   Research, written skills, analysis and conceptual thinking

Essay Topic:

"eBusiness is the most significant change in the New Zealand business environment"

Critically evaluate this statement with reference to changes within one of the following industry sectors:
1. *retail*
2. *education*
3. *tourism*
4. *financial services*
5. *manufacturing*
6. *primary industry*
7. *leisure*

Definition: *eBusiness; "the fusion of business processes, enterprise applications, and organisational structure necessary to create a high performance business" (Kalakota & Robinson, 1999[1])*

Use <u>recent</u> New Zealand examples to illustrate.

1.   Because this is an integrated, disciplinary essay, references <u>must</u> be made to management, law, marketing, accounting and information technology.

2.   Make sure you correctly use the APA referencing system.

MARKING CRITERIA

These are given in the appendices. You must also attach to your essay the following:

1.   a self assessment of your work by filling in the boxes on the marking criteria sheet
2.   a mindmap or similar which you have used to structure your essay

---

[1] Dr. Ravi Kalakota and Marcia Robinson, "e-Business Roadmap for Success", 1999, page xvi. Addison Wesley

CASE STUDY EXAMS

Due Date: Saturday 28 April and Saturday 5 May

Marks: 100 marks

Weighting: 30% of the module

Type: Individual

Capabilities: Application of knowledge, problem solving

Discipline	Date	Length	Weighting
Marketing	Saturday 28 April	1 hour 40 mins (incl. 10 minutes reading time)	20%
Accounting	Saturday 28 April	1 hour 40 mins (incl. 10 minutes reading time)	20%
Law	Saturday 5 May	2 hours 10 mins (incl. 10 minutes reading time)	30%
Management	Saturday 5 May	2 hours 10 mins (incl. 10 minutes reading time)	30%

ASSESSMENT TASK

The case study on which the exam is based will be distributed approximately two weeks before the first case study exam. This exam will be open book, and primarily assesses your problem solving capability.

Case Study exams from preceding semesters are held on desk copy at the Library and are available on g:/copy and BOL. It would be wise to use these as a means of preparation for this semester's exam.

THE BUSINESS DEVELOPMENT PLAN

As part of your assessment in module three, you are required to work on a Business Development Plan. This project will contain both group and individual elements and will be assessed in the following stages:

		Marks	Weighting	Type	Date
Stage 1	Registration of Interest		0%	Individual / Compulsory	Team Session 2 Week 2 Friday 2 May
Stage 2	Preliminary report for establishing a business.	100	5%	Group	Monday 26 March 12:00 noon
Stage 3	Written business development plan.	100	30%	Group	Tuesday 5 June 12:00noon
Stage 4	Presentation	100	10%	Group / Individual	Monday 11, Tuesday 12 & Wednesday 13 June
Stage 5	Contribution to Syndicate	15	+/- 10% of Business Plan	Individual / Group	Wednesday 13 June 5:00pm

ASSESSMENT TASK

You are a syndicate of between four and seven Bachelor of Business graduates who wish to establish a new business. By combining each syndicate member's personal savings, your syndicate is able to contribute _between $50,000 and $300,000_ (this may be increased upon negotiation with your accounting tutor) to the project. In addition, your syndicate must make use of external finance in establishing this new business. External finance is available through the Auckland Enterprise Bank (a venture capital bank). Details of their loan criteria are provided in Stage 4 of this section.

This business development plan is a major project and comprises several separate stages. It is important for you to understand that **each stage requires a different approach in terms of purpose, content and style.**

The stages of the business development plan are outlined in more detail below:

> **The Registration of Interest** is designed to get you focused on new business ideas. In this assessment you are not expected to explore an idea in any detail, merely to focus on new business opportunities. It is a chance to test the feasibility of individual ideas and give your syndicate group a choice of plans. After this individual report has been completed the syndicate will then choose the best report (or a combination of reports) to develop onto a preliminary business development plan. This will give you formal feedback before the group proceeds to development of the full Business Plan.
> (Refer to Page _17_ for further guidance)

> **The Preliminary Report** is a chance to test the feasibility of your syndicate groups idea. This plan should **not** be a detailed exploration, but a brief summary of the relevant issues. This is a group assignment.
> (Refer to Page _18_ for further guidance)

The Business Development Plan. This is completed in syndicate groups. This is a major written report requiring detailed analysis in all discipline areas. While careful analysis in each discipline area is required, you are expected to ensure that there is consistency and integration between various sections. This business development plan will then form the basis for a presentation to a group of venture capitalists from the Auckland Enterprise Bank. This panel is made up of lecturers from Module Three.
(Refer to Page *19* for further guidance)

The Presentation This is your group's opportunity to persuade the Auckland Enterprise Bank to provide external financing for your business. The Bank is a venture capitalist and supports entrepreneurial activity through the provision of loans to start-up businesses.

The written business development plan involves meticulous analysis of numerous discipline and business issues. The presentation on the other hand requires you to select the most relevant facts from the written business development plan and present them in a manner both interesting and persuasive. You are presenting to members of the Auckland Enterprise Bank - a group of professional and highly experienced business people. Your presentation should not be a summary of your written business development plan. It should be a carefully executed exercise in lobbying for funds based on researched facts and analysis. Groups are expected to adopt the dress, style and manner appropriate to such a business presentation.
(Refer to Page *21* for further guidance)

Please submit:
- 2 copies of your written business development plan.
- A self assessment of your group's performance, using the marking criteria in the appendices. **This can increase / decrease your individual business plan mark by up to 10 marks.** This is due by Wednesday 13 June at 5:00pm.

ADVICE FROM STUDENTS IN PREVIOUS SEMESTERS

- Planning is essential. Get your time frame clear.
- If we were doing it again we'd start the business plan earlier. We didn't realise how much material was included.
- Set a finish time that is much earlier than the deadline. We were working to one week early, and that wasn't long enough.
- Prioritise things. Then do your first priority first.
- Don't leave your marketing research too late, or it holds everything up.
- Choose people who are committed to doing a good plan.
- It was important to have a good mix of specialist skills, and a mix of group styles.
- Make sure you work out everyone's strengths and weaknesses, not only in choosing your group, but also in assigning tasks.
- Get your priorities right - passing or working or taking holidays.
- Project management was vital. We planned it right through in detail and charted a time line. This was an important reality check. We had thought we had plenty of time, but once we analysed the task and the time left, we realised that we didn't.
- We are a group of friends, but we decided early on that there would be no social chat, that we would be completely professional and stay on task. Part of our motivation was that our team adviser had warned us against choosing friends and we wanted to prove her wrong.
- We started before the case study. We had a brainstorming session that lasted for more than six hours and covered the walls with charts.
- We decided early on the contents page and shared out the different sections.
- It was important that everyone was eager to take on tasks, no one hung back.
- Plan to have the first complete draft ready at least a week early. Producing the first draft was a mammoth task. It took us from 11 am to 6 am the next day!
- We produced four complete drafts before we got it to a stage that we were happy with it.
- It is important that a complete draft is produced early, not just sections.
- A note of caution: just because it has been stored on a disk, doesn't mean it's finished, though it can create the illusion that it is.. It won't be finished until all sections are complete because a change in one part can require other parts to be altered.
- It was a good idea to have the draft proof read by someone with no particular business experience so that areas that were unclear were identified.
- Don't underestimate the time that it takes to get the whole thing in final form. Two computers networked together was a plus. A fast printer helped.
- We all worked together on everything. A section that had been written by one would be checked by all the others.
- We probably could have done with another week.
- The team session when we had feedback on our business idea from the whole stream was useful in clarifying our ideas.
- Make a personal commitment to the standard you wish to achieve and identify others who share that standard.
- Don't select your group on personal like/dislike criteria (such as only choosing friends).
- Ensure a mix of leader, worker, thinker and organiser.
- Choose people that have strengths in different discipline areas.
- Set standards from the start and continually measure performance.
- If performance is less than that agreed upon then take action now. DO NOT WAIT UNTIL GROUP CONTRIBUTION MARKING BEFORE COMPLAINING.
- Timetable when work is to be completed. Do not expect to be able to consolidate a draft the night before submission. In our experience, file combining, editing, printing and collating takes a minimum of 3-4 days.
- Do not plan any tasks for the day of submission. REMEMBER MURPHY'S LAW.
- Finally, take pride in what you submit and **plan** to enjoy producing it.

Stage 1   *Registration of Interest for Business Plan Ideas*

Due Date: Team Session 2   Week 2   Friday 2 March

Marks: 0

Weighting: 0% (Peer Assessment)

Type: Individual Assessment: Compulsory

PURPOSE

The purpose of the Registration of Interest is to generate ideas for Stage 2 - The Preliminary Report.

ASSESSMENT TASK

Your task is to think about ideas for a new business. Complete a registration of interest on the worksheet. A copy of this document called (regint.doc) and is located at g:\copy\476030 IM3 or BOL

MARKING CRITERIA

These ideas will be peer assessed in Team session 1 of Week 3. Your Team Advisor will facilitate this task.

This will assist you to decide which idea to develop for Stage 2 - The Preliminary Business Report.

Stage 2   *Preliminary Report*

Due Date: Monday 26 March,   12.00pm noon

Marks: 100

Weighting: 5% of the module

Type: Group Assessment

PURPOSE

The purpose of the preliminary report is to:

- Describe the business idea chosen by your group
- Identify or explore the key issues which will impact on its success or failure
- Assess the feasibility of the idea.

ASSESSMENT TASK

Your task is to conduct preliminary research on a business idea. This report is an initial exploration. You are NOT expected to develop a complete business development plan where issues are discussed in depth. However we expect at least a paragraph in answer to each question.

MARKING CRITERIA

Lecturers from the four major disciplines will mark this assessment.

Markers will comment on the feasibility of your idea.

Please use the format when completing this assignment. A copy of the preliminary report called prelim.doc is located at g:\copy\476030 IM3 or BOL.

Stage 3   *Written Business Development Plan*

Due Date   Tuesday 5 June,   12:00pm noon

Marks   100

Weighting   30% of the module

Type   Group Assessment

ASSESSMENT TASK

Each syndicate group is required to submit a written business development plan for the business idea you decide to develop.   Your plan should be written *with the aim of presenting it to The Auckland Enterprise Bank, gaining up to 75% of your equity in additional debt funding.*

SUMMATIVE ASSESSMENT

The business development plan will be marked by lecturers from all disciplines. Each discipline will carry the following weighting:

Management	25%
Law	20%
Accounting	25%
Marketing	20%
Business Economics	10%
	____
TOTAL	100%

IT marks are <u>included</u> within discipline marks. IT carries a weighting of approx. 10% overall.

MARKING CRITERIA

Your plan must comply with the presentation criteria in the Bachelor of Business Programme Handbook. Good proof-reading is essential! A clinic will be held in Week 6 to discuss a suggested format for the business development plan.

See the *business development plan marking criteria* in the appendices for further details.

Please submit:
- 2 copies of your written business development plan.
- A self assessment of your group's performance, using the marking criteria in the appendices. **This can increase / decrease your individual business plan mark by up to 10 marks.** This is due by Wednesday 13 June at 5:00pm.

After you have completed the written business development plan and presentation you will be required to meet with the module three team for an exit interview. The purpose of this interview is to complete the business development plan assessment by discussing the contribution to syndicate element. Further details are contained in stage 5 of this section.

CONTENT CONSIDERATIONS

A good business development plan is well integrated. Therefore you will need to take the discipline knowledge gained this semester and combine it using a suitable business plan format. You may wish to use a format recommended in books about writing business plans. Alternatively you may wish to create your own integrated format or choose the format covered in the business plan clinic in Week 6.

The format will be available on g: drive or BOL after Week 6.

The business development plan is an academic report. It is similar in nature to a standard business plan, but its main distinction is in the audience for which the business development plan is written. While a business plan often provides an overview of the business for investors, a business development plan requires greater depth. Essentially, you are writing a report to test the feasibility of an idea. You are also writing the plan for a specific audience, your lecturers, hence it is important to ensure you fulfil the requirements of this course. More information on the business development plan will be issued closer to the due date.

Part of the requirements for establishing your business involves borrowing money from an external source. To this end the Auckland Enterprise Bank has been established. In writing your business plan you may assume that you have obtained external funds from the Bank (up to 75% of the equity you contributed). However your loan will need to be approved by the bank upon completion of your plan. Approval of a loan will depend on your business plan presentation. Loan criteria are discussed in more detail in Stage 4 of this section.

Stage 4   *Business Development Plan Presentation*

Due Date: Monday 11, Tuesday 12 or Wednesday 13 June

Marks: 100

Weighting: 4%   Syndicate Presentation
                       6%   Individual Assessment

Times: To be advised, booking sheets available in Week 12

ASSESSMENT TASK

Each presentation will take a total of 45 minutes allocated thus:

Setting up time	10 minutes
Presentation	**20 minutes**
Individual Questions	<u>15 minutes</u>
	45 minutes

Syndicates will be expected to adhere strictly to the 20 minute presentation time.

Remember that your task is to present your business idea to the Auckland Enterprise Bank (a venture capital bank) to gain up to 75% of your equity as debt funding. Therefore the focus of your presentation is to ask for financing for your business idea.

40 of the 100 marks for this assessment are allocated to the syndicate for *team organisation* and *presentation content*.

The remaining 60 marks will be allocated for each individual's performance in terms of *delivery*, *use of visuals* and your *answers to questions* posed by the board. Each syndicate member will be asked two questions about any aspect of the Business development plan. Your answers should be concise and show depth of understanding.

See the marking criteria in the appendices for further clarification. There will be opportunity during team sessions to develop your presentation skills.

DRESS

You will be presenting your proposal to the Auckland Enterprise Bank. You are expected to dress appropriately.

CRITERIA FOR GRANTING A LOAN

The bank provides long term loans to a maximum of 75% of the equity invested in your business. The panel also will be looking for some form of security either in the form of a floating charge over assets, or a personal guarantee with security over personal assets of one or more of the owners of your business (e.g. a house).

Cash flow must be demonstrated to be adequate to service both the interest payments and repayments of capital.

Stage 5   *Contribution to Syndicate*

Due Date: Wednesday 13 June   5:00pm

Marks: +/- 10% of the business development plan mark

Weighting: **+/- 3% of the module**

Type: Summative Peer and Self Assessment

PURPOSE

This assessment gives you an opportunity to develop your peer and self assessment skills. It will also provide you with feedback from peers on how they feel you perform as part of a team. Additionally, it gives you experience in developing criteria for evaluating team performance.

The method of peer assessment being used is designed to encourage all group members to contribute equally in both task and group process. In the event that these contributions are not equal, it provides a process for recognising this, and deriving individual marks accordingly.

ASSESSMENT TASK:

How does it work?
STEP 1:
The first stage in this process is developing performance criteria (group norms) for the contribution made by each member of your syndicate. These <u>must</u> be completed in the early stages of your syndicate's development (i.e., before you commence researching and writing your business development plan. To assist with writing the performance criteria you may wish to refer back to the performance criteria developed for the *contribution to group* assessment which you developed for the *team skills presentation.* Your Team Advisor will also help with the development of contribution performance criteria. A sample performance criteria developed by a past syndicate group is included below to provide further assistance.

CONTRIBUTION TO SYNDICATE PERFORMANCE CRITERIA	
Criteria	**Meaning**
PARTICIPATION	Attending meetings; doing your share; overall effort.
TEAM COMMITMENT	Meeting group standards and objectives.
COMMUNICATION	Joining in, listening, giving feedback, good interpersonal skills.
PERFORMANCE	Innovation, initiative, meeting deadlines, quality of work.
PERSONAL ATTITUDE	Self improvement, positive attitude, level of motivation, fair, helpful.

STEP 2:
During the process of completing the business development plan you should examine the performance criteria you have developed and assess how well each member of your syndicate is meeting these criteria. At this stage you may all feel that some of the criteria do not accurately reflect the syndicates' expectations. Therefore the performance criteria should be regularly examined and adjusted as appropriate. This process will help you in completing step 3.

STEP 3:

Once your syndicate has completed the written business development plan and the business development plan presentation, each syndicate member will complete a confidential *contribution to syndicate assessment form*. **Each syndicate member must hand in this form on Wednesday 13 June 2000. A member who does hand in their form will have their marks calculated on the basis of the submitted forms.**

STEP 4:

The *contribution to syndicate assessment forms* will be collected by your team advisor and will remain strictly confidential. The results from all syndicate members will be collated and the summary for each individual syndicate member will be available during the exit interview.

As the student may appeal this team decision it must be able to be justified and <u>all</u> team members must be prepared to attend a facilitated group meeting. The team advisor may seek evidence to support your peer and self assessments. This evidence could be in the form of minutes kept for syndicate meetings; showing one person completed the majority of tasks assigned, or conversely, lack of attendance on the part of one syndicate member. Where there is insufficient evidence to support a peer assessment the team advisor reserves the right to disregard it.

How are the results calculated?

Because calculating an individual's contribution mark is quite complex your syndicate is not required to perform this function. However, it is important for you to know how it works. To this end, let us use an example of a syndicate group consisting of five members: Chris, Sarah, Tony, Bridget and Kim. The syndicate received a mark of **58** for their business development plan. The first stage of calculating syndicate contribution marks is for Team Advisors to convert the rating scale symbols into numbers and calculate the mean for each column on the *contribution to syndicate* assessment form. Next, the mark for each syndicate member is determined as follows:

Chris received	67, 68, 70, 67 & 68 from peer and self assessments so his individual average is **68**
Sarah received	58, 55, 58, 56 & 57 from peer and self assessments so her individual average is **57**
Tony received	69, 70, 73, 71 & 68 from peer and self assessments so his individual average is **70**
Bridget received	75, 75, 79, 80 & 77 from peer and self assessments so her individual average is **77**
Kim received	39, 50, 41, 42 & 40 from peer and self assessments so his individual average is **42**

The next step is to determine the syndicate contribution average by calculating the mean between each individual average score. In this case $(68+57+70+77+42) \div 5 = $ **63**.

The difference between the syndicate average and each individual average then determines the adjustment made to the business development plan. For example;

Syndicate Member		Individual Average		Syndicate Average		Contribution Mark	Adjusted Contribution Mark*	(see below*)
Chris	⇒	68	-	63	=	+ 5	+2	
Sarah	⇒	57	-	63	=	- 4	-2	
Tony	⇒	70	-	63	=	+ 7	+3	
Bridget	⇒	77	-	63	=	+ 14	+7	
Kim	⇒	42	-	63	=	- 21	<u>-10</u>	
							0	

These contribution marks are then used to adjust each syndicate member's business development plan mark as follows (as stated earlier the syndicate received 66 for their business development plan):

Chris will receive	58 + 2 = **60**	for his business development plan.
Sarah will receive	58 - 2 = **56**	for her business development plan.
Tony will receive	58 + 3 = **61**	for his business development plan.
Bridget will receive	58 + 7 = **65**	for her business development plan.
Kim will receive	58 - 10 = **48**	for his business development plan.

*NOTE: The sum of the adjustments must be equal to zero

*Because the adjustments to the raw mark exceeded 10 the team advisor may scale the adjustments back on a pro rata basis. Teams can decide on the final marks themselves <u>BUT</u> in all cases the sum of the marks must be equal to zero and on an individual basis not be greater that +/- 10 marks.

Non-performance of syndicate members

In extreme circumstances, where one or more members of your syndicate are not contributing to your project, you may wish to instigate more serious measures. In Integrated Module 3 there is a process by which syndicate members may be removed from the group (resulting in an automatic fail in the module). This process must be started as early as possible to allow for several warnings to be given to the non-performing member. To find out more about this process you <u>must</u> contact the module co-ordinator (this is the only person who can advise you on how to proceed).

Appendices

A copy of this appendix is located at: g:\copy\parnell.cpy\im3 or
g:/copy/476030 IM3 or BOL

called: markcrit.doc

***NOTE: Please hand in the relevant marking criteria and marking sheet with each
assessment***

Integrated Module Three

REVIEW PRESENTATION MARKING CRITERIA

Students Names:

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....

CRITERIA	Syndicate Total	Comments
Team Organisation Obvious Group Work All Joined In Logical Progression Continuity And Flow (clear Links)	/10	
Content Shows how main issues integrate Significance of theme evaluated Links between disciplines analysed Disciplines linked to the theme Own views developed and justified Conclusions reached	/50	
Delivery Clear Introduction Enthusiasm Notes Did Not Intrude Good Eye Contact Audible & Easily Understood	/10	
Visuals Clear Effective Well Managed	/5	
Planning Evidence Hard copy of online discussion (BOL) Mindmap Articles	/20	
Question Time Obvious Understanding & Knowledge Competently Handled	/5	
OVERALL MARK	**100**	

Presentation Note: Reading notes is not acceptable at this level.

INTEGRATED ESSAY MARKING CRITERIA

Student Name / Stream:...
.

	A	B	C	D	
Objective, reasoned argument; logical and coherent; focuses on the topic.	←——————————————→				Poorly argued; lacks logical construction.
Argument expanded and developed.	←——————————→				Superficial or narrow treatment of the topic.
Demonstrates understanding of links between disciplines.	←————————————→				No linkages made between disciplines.
Excellent illustration of theories and concepts using relevant examples.	←————————————→				No attempt to illustrate theories and concepts.
Evidence of wide reading on the topic.	←————————————→				Used textbooks and class materials only
Sources clearly acknowledged.	←————————————→				Inadequate acknowledgment; plagiarism.
Correct application of referencing system (e.g. APA system).	←————————————→				Incorrect referencing
Fluent writing style; expression clear and concise.	←————————————→				Poor expression.
Correct grammar and spelling.	←————————————→				Incorrect grammar and spelling.
Appropriate length.	Yes ☐ No ☐				

Please note: These criteria do <u>not</u> carry equal weightings. The first five criteria carry greater weight.

Mark	_____ **/ 100**
***Less* Late penalties**	_____
TOTAL	_____ **/ 100**

Additional Guidelines for the Integrated Essay

The essay is marked from an integrated perspective by the major discipline specialists. Each essay is then audit marked to maintain consistency between markers.

Marks are awarded on the following basis:

A Grade: ***Excellent .... 80 - 100***

A+   90 – 100
A   85 – 89
A-   80 - 84

A detailed coherently written, organised essay that answers the question succinctly from all four discipline perspectives. An objective reasoned argument that focuses on the relevant issues of the topic, and is expanded and developed with appropriate examples. Theories integrated well into the analysis. Shows evidence of having read relevant texts, journals and so on and clearly sources any authors quoted in the essay. Very minor errors of expression.

B Grade   ***Very Good .... 65 - 79***

B+   75 – 79
B   70 - 74
B-   65 - 69

Gives a sound analysis with many of the main theories (from all disciplines) applied. Concepts defined and explained to an acceptable level. Shows a good understanding of most of the concepts and integrates them satisfactorily into the analysis. Some good examples given. Lacks the depth of an "A" analysis. Well structured - minor inadequacies. Referencing is good but some minor flaws evident. Mainly logical and coherently organised. Clear and concise and correctly written.

C Grade   ***Good / Satisfactory 50 - 65***

C+   60 - 64
C   55 - 59
C-   50 - 54

Analysis is adequate with a number of the main theories in most disciplines identified and applied. Difficulty in sustaining or developing a coherent argument, showing some confusion, but generally demonstrating evidence of reading and thinking about the topic. Structure reasonably well and organised in a somewhat logical fashion. Sources acknowledged. Generally correctly expressed and writing of a satisfactory standard.

D Grade   ***Inadequate.............. 0 - 49***

Analysis shows some understanding of the problems, but few theories discussed. Lacks examples, definitions and explanations in two or more disciplines. A somewhat superficial, general analysis supplying mainly anecdotal information. Shows some attempt at structure, but not very logically organised. Inadequate referencing and poor expression of concepts.

Low D Grade   ***Very Poor***

Failed to come to grips with the topic. Shows little or no evidence of reading on the topic. No ability to present a coherent, well-organised argument. Very poorly expressed.

PRELIMINARY REPORT MARKING CRITERIA

Student Name / Stream: ....

Feasibility of Business Idea

Law

	5	4	3	2	1	
Clearly Developed	❏	❏	❏	❏	❏	Superficial
Promising Idea	❏	❏	❏	❏	❏	Idea not practical

Marketing

Clearly Developed	❏	❏	❏	❏	❏	Superficial
Promising Idea	❏	❏	❏	❏	❏	Idea not practical

Accounting

Clearly Developed	❏	❏	❏	❏	❏	Superficial
Promising Idea	❏	❏	❏	❏	❏	Idea not practical

Management

Clearly Developed	❏	❏	❏	❏	❏	Superficial
Promising Idea	❏	❏	❏	❏	❏	Idea not practical

Mark	_____ **/ 100**
***Less* Late penalties**	_____
TOTAL	_____ **/ 100**

Comments:

BUSINESS DEVELOPMENT PLAN MARKING CRITERIA

Syndicate Name / Stream**:** ....

	A	**B**	**C**	**D**	

Comprehensive
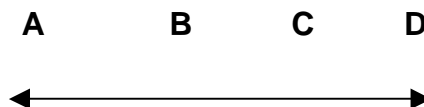
All points covered	← ────────────── →	Not much coverage
Points are relevant to plan	← ────────────── →	Points have little relevance
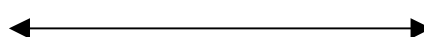
Application of knowledge

Shows an understanding of business through explanation	← ────────────── →	Little understanding and explanation
Applies relevant theories and concepts to plan	← ────────────── →	No attempt to link relevant theories and concepts to plan
Covered in depth	← ────────────── →	Superficial treatment
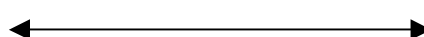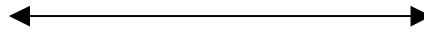
Integration

Understands relationships between disciplines	← ────────────── →	No linkages made

Research

Carried out relevant relationships between disciplines	← ────────────── →	No linkages made
Adequate acknowledgment of sources	← ────────────── →	Inadequate / incorrect acknowledgment
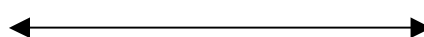
Presentation

Fluent and logical piece of writing	← ────────────── →	Clumsily written, without logic
Succinct writing	← ────────────── →	Unnecessarily verbose
Well set out	← ────────────── →	Unstructured
Correct grammar and spelling	← ────────────── →	Incorrect grammar and spelling
Consistent writing style	← ────────────── →	Evidence of many authors throughout the plan
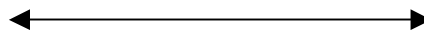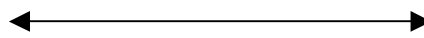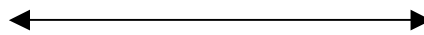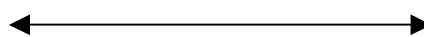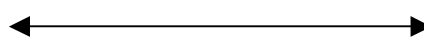
Note: These criteria do not carry equal weightings.

BUSINESS DEVELOPMENT PLAN MASTER MARKING SHEET

Business Name/Stream: ....

Student Names:

1. .………...

2. ....……..

3. ....……...

4. ....……..

5. ....

6. ....

7. ....……..

Section	Discipline	Percentage	Weighting	Total
1.	Management	...............%	0.25	_____ **/ 25**
2.	Law	...............%	0.20	_____ **/ 20**
3.	Accounting	...............%	0.25	_____ **/ 25**
4.	Marketing	...............%	0.20	_____ **/ 20**
6.	Business Economics	...............%	0.10	_____ **/ 10**
		Sub-total	**1**	_____ **/ 100**
		***Less* Late penalties**		_____
		TOTAL		_____ **/ 100**

Integrated Module Three

SYNDICATE PRESENTATION MARKING CRITERIA

Name of syndicate/ stream: ....

CRITERIA	Syndicate Total	Full	Names					
		....	....	....	....	....	....	....
Team Organisation Obvious Group Work Equal participation Logical Progression Continuity And Flow (clear Links)	/20							
Content Knowledgeable Adjusted For Audience Convincing Examples and Statistics Persuasive Techniques Clearly Structured And Signposted Effective Conclusion	/20							
Delivery Interest created for audience Enthusiasm Notes Did Not Intrude Good Eye Contact Audible & Easily Understood Appropriate effective use of gesture		/30	/30	/30	/30	/30	/30	/30
Visuals Clear Effective Well Managed		/10	/10	/10	/10	/10	/10	/10
Question Time Obvious Understanding & Knowledge Competently Handled		/20	/20	/20	/20	/20	/20	/20
Individual Total		**/60**	**/60**	**/60**	**/60**	**/60**	**/60**	**/60**
Syndicate Total	**/40**							
OVERALL MARK	**100**							

* Reading notes and using cue cards is <u>not</u> acceptable at this level

Integrated Module Three

CONTRIBUTION TO SYNDICATE

Syndicate Name / Stream: ....

This assessment will add or subtract up to 10% from your business development plan. Please write the criteria you developed in the table below and complete this form rating yourself and all other members of your syndicate.
Use the following scale to enter your responses in the table below..

Weighting	Meaning	Explanation
100	Outstanding	Far exceeded expectations, contribution was exceptional
80	Excellent	Performance was beyond expectations, an extremely good contribution
60	Good	Did everything that was expected well
50	Satisfactory	Generally complied with criteria with some minor lapses
40	Below Expectations	Met the criteria some of the time but effort was not consistent
20	Very Poor	Unsatisfactory. Generally did not meet the criteria, a very poor performance
0	Nil	No contribution in this area

Performance Criteria (write your criteria below)	Self:	Peer:	Peer:	Peer:	Peer:	Peer:	Peer: ....
Calculate average here ⟹							
Less Team average +/- marks							
Adjustment (maximum +/- 10) **THE ADJUSTMENT TOTAL MUST = 0**							

YOU <u>MUST</u> PROVIDE A JUSTIFICATION FOR THESE MARKS
(PLEASE USE THE BACK OF THIS SHEET)
These must relate to your agreed criteria in your group contract

ASSIGNMENT COVER SHEET

Student Name: ....……………..
...

Assignment: ....………………
...

Stream / Team Advisor: ..../.................... **No.** **Words**
.....................……...

Syndicate Group Members: ....………….....……....
...

....…………....…..........
...

(only if group assessment)

Except where I have indicated the work I am submitting in the assessment is my own work and has not been submitted for assessment in any other course.

Signature:..

LATE ASSESSMENTS

Students must complete this section if the assessment is being submitted after the original assessment deadline in the Assessment Timetable.

Extension granted?	*YES / NO*	*Date handed in:*	*........./........./.........*
Module Co-ordinator Signature:		*Received By:* .... *(name)*	
Extension Granted Until: ..../......./...... *Time: ....*		*Time Received: ....*	