Social integration of people with disabilities: the development of an information technology model based on personal growth and achievement

John A.M. Earls
University of Wollongong


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SOCIAL INTEGRATION OF PEOPLE WITH DISABILITIES
- THE DEVELOPMENT OF AN INFORMATION
TECHNOLOGY MODEL BASED ON PERSONAL
GROWTH AND ACHIEVEMENT

A thesis submitted in fulfilment of the
requirements for the award of the degree of

DOCTOR OF PHILOSOPHY

from

THE UNIVERSITY OF WOLLONGONG

by

John A. M. Earls, M.Ed.

Department of Business Systems
1990
I declare that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and has not been submitted in whole or in part, for a degree at this or any other university.

17.05.90
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ABSTRACT

This research examines the use of a computer bulletin board as a means of facilitating the social integration of people with disabilities.

The literature review identifies significant parallel research strands in the

- Social Integration of People with Disabilities
- Social Psychology of Information Technology.

To develop a model which draws these important strands together three groups interact using a computer bulletin board. The groups are people with disabilities, tertiary computing students and speech and occupational therapists. The study conducts pre, post and long term attitude tests, collects data via the operating system, records all textual data generated over a three month period (almost 6000 pages) and ultimately carries out longitudinal case studies with the disabled participants.

The short term (three months) attitude changes are inconclusive, but the longer term (two year) changes show a highly significant improvement in the attitude of people with disabilities who participated. The case studies showed that all participants with disabilities had improved their self image, their confidence and had made identifiable integrative gains. These included becoming politically active, living independently, gaining employment for
over fifty percent of those involved, publishing literary works and taking up further study. In addition the clearly demonstrated benefits evoked very positive changes in their peer group, in structural changes within the organisation, in Federal Government Department of Community Services and Health service delivery and in the provision of an "Access Australia" innovative award to the Redcliffe City Municipal Library.

Grounded Theory was used to identify a range of factors which supported or inhibited the Integrative process.

The study demonstrated the value of integrating the two research streams, the benefits of the process (with minimal disadvantages) and the efficacy of the model.

A significant issue emerging was the need for people with disabilities to be empowered, able to make their own choices and develop their own models. As a consequence the study concluded by outlining relevant areas of suggested future development in the mainstream and producing a skeletal model as a basis for future integrative work involving the participants themselves.
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INTRODUCTION

"Knowledge is power, and by implication those who do not have knowledge, or access to it, are without power. Physically disabled people are amongst those who are without power, whether through physical, financial, and social constraints or through lack of access to the tools, such as information, which can enable them to gain influence over matters which affect them".

(Newsome, 1985 p.22)

The quotation is by a person who has a significant disability, described as cerebral palsy, but who, as a person with significant achievements, epitomises the distinction between disability and handicap.

This study is about power, or more specifically the empowerment of people whose disability is cerebral palsy. The study argues for and attempts to demonstrate how the deficiencies highlighted in the opening quotation, especially that of information, can be overcome.

However power can be obtained in many ways and with socially unacceptable consequences. In attempting to increase the power of people with disabilities the objective is to arrive at a constructive and socially acceptable solution which is of benefit not only to them but to the broader community into which they seek integration as normal "citizen" members.
Donaldson (1980); Evans (1976); and Wright (1980) argued that to improve community attitudes towards disabled people much more emphasis must be devoted towards strategies for fostering the acceptance of disabled people in social interaction.

Wright presented guidelines for the creation of an improved environment which, it was argued, should include

"an equal status level where disabled and non disabled people can participate voluntary activities which are mutually rewarding, perceived as enjoyable and shared by both disabled and non disabled an environment where disabled people are seen as credible coping individuals a friendly non threatening atmosphere an environment where tension associated with sharing is reduced and people are able to satisfy their curiosity without their observation appearing to be obvious."

This study attempts to address these guidelines by examining the social use of computing within the context of normalisation theory.

By considering the issues and interactions which take place in a specific application the objective is firstly to establish, in general, whether such an approach merits further effort as a normalisation
"tool" and secondly by considering the social, personal, technical and resource issues whether the application model can be enhanced.

1.1 PEOPLE WITH DISABILITIES AND NORMALISATION THEORY

Wolfensberger (1977) states that he uses three definitions of normalisation depending on his audience

the use of culturally valued means in order to enable people to live culturally valued lives

the use of culturally normative means to offer persons life conditions at least as good as that of average citizens, and to as much as possible enhance or support their behaviour, appearances, experiences, status and reputation.

the utilisation of means which are as culturally normative as possible, in order to establish, enable or support behaviours, appearances, experiences and interpretations which are as culturally normative as possible.

Wolfensberger and Tullman (1982); and Wolfensberger and Thomas (1983) argue that the most explicit and highest goal of normalisation must be the creation, support and defence of valued social roles for people who are at risk of social devaluation. All other elements and objectives of the theory of normalisation are really subservient to this end.
Nirje (1976) presents a slightly different interpretation stating that normalisation means sharing a normal rhythm of the day with privacy, activities and mutual responsibilities; a normal rhythm of the week with a home to live in, a school or work to go to and leisure time with a modicum of social interaction. Molony and Taplin (1988) describe normalisation as an uncomplicated idea expanded by Wolfensberger and others in America into a complex ideology claimed by Nirje to "deviate dramatically from the principle as originally conceived" and to lead to a number of misconceptions including that of normalising the person rather than normalising the environment.

However despite debate on definition and criticism of the differing methodologies for implementation, which are discussed later, normalisation theory is having a powerful and sustained impact on the movement to integrate disabled people within the normal broad community.

1.2 SOCIAL ASPECTS OF COMPUTING

Johansen, Vallee and Spangler (1979) summarise a number of studies with the statement "computer conferencing promotes equality and flexibility of roles in the communication situation by enhancing candour of opinions and by helping to bring about greater equality of participation". Hiltz, Johnson, Aronovitch and Turoff (1980) draw attention to the fact that cognitive and social
emotional changes using a computer tend to be different from face to face communication. Extensive work has been done by researchers, based at Carnegie Mellon University, into the social issues and interactions which take place on electronic mailing systems. (Kiesler, Siegel and McGuire, 1984; Kiesler, Zubrow, Moses and Geller, 1984).

Siegel, Dubrosvsky, Kiesler and McGuire (1986); and DeSanctis and Gallupe (1987) argue that the reduction of social context cues in computer mediated communication should "reduce normative influence relative to informational influence, this should reduce the group member's social approval of one another and increase the importance of arguments or decision proposals".

Kmetz (1984) points out that one of the advantages of electronic groups is the sharing of information which he divides into rapid diffusion of ideas and rapid shared feedback. Used in this way electronic groups become information buffers, devices for pooling current information in a readily accessible form. Cathart and Gumpert (1983) believe that computer mediated communication systems will change the existing concept of friendship. Rice and Case (1983); and Hiltz and Turoff (1981) both found that as individuals became more experienced in their use of computing conferencing systems so too did the proportion of socio emotional content rise.

This rich and expanding area of research could present considerable social opportunities for people with disabilities both as individuals
and as a means of integration with a very wide alternative social circle.

1.3 THE SCALE OF THE PROBLEM

This study is undertaken with three groups. One of these groups is composed of ten adults whose disability is cerebral palsy. Cerebral palsy as a diagnostic condition is described later in the study together with such factors as incidence and levels of intelligence. It will not be argued that all people with cerebral palsy could directly benefit from or participate in computerised social systems, although a very large number of people with other disabilities and many people who are isolated by age and infirmity could directly benefit. However almost all people with disabilities will benefit from improvements in community attitudes towards the disabled; therefore successful interaction and experiences by part of the disabled population can have potential flow-on benefits for the entire disabled population.

The global figures are very significant indeed.

The Australian Bureau of Statistics survey of 1988 shows that there has been a very significant increase in the number of disabled and handicapped people in Australia since the previous survey in 1981. The survey estimated "two million, five hundred and forty three thousand people or 15.6% of the Australian population, were disabled”. Approximately 84% of the disabled population or two
million one hundred and twenty four thousand one hundred people (13% of the total population) were found by the survey to be handicapped. The handicapped can be divided into four categories:

- severely handicapped: 4%
- moderately handicapped: 3.4%
- mildly handicapped: 3.8%
- severity not determined: 1.9%

In other countries the patterns are similar.

Pickering and Stevens (1986) state that in the United Kingdom some three million persons suffer from some sort of impairment and of these, slightly less than half can be said to have a substantial handicap that is one that is a major impediment to normal independent life.

Nezzo (1988) cites the national centre for health statistics advance data for 1988 and gives the following figures for different disabilities within the United States:

- visual impairments: 8,172,000
- hearing impairments: 21,028,000
- speech impairments: 2,360,000
- physical disabilities: 10,459,000

Thus, even without the inclusion of the aged the numbers are very large indeed. Furthermore, as will be discussed, improvements in
medical, social and educational services are contributing to growth in numbers at an increasing rate.

1.4 THE SCALE OF COMMUNITY COST

Such large numbers inevitably lead to large costs.

Bowe (1984) states that on an average day there are one million 500 thousand people in American Nursing Homes with thousands entering such homes every year because they can no longer live independently; of course, it must be remembered that this includes aged people as well as people with disabilities.

In 1985 in a submission to the Australian Better Health Commission the Australian Cerebral Palsy Association estimated costs for individuals as follows

for children in educational and paramedical programs $10,000 per child per year

for adults in activity therapy centre programs $10,000 per adult per year

for adults working in sheltered employment units $3,000 per adult per year
The costs of accommodation were between $22,000-$35,000 per year for a child and for an adult between $18,000-$30,000 per year. These costs did not include the additional expenses associated with the provision of specialised aids and appliances and alterations to homes or the provision of social security payments such as allowances for employment and mobility and the invalid pension.

It will be argued that computing can aid the movement of disabled people out of institutions to a more independent life which is less costly to maintain on an ongoing basis. However governments are reluctant to incur the short term costs of change despite the obvious long term benefits - for fairly obvious political reasons. This is doubly unfortunate since evidence is also presented in this study that even people with very significant disabilities can use computing for meaningful employment and as a consequence become tax payers rather than tax dependents.

1.5 A WINDOW OF OPPORTUNITY

The review of the literature will demonstrate that there are two significant areas of research addressing

the sociology and social psychology of information technology and

normalisation theory and the integration of people with disabilities.
The case for the conduct of this study as a valuable and original area of research identifies a window of opportunity where people with disabilities, service providers, researchers within both streams and other groups within the community can come together to significant mutual benefit. Hopefully an outcome will be further work to synthesize these two research fields.

1.6 METHODOLOGY SELECTED

The blending of two distinct areas into a study which looks at both quantitative issues and qualitative issues makes a mixed methodology appropriate.

There is a distinct tradition in the social science literature supporting research methods advocating the use of multiple methods. This multiple strategy is described in a number of ways eg convergent methodology, convergent validation or what has been called "triangulation". (Campbell and Fiske, 1959; Smith, 1975; Denzin, 1978). A range of authors support the use of multiple methods in a research project with a sociological emphasis, especially where the time frame is longitudinal and the project is multi-disciplinary. For such circumstances combined quantitative and qualitative approaches are recommended by many methods texts (Webb, Campbell, Schwartz and Sechrest, 1966; Denzin, 1970; Smith, 1981; Abrahamson, 1983; Chadwick, Bahr and Albrecht, 1984).
Kraut, Dumais and Koch (1989) argue that using both qualitative and quantitative research methods over time provides an unusually rich picture of the effects of technological change. They point out that use of computing technology by each individual changes over time and studies conducted in this way provide a much more realistic picture of the effects both on technical and social issues.

In addition to the appropriate quantitative measures which are discussed in the relevant area the study makes use of the valuable qualitative approach inherent in the application of Grounded Theory.

Grounded theory is a particular style of qualitative data analysis developed by Strauss and Glaser (Glaser and Strauss, 1967; Glaser, 1978; Strauss, 1986). It has been used in a wide range of sociological studies involving special or disadvantaged social groups (Biernacki, 1986; Broadhead, 1983; Bowers, 1983; Cauhope, 1983; Hoffman-Riem, 1984). Hazan (1985) presents an excellent example of its successful use in what she argues is "the ideal method for dealing with the uncharted and ambiguous areas as the interfaces in health and human services. The interactive character of constant comparison during analysis worked extremely well in the analysis of the textual material from the four different vantages of the populations" (p.20).
1.7 STRUCTURE AND PRESENTATION

After the introduction the study has five main sections.

The second section reviews the literature and presents the argument for the study and the synthesis of the two separate research streams.

The third section describes the series of interwoven studies conducted over a period of two years, with their separate, but in the overall, related methodologies.

The fourth section details the outcomes not only for participants but for their peers and other sections of the community.

The fifth section describes how a future enhanced model might be developed and identifies areas where further research would be of value.

The sixth section concludes the study.
2. NORMALISATION THEORY: SOCIAL INTEGRATION: MAINSTREAM SOCIO-TECHNICAL DEVELOPMENTS

2.1 THE EVOLUTION OF DISABILITY SERVICES TO THE NORMALISATION MODEL RELEVANT TO PEOPLE WHOSE DISABILITY IS CEREBRAL PALSY

2.1.1 THE HISTORICAL EVOLUTION OF SERVICES

Throughout history the community approach to those with a disability has, at best, been ambivalent. In some instances people with a disability have been credited with special or compensatory characteristics. The approach of the Ancient Greeks to individuals with epilepsy, and what was probably cerebral palsy, was positive but generally those with a disability were seen as inferior. The disabled received support from family members and the extended family in small communities, for basic needs such as food and shelter. The formal provision of employment with any dignity did not exist and people who were disabled were allocated tasks that, for a variety of reasons, others were reluctant, unwilling or unable to perform.

The first sheltered workshop is recorded by Farrell (1962) as being established in France in 1254 as the Congregation of the Three Hundred for three hundred crusaders who had their eyes gouged out by the Saracens. The view being that blindness acquired by
noble people in battle was of the highest order and therefore required some special provision.

In considering Britain, Taylor (1981) describes the development of care and support for disabled people as having three stages. The pre-industrial stage was based on informal, familial and community care with financial support available from 1601 under the Poor Law Act. The second stage, in response to the process of industrialisation and weakened family caring capacities, saw a shift towards institutional care with all the consequences of imposed passivity and segregation from society and the growth of professional paternalism. We are now slowly emerging from the second phase into the third phase which involves the compensatory process of desegregation and renormalisation of people's lives.

The historical and sociological patterns within Australia evolve from the British model. Dickey (1980) describes four separate periods in Australian history with separate patterns in which the attitudes towards disabled persons changed according to the priorities of the growing nation. These were

the convict era (1785-1859)

the period of free trade (1835-1890)

the liberal period of universal rights (1890-1949)

the period of growth of government power in the area of disability (1949 to the present).
Brown (1972) identifies many of the problems of the earlier stages in Australia when benevolent societies offered support to the disabled based on evidence of piety or moral behaviour. Individuals requiring assistance were given preferential treatment if they possessed a bible. As benevolent organisations could no longer sustain the full cost they received a grant of charity from the Governor of New South Wales which ultimately amounted to 70 percent of their income. This allowed the Governor to absolve himself of his responsibility and the societies to pursue their goals of benevolent morality without official supervision.

In the free trade period benevolent societies moved their emphasis from one of morality to one more comfortable with the ideology of free trade and actively promoted the work ethic among the disabled so that priority was given to those who could either work or were capable of being returned to the workforce. The permanently incapacitated received grudging service and a very much lower priority. The separation of the poor and those who were disabled, as classifications during the free trade period, ultimately led to the subdivision of the disabled into special groups according to their work abilities. Thus in Sydney the emphasis on programs for particular disabilities arose from their diagnostic classification in the work context rather than in the case of their diagnostic medical or therapeutic needs.

The more liberalised period of universal rights came with the contemporary rise of the trade union movement and the beginning of the entry of the working class into government. It came to be
argued that the economy rather than personal moral qualities should be the determinant of the aggregate of society resources available to disadvantaged groups. Whilst this extended the total resources available to disabled people, it also commenced the establishment of the bureaucracy necessary to make the final compromise between liberal dogma and the pragmatism of balancing the global and individual organisational budget.

The world experienced a massive rise in disability due to war injuries. Due to improved medical and rehabilitation procedures the huge number of severely war injured was accompanied by a much higher long term survival rate. This increased the emphasis on rehabilitation measures which spread to those with a more permanent disability, whose numbers were also rising due to the same scale of improvement in neo natal and therapy techniques. This combination was creating a support requirement on a scale never before experienced. This trend not only continues but accelerates as techniques and procedures continue to improve. In addition to a range of Australian Federal and State legislation supporting the needs of the provision of services, the United Nations had a Bill of Human Rights in 1948 and in 1981 the Year of Disabled Persons. However attitudes towards people with disabilities remain deeply entrenched and change extremely slowly. Historically the medical profession has tended to be the instrument of current community attitudes towards people with disabilities rather than an upholder of their rights. The medical practitioner has certified that persons are in need of benefits, classified their disability with a view to allocating them community resources and
made other arrangements as appropriate within the historical medical model.

Burdekin (1989) lists the declaration of rights of disabled person which have been enshrined by the Australian Federal Government in the Human Rights and Equal Opportunities Commission Act. As the first commissioner he points out that the Act is a starting point, not an end in itself. He points out that the list of rights has a slightly anachronistic terminology, due to their age, but they are nonetheless a very important range of rights. They include

the right to a decent life, as normal and full as possible

the right to any necessary services to develop skills and capabilities to the maximum

the right to economic and social security

the right to participate in all social activities.

Burdekin, the Australian Human Rights Commissioner, believes that the Americans with Disabilities Act of 1989, which is currently being implemented in the United States, will ultimately have an impact on the Australian scene. This Act will not only prohibit discrimination in regard to people with disabilities but will also impose a number of positive requirements as well as barring discrimination in a more narrow sense. The thrust of this American Bill emphasises that a rights based approach as opposed to a
welfare approach can be of enormous benefit in analysing and addressing the needs of the disadvantaged.

In 1974 the Australian Federal Government replaced certain social security provisions and the Handicapped Childrens' Act with the Handicapped Persons Assistance Act. While this legislation provided considerable support for programs in the area of disability a significant drawback was the emphasis on the provision of service at the approved address or addresses of the service providing organisation.

In 1983 the Government undertook an exhaustive round of consultations entitled the Handicapped Programs Review. As a consequence the Disability Services Act, 1986 was enacted and introduced over a five year Transition period commencing at the beginning of July 1987. This Australian act was paralleled by a related act in the United States in the same year. Thus windows of opportunity were opening simultaneously in both countries in response to the pressures of the very rapidly growing demands. The new Australian Act introduced many changes. Three of the changes are particularly relevant to the focus and timeliness of this study.

Firstly, great emphasis is placed on consumer participation in, and control of, service direction and management. Secondly, services are not tied to a location - indeed they are encouraged to be integrated within the general community. Thirdly, small decentralised services are encouraged at the expense of larger, established, service-provider dominated organisations.
While these objectives are socially desirable they can not only increase the cost but also create significant transport and communication problems for those who are already disadvantaged. This study explores a model which overcomes the disadvantages and enhances the social benefits of group empowerment which aims to give each individual control over their own lives.

2.1.2 THE GROWTH AND IMPACT OF DISABILITY NUMBERS

Advances in a wide range of professional areas coupled with improved medication and rehabilitation technology have significantly increased the long term survival of many people with birth or accident disabilities.

On a global scale Bowe (1984) states that the United Nations estimates are that approximately 10% of the world's population is disabled - that is 500 million people with special needs.

Each survey and census shows the problem to be on the increase irrespective of country.

For Australia Doenau (1984) quotes the Bureau of Statistics survey as indicating that 1.942 million of Australia's population have a disability. This is equivalent to 13.2% of the population. This can be compared against the American figure of 13.6%. The World Health Organisation differentiates between a disability and a
handicap in that a disabled person is not necessarily handicapped but if they are handicapped or considered to be handicapped, this would reduce the figure to 8.6% of the population. Finally classifying the specific group of those with a severe handicap would reduce the World Health figure for Australia from 1.265 million people who are handicapped to .514 million of with a severe handicap.

Four years later the Australian Bureau of Statistics survey of 1988 shows that there has been a very significant increase in the number of disabled and handicapped people in Australia since the previous survey in 1981. The survey estimated "two million, five hundred and forty three thousand people or 15.6% of the Australian population, were disabled". Approximately 84% of the disabled population or two million one hundred and twenty four thousand one hundred people (13% of the total population) were found by the survey to be handicapped. The handicapped can be divided into four categories

- severely handicapped 4%
- moderately handicapped 3.4%
- mildly handicapped 3.8%
- severity not determined 1.9%

In other countries the patterns are similar.
Pickering and Stevens (1986) state that in the United Kingdom some three million persons suffer from some sort of impairment and of these, slightly less than half can be said to have a substantial handicap, that is one that is a major impediment to normal independent life.

Nezzo (1988) cites the national centre for health statistics advance data for 1988 and gives the following figures for different disabilities within the United States

- visual impairments 8,172,000
- hearing impairments 21,028,000
- speech impairments 2,360,000
- physical disabilities 10,459,000

Unfortunately the disabled tend to represent an even larger percentage of the unemployed than they do of the total population. Kiernan and Bruininks (1986 p. 36) consider that the best estimate of adults with disabilities, who are unemployed, is between 74% and 86% whereas the official unemployment level in the United States is around 7 - 8 percent.

Rogers (1987) reports that over half of all the nearly 22 million disabled adults in the United States (12.3m people) are not in the labour force. She indicates that this means they are not working and are not looking for work while at the same time the community
spends large sums of money on the disabled. One estimate shows that public and private disability transfer payments (that is cash payments made to compensate individuals for their disability) made to persons aged 18-64 reached $70.6 billion in 1981 (2.4% of GNP). In addition an estimated $114 billion was spent on health care costs for disabled persons in 1981, bringing the total costs of direct transfer payments and health care to $184.6 billion (6.28% of GNP). Bowe (1984) states that on an average day there are one million 500 thousand people in American Nursing Homes with thousands entering such homes every year because they can no longer live independently; of course, it must be remembered that this includes aged people as well as people with disabilities.

Studies in other countries also identify significant costs for disability programs.

In 1985 in a submission to the Australian Better Health Commission the Australian Cerebral Palsy Association (ACPA) estimated costs for individuals as follows

- for children in educational and paramedical programs $10,000 per child per year
- for adults in activity therapy centre programs $10,000 per adult per year
- for adults working in sheltered employment units $3,000 per adult per year
The costs of accommodation were between $22,000-$35,000 per year for a child and for an adult between $18,000-$30,000 per year. These costs did not include the additional expenses associated with the provision of specialised aids and appliances and alterations to homes, or the provision of social security payments such as allowances for employment and mobility and the invalid pension.

ACPA (1985) estimate that their case load will grow for at least another 30 years before births and deaths are in equilibrium. With this steadily rising prevalence, financial costs for the provision of life time services will also grow in proportion. The organisations involved believe that while improved medical and therapy procedures have reduced the numbers with a mild disability requiring services, the number of the more severely disabled requiring admission to services has increased. By extrapolating United Kingdom studies to a 1985 Australian position they believe that a life time cost of service provision to a cerebral palsied person in residence at a non-inflated cost will be in excess of one million Australian dollars.

These figures allied to historically expensive service delivery models only serve to reinforce the argument in favour of community integration since studies show that this is a direction that is not only socially acceptable to the disabled consumer but less expensive to the community.

Hayes (1984) states that the humanitarian and ethical arguments for integration would probably not have advanced the cause as far had it not been for the very strong economic argument. It has been
estimated that savings of 80% of average annual provision costs in public institutions could be made if the person were not institutionalised.

A series of recent studies conducted by the Government of South Australia, who have a reputation for enlightenment in the area of disability, comparing costs for institutional and community living found that there was little doubt of the viability of community living in preference for institutional care even for extremely dependent people. More importantly the studies referred to the significant social advantages not only for the individuals but for staff and families - which had potentially cumulative and compounding long term effects on the economic outcomes.

It is clear that any encouragement to this trend from an effective computer conferencing system for disabled people can only foster this desirable social movement.

2.1.3 CEREBRAL PALSY - DESCRIPTION

Cerebral palsy results from a non progressive disorder of the brain occurring as a result of interference during its development in the period until approximately three years of age. The motor disability which is caused results in a lack of muscular control. Bleck (1975) states that the term cerebral palsy by common usage describes a non progressive disorder of movement or posture beginning in childhood due to malfunction or damage of the brain and indicates
that in almost 90 percent of cases brain damage occurs before or during birth. Swartz (1951) defined cerebral palsy as an aggregate of handicaps, emotional, neuromuscular, spatial sensory and peripheral sensory caused by damage or absent brain structure. Crothers and Paine (1959) stated that cerebral palsy is not a disease in the medical sense but is really more usefully an administrative term which describes "individuals who are handicapped by motor disorders which are due to non progressive abnormalities of the brain".

Cruickshank (1976) criticises many of the existing definitions of cerebral palsy stating firstly that cerebral palsy is more than a motor problem and secondly that most definitions are unduly restrictive in limiting aetiology to "birth trauma" alone. While some degree of mental retardation is present in the majority of cases, Cruickshank (1976) believes that physiological dysfunction is a more appropriate term than limiting the concept to mental retardation alone. The extensive debate which has taken place on the classification procedures for cerebral palsy serve to indicate the complexity of the topic. Bleck (1975); Blencowe and Sheldon (1969); Crothers and Paine (1959); Cruickshank (1976); Denhoff and Robinault (1969); Holt (1975); Ingram (1964); Johnson and Blank (1968); Miers (1957); Phelps (1950); Smith and Neisworth (1975); all make a contribution to the current definitions of cerebral palsy which are clinical rather than pathological and which may be summarised by the five classifications of Denhoff (1976) into type, topography, severity, tonus and associated dysfunctions.
The subdivisions of type are based on the particular character of disordered movements. Spasticity is the most common occurring in more than 50 percent of the cases reported. This inhibits the control of voluntary movement; attempts to stretch the muscles or move the limbs, cause strong and, in some cases, repetitive, contraction. During development muscles shorten with a consequent deformation of the particular limb. The presumed sites of brain injury are the cerebral cortex or the pyramidal tract. Dyskinesia, of which athetosis is the most significant type, occurs in up to 25 percent of the reported cases. Normal voluntary movements become awkward and contorted due to involuntary jerking. The presumed site of injury in this case is the extra pyramidal system particularly basal ganglia. Ataxia which occurs in up to 10% cases results in lack of coordination and balance since the control of posture is affected. The presumed site of brain injury is the cerebellum. Mixed types have been reported in the range of 15-40 percent of cases. Atonia is rarely reported.

The topography describes the various types of the neuromotor disability the normal classifications are

monoplegia, which is rare and affects one limb only

ehemiplegia, which occurs in 35-40% of cases and affects an upper and lower limb on the same side

paraplegia, which occurs in 10-20% of cases and affects the lower limbs only
diplegia, which occurs in 10-20% of cases affecting major involvement in the lower limbs and minor involvement in the upper limbs.

triplegia, which is rare, affecting 3 limbs, usually one upper limb and both lower limbs

quadriplegia, which occurs in 15-20% of cases affecting major involvement of all four limbs; this condition is also described as tetraplegia.

The classification double hemiplegia is sometimes used to describe upper limb involvement greater than lower limb involvement.

Severity is divided into the three classifications of mild, moderate and severe; the state of muscle tonus is divided into decreased, normal, increased and inconsistent tonus.

Cerebral palsy can be present with one or more associated dysfunctions which are normally classified as sensory, convulsive, intellectual, perceptual, behavioural, learning and emotional.

Shaver and Malik (1981) point out that cerebral palsy is not a single disorder. It refers to a whole group of conditions that stem from damage to the developing brain which usually occurs around the time of birth. A chief characteristic is loss or impairment of control of the voluntary muscles such as in arms, legs or tongue. The involvement may range from mild to severe. At times it is obvious, as in staggering gait or slurred speech. At other times it is
less obvious, as in poor control of muscles used to regulate vision, resulting in difficulty moving one's eye across a line to read it. In addition to the motor impairment, cerebral palsy may also involve other disorders related to brain damage such as convulsions, behaviour disorders, perceptual problems (e.g. letter reversals) and sensory defects (hearing) which lead to learning difficulties and compound the impairment. Although an individual with cerebral palsy may be impaired in a single area, such as gait, more often a combination of muscle groups and related disorders is involved.

2.1.4 CEREBRAL PALSY - INCIDENCE AND INTELLIGENCE

Estimates of the incidence of cerebral palsy vary widely. The comments of Berry (1981) are particularly relevant when applied to cerebral palsy. He refers to the considerable variances in incidence rates of disability in modern epidemiological studies often undertaken not too many miles apart and relatively chronologically close together. He points out that when prevalence is combined with incidence then the problem becomes even more confusing. Phelps (1950) reports an incidence of 6 per thousand live births and a prevalence of 150 per 100 thousand of the population. Dunsdon (1952) reviewed evidence of the incidence of cerebral palsy by type in several populations in England, Wales and the United States. He reported average proportions of 10.4% athetoid, 81.85% spastic and mixed and 7.5% ataxic. Henderson (1961) in carrying out a study involving 140 cerebral palsied children reported the percentages to be spastic type 78.3% athetoid 7.5%.
It must be realised that, historically, those with birth disabilities have rarely survived childhood. The present picture is quite different with medicine, therapy and medication creating a situation were a normal life span is an increasing reality for the majority. This trend applies across disability groups and is not confined to those whose disability is cerebral palsy. Since birth incidence of cerebral palsy (and many other disabilities) is almost constant, the enhanced survival rate will continue to increase the prevalence within the total population over the next two or three decades until the life span of a disabled person equates with the general population norm. While such a trend is socially desirable, it changes the value of the work undertaken in this study from being desirable to benefit a limited number, to being essential to community cost containment; as well as being of potential direct value to a very significant proportion of the total population.

Mair (1961) considered that it was among children of school age that the prevalence of cerebral palsy could be most accurately assessed. He analysed a series of United Kingdom studies which covered Edinburgh, Dundee, Birmingham, Leeds and Northern Ireland and inferred that the incidence among children of school age was slightly in excess of two per thousand. Vernon (1967) believed that although many infants now live through the catastrophic events of the perinatal stage, the prevalence of severe multiple handicaps among them has increased. While early diagnosis and treatment improve the programs of many, other factors may increase the numbers at risk. Calhoun and Howisher (1979) point out that the rise in teenage pregnancies and drug and
alcohol abuse have increased the incidence of children born with central nervous system damage such as cerebral palsy.

There is debate not only from the intelligence level of people whose disability is cerebral palsy but also on the difference of levels between types of cerebral palsy.

Schonell (1956) drew comparisons between the work she had carried out in England and the work she had carried out in Australia and found that the incidence between the two places, many thousands of miles apart, were similar. In pursuing her studies in greater depth it emerged that a similar pattern existed among intelligence levels then classified as dull, normal or super normal. The incidence in the dull category in England was 50.9% and in Australia 51.8%. Hohman and Freedheim (1959) considered the influence of the severity of physical handicap and associated language disorders on the reliability of intelligence assessment and found that reliability was influenced more by sensory handicap and speech disorder than degree of physical handicap. Cockburn (1971) found that when spastic tetraplegics were excluded from her sample and the remaining spastics were compared against athetoids, that there was little difference in the levels of intelligence with spastics averaging 78.9 and athetoids 77.4. Hardmann and Drew (1977) indicated that despite very wide ranges in estimates of intelligence, most research indicates that mental retardation occurs among people whose disability is cerebral palsy with a much higher frequency than in the non cerebral palsied population.
Cerebral palsy is normally present with one or more additional disabilities which add to the educational, emotional and independent living problems of the individual. Bowley (1969) reported that although 43.7% of children who are cerebral palsied made average or good progress at school, despite severe physical handicap, 20.3% were not making good progress although their intelligence levels were satisfactory. Due to poor intelligence, epilepsy, defective sight, hearing, or speech 35.9% were doing badly at school and had a social maturity level below average in 40% of the cases. Some of the problems experienced are undoubtedly due to the physical prominence of the physically handicapped in a normal environment. Comino (1976) has stated that there are few conditions found in human beings that show such a multiplicity of variables and so high an incidence of secondary problems as cerebral palsy.

Cruickshank, Hallihan and Bice (1976) provide one of the main arguments for this study when they state (p.109) "one of the real challenges in our culture is the intellectually normal or superior disabled person who cannot profit from therapeutic programs and who during his/her entire life span must function in an occupational or vocational levels considerably below their mental ability".
2.1.5 NORMALISATION - ORIGINS AND EVOLUTION

Despite the earlier development and adoption of normalisation as a principle in Denmark by Bank-Mikkelsen it is generally believed that the first systematic and definitive statement on normalisation was by Nirje (1969). Nirje is at great pains to emphasise that he has never used the phrase "normalisation of the person" but rather "the normalisation of life conditions".

The early work in Scandinavia was taken up with great enthusiasm and commitment by Wolfensberger (1972), who in his initial work on normalisation used a number of mainstream expressions especially "mainstream of a culture"; "mainstream of society"; "societal mainstream"; "community mainstream"; and "service mainstream".

Five years later Wolfensberger (1977) stated that he used three definitions of normalisation depending on his audience:

the use of culturally valued means in order to enable people to live culturally valued lives

the use of culturally normative means to offer persons life conditions at least as good as that of average citizens, and to as much as possible enhance or support their behaviour appearances, experiences, status and reputation
the utilisation of means which are as culturally normative as possible, in order to establish, enable or support behaviours, appearances, experiences and interpretations which are as culturally normative as possible.

Wolfensberger (1977) states that, in most societies and across the span of history, devalued people tend to be thrown into a relatively small number of relatively cohesive role images. These role perceptions tend to be highly correlated with various systematic human service approaches.

In the same 1977 publication Wolfensberger stresses that the use of culturally normative means is an important part of normalisation. He points out that if a devalued method is used in human service, its image of audity transfers to the person or group being served. If we were concerned only with outcomes we would use cattle prods and electric shock to get powerful behaviour results. It is important to take into account the imagery of the service means and methods which transfer to the person. Therefore in computing or in bulletin board use the image of how that is perceived will transfer to the individuals who participate in such a process.

Wolfensberger (1977) also believes that as deviances and stigmata increase in number they have a factorial effect on the observer. In such a case three stigmata would have an effect of increasing the observed consequence by a factor of 6 (ie 3 x 2 x 1). While such a proposition may be true it would be extremely difficult to prove.
and one of the dangers of such a statement in an emotive area by such a person is that it is accepted uncritically by his acolytes.

On the other hand by 1976 the more grass roots initiator (Nirje, 1976) starts to present a slightly different interpretation, stating that normalisation means sharing a normal rhythm of the day with privacy, activities and mutual responsibilities; a normal rhythm of the week with a home to live in, a school or work to go to and leisure time with a modicum of social interaction.

Wolfensberger (1980) argues that normalisation is as much about means and processes as it is about outcomes. Secondly he says that normalisation does not mean only "normal" treatment but preferably "valued" treatment. Thirdly he says that non normative means may be used if the outcomes outweigh the disadvantages of the use of the non normative means. Perhaps a reason for the initial publication rejection of his work was a concern that the process provided more satisfaction to the proponent and the service provider than it did to the person with a disability?

Wolfensberger (1980) points out that a distinction must be made between mainstreaming and social integration and that the two are not the same.

Wolfensberger and Tullman (1982) and Wolfensberger and Thomas (1983) argue that the most explicit and highest goal of normalisation must be the creation, support and defence of valued social roles for people who are at risk of social devaluation. All
other elements and objectives of the theory of normalisation are really subservient to this end.

Wolfensberger (1983) derives the term social role valorisation from the French term for normalisation which he considers to be "la valorisation du role social".

2.1.6 NORMALISATION - MODIFIED AND ALTERNATIVE VIEWS

By 1985 Nirje, who always tends to adopt a more pragmatic stance, has moved further away from the views of Wolfensberger the enthusiastic proponent. Nirje (1985) says that too little is known and too little research is done on normalisation principles outside Scandinavia. The normalisation principle is open for tests of its possible need of refinement.

Perrin and Nirje (1985) believe that the later statement of Wolfensberger on normalisation deviates dramatically from the principle as originally conceived and presented by Nirje.

They believe that any form of structure that furthers the facet of integration which is already part of a normal activity is an appropriate one for use by people with disabilities. They point out that physical placement in the community does not necessarily represent integration or normalisation; the issue is how closely do the lives of people with disabilities approach those of other members of the community. They stress that normalisation as
originally conceived, indicates that individuals should be encouraged and assisted in expressing their own preferences and making their own choices. Opportunities and training should be provided to assist in this process.

A quite different view of normalisation is presented in a social psychological context of a review of stigma by Ainlay, Becker and Colman (1986) who state that (p.50) "normalisation describes the way in which stigmatised individuals adapt themselves to society by attempting to reduce their variance from cultural norms".

They go on to state that normalisation covers a broad area of behaviour. Normalisation can occur with any disenfranchised group set aside by deviance or social marginality. This process is a strategy for survival for various stigmatised minorities and has been described for many populations including black communities (Mithun, 1973; Stack, 1974) and tramps (Spradley, 1970).

Katz (1981) argues that the main reason why non stigmatised people avoid those who are stigmatised is not because of a strong distaste but instead because they are confused about the nature of their own feelings. The confusion stems from the fact that non stigmatised people maintain both negative and positive feelings towards those who are stigmatised.

Graycar, Dorsch and Mykyla (1986), in Australia, were intensely critical of Wolfensberger's system as being rigidly conformist.
They believed that social role valorisation (SRV) has considerable benefits as a conscious raiser in human service provision. At the same time it has several difficulties that must be addressed before it can achieve full effect. These difficulties are serious enough that if not corrected or at least modified, social role valorisation will become another esoteric body of information with a diminishing band of idealists who believe that they alone know the truth and can safely criticise those outside from within the ranks of the initiated.

What SRV does well is to raise questions about human services that we either do not ask ourselves or do not ask sufficiently frequently such as "is the service we are providing enriching or demeaning these people?" SRV does not only ask general questions but in the "Passing" evaluation asks hundreds of questions in a concerted cohesive and quite comprehensive way that covers many aspects of the service provision. It must be recognised that SRV is not a static idea but a dynamic one and the questions therefore are under continual review and evolution.

There are at least three problems in social role valorisation and its application. These are its jargon, its idealism and its lack of address to the needs of its clients in a prominent way. The jargon is disorienting. Graycar et al. (1986) comment that the jargon in SRV appears to induce obscurity. The preoccupation with idealism led Graycar to state "the leaders deliberately avoid consideration of the limits or constraints by which service agencies are bound". He believes the single most consistent criticism of normalisation or social role valorisation is the lack of reality in its practical
application. The practitioners of SRV have turned a general principle "people should have a normal social life" into a rule "people must have a normal social life". In applying a principle in such a way they obviously violate the built-in pragmatism of the original founders Bank-Mikkelsen and Nirje. Both these two indicated that normalisation was to be undertaken as far as possible - not at any cost.

One of the greatest faults of social role valorisation seems to be that it does not consciously assert the priority of the individual's need over the system nor try to build into its approach the systematic definition of the individual's needs. Partly because of this failure and partly because of reliance on structural changes external to the individual and partly because of the way those introducing it are using it, SRV tends to be idealistic and does not easily relate to the world as it is.

Eckersley (1987) strongly supports the views of Graycar from both a theoretical viewpoint and from his position as a practical provider of services.

Molony and Taplin (1988) describe normalisation as an uncomplicated idea expanded by Wolfensberger and others in America into a complex ideology claimed by Nirje to "deviate dramatically from the principle as originally conceived" and to lead to a number of misconceptions including that of normalising the person rather than normalising the environment.
2.1.7 INTEGRATION OF SCHOOLCHILDREN

At this stage it can be argued that the integration of schoolchildren who are disabled has been more successful than the integration of adults with disabilities. However success is a question of degree. In certain cases the lack of success in school integration has led to a situation where some, who support the principle but are highly critical of the implementation methodology, describe it as "maindumping". Stobart (1986) argues that a loose and wishful synthesis of psychological models has led to the belief that merely placing disabled children in the mainstream will result in increased social interaction between disabled and non disabled children as well as increased social acceptance of handicapped students by their peers.

However, a consequence of the integration thrust will be an increasing number of school leavers who have gone through a form of integration. Many of them will have concluded that a similar model, degree and extent of integration exists in the adult domain. Since this is not the case it is of value to review some of the experiences and issues in the integration and mainstreaming of schoolchildren.

The earliest work in Australia in regard to the integration of special children can be traced to Wyndham as early as 1932. Generally, 1964 is taken as the date of the formalisation of the concept with the inclusion in the charter of the Australian Council for the Rehabilitation of Disabled including the following, "every effort
should be made at each stage of the development of a child with a physical handicap to ensure that he is able to live in society as fully as possible. Educational provision should therefore be directed towards the optimum degree of integration with his fellows who have no disability rather than towards segregation from them”.

Dunn (1968) was the author of the Peabody test and was frequently credited with a major role in turning the United States away from the practice of discriminatory labelling of students with handicaps. While supporting integration he pointed out that physical integration does not assure social integration. In fact pupils may be more cruelly segregated socially in a program when they are not accepted by their classmates than in one where they are physically separated during school hours for their academic instruction.

Birch (1976), a distinguished American special educationalist, pointed out that mainstreaming had a much shorter pedigree than integration. He said "I wish I knew who first used the word mainstreaming to convey the idea of providing special education to exceptional children while they attended regular classes. It is a recent usage. Mainstreaming is not defined in that sense in either current educational or general dictionaries".

In a detailed comparison of special education in Australia as compared with the United States, Safran (1989), points out that the fundamental difference is that the Australian system reflects its British roots and emphasises the principles of parliamentary supremacy, a constitutional framework setting out government
powers and functions and variable interstate policies. In contrast the US system is legally based on a constitution which emphasises individual rights and procedural process with guarantees and a history of case law.

Within Australia there are different experiences and philosophies between States. As a consequence there have been quite different approaches to resource allocation - a critical factor in determining success or failure. In the State of Victoria the government recognises that there are problems in special education outside those of the child itself. They do not label children by particular disability but rather describe them as "children with problems in schooling" (Fulcher, 1986).

One of the advantages of the Victorian system, as highlighted by Tarr (1988), is that the State government, when allocating funding, uses the US special education identification and prevalence rates. Since the American taxonomy includes a much higher proportion of children who are classified as learning disabled or with behavioural problems, this means that the per capita special education funding is much more generous than in any other Australian state.

The Queensland Department of Education Policy on Integration (1986) states that there appears to be a universal acceptance of the philosophy of integration of handicapped children that has arisen out of the notion of normalisation which has been translated in the educational setting as the principle of integration. In accepting this policy the Department identifies a number of issues which they see as principles. These include the view that
integration involves the provision of adequate and appropriate specialist and resource support.

integration requires negotiation to ensure an appropriate climate and an acceptable model.

An extensive review of the New Zealand education experience by Chapman (1988) is cautious about the benefits of mainstreaming students with disabilities. He indicates out that the policy is based on social justice and equity with little attention directed towards important psychological and educational aspects. He argues that the placement of students with special needs into regular classrooms without changing the regular education system and providing adequate professional support services is main-dumping rather than mainstreaming.

Barclay and Kehle (1979) summarised a range of studies which addressed the impact of handicapped students on other students in the classroom. These studies showed that

the mainstreaming of children with disabilities without a very careful assessment of their social skills support system and aptitude for making friends results in generally adverse socially affective consequences.

selected academic placement for disabled children appears to be the best setting for building appropriate social skills and maintaining achievement motivation.
female disabled students have a particularly difficult time in the transition to mainstreamed classrooms where children with different types of disability are simultaneously mainstreamed, the differences in integration are a function of specific characteristics of individual children rather than categorical types.

In a major examination of research findings in the United States Strain and Kerr (1981) argue that a careful survey of the literature indicates that as far as mainstreaming is concerned "no operational definition exists" and they ask "what types of educational practice actually do qualify as mainstreaming" (p.77).

Bogdan and Barnes (1979) undertook a major three year research project in the United States entitled "a qualitative sociological study of mainstreaming". This investigation set out to discover what factors were responsible for the successful operation of integrating disabled children with their peers. Their investigation spanned a range of 25 programs which had been nominated as successful mainstreaming. They discovered that in many cases disability was treated as an administrative classification. Students were only classified as disabled if they required special services, were reviewed by the committee on the handicapped and had an individualised educational program (ie PE). A young woman who lived close to a school and used a wheelchair but did not require special transportation and had no other needs, was therefore classified as an ordinary student because administratively she had
no requirement for special services. As case studies generated within the overall study consistently illustrated, the variability used in defining children as handicapped was extensive. Madden and Slavin (1983) argue very strongly that with adequate support regular class placement is usually superior to full time special class placement.

Although Minde (1978) found that the parents of cerebral palsied children progressively became less hopeful about the future of their children, the trend to integrate at an even earlier age continues despite the increasing severity of some disabled survivors.

Hanline and Hanson (1989) conclude that the significant efforts to integrate very severely disabled children pose longitudinal questions in regard to the integration of such children when they grow up. They are of the view that the successful integration of very young severely disabled children creates the expectation in the families of those children that similar integrative strategies will exist throughout their lives. If these expectations are not to end in confrontation it will be important that the integrative strategies for children subsequently flow throughout the spectrum of life services. They go on to say that schools are integrating infants and toddlers with multiple disabilities many of whom are fed through gastrointestinal tubes and children who have tracheostomies or other life support sustaining technology.

Hopefully the findings of Sandford (1988) will become a general outcome. In studying the interactions of kindergarten children to
disabled children of the same age it was found that the initial attitudes of the non disabled children were hostile, but over time and exposure to the disabled children they became much more positive and non threatening.

Kirby (1986) believes that it is unfortunate that formal education stops for many people with disabilities just when they are reaching early adulthood and beginning to realise how essential certain basic skills such as reading, writing and counting are for being independent in the community.

Successful outcomes to this study could not only facilitate a solution to the problem identified by Kirby but could extend the computer communication model of integration into the school domain, as a normal adjunct, with considerable benefits. Such a development would provide a constructive bridge to the adult environment for many adolescents with disabilities.

2.1.8 INTEGRATION IN EMPLOYMENT

The move from school to employment is a difficult one for many adolescents. It is especially so for those who are disabled.

Work undertaken by Shaver and Malik (1981) shows that someone with a severe and complex a condition such as cerebral palsy, generally has far fewer job options than a non disabled person of the same age and background. Aside from physical limitations, the
more subtle aspects of cerebral palsy, such as perceptual impairments, can affect job choice as well. In addition the brain damage, characteristic of cerebral palsy may result in less than normal ability to handle stress and anxiety which ultimately prevents individuals so disabled from doing any jobs which have a high stress content. Cerebral palsy may subtly and cumulatively affect job performance in other ways as well. Prolonged physical dependence on others may rob an individual of the confidence that grows from learning to be independent, may cause others to regard him or her as incapable, and may result in delays in emotional and social development. Lack of knowledge about the problems experienced by those with cerebral palsy leads to low expectations on behalf of the community and lack of time devoted to what may be solvable, if unique, problems. This increases the reasons to make the most of options that are not excluded by the condition of cerebral palsy.

Shafer, Rice and Metzler (1989) conducted an extensive survey comparing the attitudes of co-workers with disabled people with workers who were not co-workers. They found that those who had experience of working with people with disabilities were much more comfortable in their attitudes towards the disabled and prepared to continue in that role. Those with experience of the disabled also had a significantly higher rating of social and vocational competence for the disabled individuals. Collectively these data provide additional support for the view that social integration is an outcome of supported employment and interaction in the workplace between the able and the disabled.
Horner and Bellamy (1979) and Bellamy, Horner and Inman (1979) showed that people with disabilities could be trained to achieve and maintain open employment and that most of them were capable of acquiring much more complicated work skills than had previously been assumed.

Success in integration means not only effort to acquire work skills, as would be expected of any school leaver, but a range of social skills coupled with changes in fellow worker and community attitudes. Factors such as social skills and attitudes, not only towards their fellow workers but to work itself, are at least as important as work skills for people with disabilities who wish to make the transition from sheltered to open employment. (Brolin, 1979; Kiernan and Stark, 1986; O'Leary, 1986; Rusch, 1986; and Wehman, 1981).

Studies by Bellamy, Horner and Inman (1979); Halpern (1985); Wehman, Moon and McCarthy (1986) all conclude that the increasing move for people with disabilities for integrated employment will require not only improved vocational competence but very much enhanced social skills.

Getting and maintaining a job, however, is only one of the challenges in leaving school. Kirby (1986) draws attention to the fact that research is needed to show that working and living in the community does not lead to a more lonely and marginal life than that available in a congenial sheltered workshop environment.
A successful bulletin board such as that proposed in this study could be an appropriate tool in overcoming the problem of a lonely life.

2.1.9 ATTITUDES

The review of the integration of disabled children into school and the integration of disabled adults into the work environment both alluded to the issue of the attitudes of non-disabled peers. Attitude change is critical to such social change and is interwoven with the issues of deviance and stigma. To achieve successful and comfortable integration will require not only a change in peer attitudes but changes in the attitudes of the disabled towards themselves. Shortridge (1982) believes that attitudes towards people with disabilities must be recognised and addressed in the light of their profound effect on the integration of disabled people into regular community environments. Since this is one of the measures used in this study it is appropriate to discuss relevant aspects of deviance, stigma and attitude at this juncture.

Haralambos (1980) points out that deviance really means to deviate from an accepted path. Deviance therefore consists of those acts which do not follow the norms and expectations of a particular social group. Deviance may be positively sanctioned (rewarded) negatively sanctioned (punished) or simply accepted without reward or punishment. A soldier on the battlefield who risks his life may be termed deviant as may be the physicist who breaks the
rules and develops a new theory. The soldier might receive a medal and the physicist might receive a Nobel prize. However in practice the study of deviance and the general acceptance of deviance in society is usually limited to deviance which results in negative sanctions. Disabled people are implicitly deviant in that as a group they are separate from the accepted path. Unfortunately society implicitly punishes this form of deviance by its lack of support and implicit intolerance.

Haralambos (1980) quotes the problems of labelling theory in considering issues of deviance. For instance a person who is labelled male and is labelled disabled is treated in accord with the lowest value of label ie. disability is a lower value than male so the person is treated not as a male but as a disabled person.

Labelling reflects society's attempts to deal with the threats provided by people who are different. Johnson (1979) argued that the human species depends for survival on cohesion, mutual support and feeling of being intact. Any manifestation of differences creates feelings of insecurity in the person who is different, his or her family and members of the wider community. Labels are a way of separating a person who is different and denying full membership of the larger group. Simpson (1980) argued that the non acceptance of disabled people reflects a natural response to people who are strange.

Bogdan and Kugelmass (1984) point to the approach where human experiences are mediated by interpretation. Objects such as
wheelchairs do not produce their own meaning, meaning is bestowed upon them.

Simpson (1980), in an extensive review of the literature, concludes that substantial data support the position that non exceptional people can be expected to interact appropriately with their exceptional peers only when given suitable direction for doing so. He states that contrary to popular belief simply providing for contact between regular and special pupils in school seldom provides fortuitous attitude change. Mechanisms must be introduced which foster the improvement of attitudes and interaction.

A number of authors indicate that community attitudes tend to be negative or non accepting and result in disabled people being denied the rights, dignity and life opportunities available to, and taken for granted by, others (Donaldson, 1980; Evans, 1976; Hastings, 1980). A negative attitude is associated with a view of disabled people as separate or different. The usual implication is that difference implies inferiority or inadequacy, however sometimes it is taken to imply positive or praiseworthy characteristics - but this is rare. Westbrook (1984) established that the negative attitudes of others towards disabled people resulted in feelings of inferiority by those perceived to be disabled and therefore inferior. Negative attitudes continue to be found in groups that may be encountered by disabled persons as they mature (Ayer, 1970; Kang and Masoodi, 1977; Larsen, 1975; Pander and Bartel, 1972).
A study carried out by Leonard and Crawford (1989) indicated that attitudes about personal interaction were changed by personal contact with disabled individuals while societal views were not. They argue that two entirely different types of program are necessary to change two different types of attitude. Programs for volunteers should concentrate on the personal level. In contrast, societal attitudes should be changed by media coverage educational programs. As a consequence the authors believed that the contrasts between positive attitudes at one level and negative attitudes at another may account for some of the apparent contradictions arising out of previous research where evidence of both positive evaluations of people with disabilities and people without disabilities have been reported.

Leonard and Crawford (1989) also arrived at the important conclusion that attitudes to people with disabilities can be divided into two types in another dimension. They contrast attitudes at the societal level which refer to disability issues such as the provision of goods and services to people with disabilities, integration into schools and employment and the role of charities. They believe it is possible that attitudes at this level are limited to people's political or religious beliefs and values. However attitudes at the personal level are more directly linked with personal experience. This creates a situation where some individuals accept disabled people in their personal contact with them but do not support integration within the community or equal employment opportunities. At the other contrast there are individuals who express fairly positive attitudes about such issues as integration within the community but experience a great deal of personal discomfort when they actually
meet individual disabled people. Similar conclusions are expressed by Fortini (1987) and Voeltz (1980).

2.1.10 SOCIAL LIFE AND SOCIAL STRUGGLES

Issues such as the integration of the disabled have and will involve changes in the parameters of the mainstream social environment, changes in the attitudes of the community and, particularly, a struggle to change the model which views the person with a disability as an artefact within a delivery structure that meets the need of the service provider. Often inquiries address physical and financial resource issues and ignore aspects which are just as critical. As an example, Cousens and Crawford (1988) point out that it is peculiar that the Richmond report in New South Wales did not address the question of community acceptance of people with disabilities in any depth. The Report stated the belief "a wide range of behaviour should be tolerated within the community" and offered no empirical evidence in support of the view that community attitudes were changing to be more tolerant of people with disabilities.

A range of authors (Aviram and Segal, 1973; Bassuk, 1984; Rothwell, 1983; Segal, Baumohl and Moyles, 1980) all point out that it is fundamental to the success of moving disabled people into the community that members of the community should be prepared to accept them. Without such acceptance, not only is the independent living program not successful, but can be positively adverse. The
study by Trute and Loewen (1978), made a distinction between social responsibility and social interaction when they studied the social rejection issues towards people with chronic disabilities within an urban environment. They found that social responsibility towards the disabled progressively improved over time but social interaction varied within the communities and was much more resistant to change.

Cousens and Crawford (1988), in an Australian study, found that those who had contact with an occasional group of disabled people in the community, were more accepting than those who had no contact, however they point out that the practical issue is whether the demonstrated effect of contact can be extrapolated to a likely effect on behaviour. Their study indicated that this issue required further research. Aviram and Segal (1973), found that while there was verbal agreement on the concept of community based programs for disabled people, it coincided with vigorous opposition to the actual establishment of facilities in residential neighbourhoods.

Cocks (1985) argues that the predominance of a medical model and the lack of application of a social systems model to services for people with disabilities in Australia is a major impediment to the provision of appropriate services. Guy (1985) identifies three models and believes that emphasis in social action and research should be aimed at accelerating the movement from the first to the third; which would address the concerns of Cocks. In describing the different issues which are involved Guy stresses that with the three
models, the role of the client moves from patient through trainee to, ultimately, that of citizen.

It is widely recognised that neither a medical model of disease nor a sociological model of deviancy is entirely useful in describing disability. However, no adequate substitute model has been yet been developed - let alone universally adopted. Similarly, extreme positions are held in regard to whether people with disabilities should work or be employed. The community tends to oscillate between two extreme views, the first is that the disabled are extremely unfortunate in suffering their disability and should not be expected to work as well. The other and directly conflicting school of thought adopts the view that all disabled persons can and should work, with disabled persons seen as potentially productive members of society.

Other social struggles exist in the fundamental area of communication. Individuals using devices for communication have reported many experiences in which they are viewed as inferior in terms of intelligence, ability and overall worth as a communication and social partner (Creech, 1981; Rush, 1983; Viggiano, 1981). Kratt (1985) points out that many non-disabled people are unaware of the difficulties that people with disabilities have in simply gaining attention to commence a communication interaction. If they have no speech or incomprehensible speech they are driven to a number of strategies of gesturing, tugging the clothing etc. Such actions use energy, increase tension and reinforce the feeling of inferiority which the disabled person experiences.
A number of researchers consider that even when both individuals are physically present in a conversation between an able and a disabled person, the traditional signals, if not missing, are frequently altered due to the disability of the disabled person. This not only disadvantages the disabled person but can be used by the able bodied person to take control of the topic, content, interaction and ultimately social control, frequently by questioning the validity of the communication process of the disabled person. (Blau, 1983; Corsaro, 1979; Mishler, 1975; and Rush, 1983). These same authors point out that disabled speakers or disabled communicators, using such devices as signing or a communication board, often have great difficulty in signalling a turn ie that they have completed what they want to say or they wish to interrupt or they believe that it is now their turn in a group conversation. Extensive work has been done by a group of researchers at Carnegie Mellon University into the issues of the presence or absence of cues. The relevance of this work, and the rather different circumstances in regard to people with disabilities, is discussed in detail later.

The structured but neutral operation of a computing bulletin board could eliminate these types of disadvantage and at the same time assist the proposition put forward by Beckey (1982), who argues that future research should be directed towards discovering methods of encouraging disabled people to participate in future planning for the services which they need rather than having their "alleged problems" identified and determined by others who believe they know best.
2.2 COMPUTING USES BY PEOPLE WITH DISABILITIES

The previous section demonstrated that there are a range of areas where people with disabilities might benefit by using computers. In addition the general transfer of computing technology and the growth of use can, at first sight, lead to the view that computers are used extensively by disabled people. However if one reverts to the normalisation definition as propounded by Nirje (1969, 1985) the reality is somewhat different. It is more relevant in many cases to say computers are used on people with disabilities or to distinguish the circumstances where the decision as to use is not made by the disabled person but by a third party. In the normal "citizen" model as proposed earlier by Guy (1985) the comparative use areas by disabled people would be where

the decision to use for normal children was made by the parent or teacher

the decision to use was made by the disabled adult and the purpose in use was similar to the use made by a person without a disability. eg computing uses for employment or education.

It is not intended to deny or understate the value of many aspects of computing to disabled people, but rather to increase the focus on the aspects which socially empower rather than address a physiological malfunction. There are certainly areas, especially with children, where the boundaries between these two issues are
impossible to sensibly distinguish. An excellent example is the work of Valente (1986) which is later reviewed in more detail. Computer uses are therefore narrowed to examples covering special education, employment and independence.

2.2.1 COMPUTING IN SPECIAL EDUCATION

Computing in education has been successfully and extensively used and applied in education for at least three decades. While the initial emphasis was in quantitative faculties within universities, use spread rapidly to all areas of the educational system with considerable benefit. Reviews, studies and critiques abound; the comprehensive overview by Chambers and Sprecher (1980) is a particularly useful starting point between the earlier mainframe years and the micro explosion of the last decade. Five years later Kolich (1985) provides an update on the earlier work.

Computing in "special" education has grown rapidly with some excellent programs that not only aim to educate but, even more importantly, to integrate.

Dutton (1985) points out three successful strategies which have been field tested to promote the integration and acceptance of students with disabilities among their non disabled peers. The first strategy involved cross tutoring in a special day class with the disabled student as a computer tutor. In the example a special day class teacher collaborated with the kindergarten teacher in the
same school. The special day class students acted as experts and guides for the young children with each special day class student being assigned the role of tutor for 30 minutes per day. The kindergarten children were observed to be fascinated with the computer and engaged in a learning process. The special day class students were observed to be patient and kind; they clearly enjoyed their role and exhibited no negative or inappropriate behaviours. For the students with disabilities there were several positive outcomes. Firstly they had positive experiences with non disabled students, secondly they practised being successful while historically they had previously frequently experienced failure. Thirdly they enjoyed the role of the trusted and capable "computer expert" and their self esteem began to rise.

The second strategy was to use a simple data base management program to focus upon similarities between students in regular classes and students with disabilities who are mainstreamed into those classes. In this example students worked in pairs collecting and entering data on members of the class into a simple data base filing system. Students with disabilities were grouped with well accepted students. Apart from the non disabled students learning the concept of a data base as a useful tool, they also learned that people with disabilities had similar likes and dislikes to themselves and therefore were more acceptable. They also saw that disabled people could display competence with computing.

The third strategy was the use of the computer as a prosthesis to allow students with physical disabilities to function in the regular classroom. In this experiment the disabled student used an Apple
He and Bank Street Writer word processor as a substitute for pen and paper. Apart from allowing the disabled student to function normally, it demonstrated to non disabled students that those with cerebral palsy could be intellectually capable; it presented an opportunity to interact as equals. For the disabled student, apart from being a learning experience, it created an environment where he was seen as a competent individual, established friendships with ordinary children and his self esteem was enhanced as his classmates and teacher identified his abilities.

Dutton concludes that micro computers are so highly motivating "and socially acceptable" that they become tools in the process of bringing children together.

Similar work is reported by Cunningham and Gose (1986) where they found that physically handicapped students using telecommunications are looked up to as experts by other able bodied students. It greatly enhanced their mainstreaming and social opportunities. Roles are reversed when the able bodied student is dependent on the disabled student for assistance within the computer area.

Papert (1980) argues that his logo turtle is an excellent example of where computing can reduce the barriers to conceptual self expression which exist between able bodied and disabled children. Both are able to construct drawings with an equally full consciousness of the processes which lead them to the end product. Wier, Russell and Valente (1982) state "a severe physical handicap imposes a dependent passive role on its victim. The
uncompromising way in which Logo places initiative and control in the hands of the users allows them to have a direct effect on their environment".

Valente (1986) in his thesis presents a model for the use of computers with cerebral palsied children thus enhancing the capacity of the computer as an effective and versatile educational tool as well as an invaluable instrument in the diagnosis and remediation of the deficiencies these children may have. Valente believes that the motor impairment which children with cerebral palsy have, makes it extremely difficult to evaluate their intellectual abilities. The computer provides the means whereby children can perform evaluative or evaluatable activities. He found that the strategies to solve the task used by cerebral palsied children were not different from the strategies used by normal non handicapped children. He proposed that as a consequence this showed that the ability of the cerebral palsied children was delayed rather than distorted.

Valente conducted his study as part of the Information Prosthetics for the Handicapped Program at the Logo laboratory at the Massachusetts Institute of Technology. He stated that the primary focus of his project was the application rather than the development of new technology. The study involved indepth work with only three individuals, all of whom were severely disabled by cerebral palsy. In generalising the value of his work, however, Valente (1986) estimates that 16 out of every 5,000 people in the United States have cerebral palsy. He believes that approximately 10,000 infants are born with this condition each year. In using the
United States definition he extends this by a further 2,000 young children who acquire cerebral palsy as a result of head injuries.

While the latter group of children would not be classified as cerebral palsied within either the Australian or British definition they would undoubtedly benefit, as would children in a wider range of diagnostic classifications. The earlier discussion in this section has highlighted the magnitude of the problem and as a consequence the significant benefits to be derived from the types of successful strategy developed by this bulletin board research project.

The objective of Valente's research was to develop a computer based learning environment for children physically handicapped by cerebral palsy and to study several issues related to the use of this environment for diagnostic and educational purposes. The aim of the study was to present a model for the use of computers for cerebral palsied children thus enhancing the capacity of the computer as an effective and versatile tool as well as an invaluable aid in the remediation of deficiencies the children might have. The study involved work with seven children of whom three were used as detailed case studies. Valente claimed that the detailed grounded theory type consideration of the data allowed what he argued was a magnified view of the process.

Valente's work has an added importance to this study in that it takes a very detailed and qualitative approach to social outcomes involving a relatively small sample. In doing this it is something of a departure from the more formal MIT laboratory methodologies.
Fleischmann (1986) reports on the success of a small computer aided design workshop staffed entirely by severely disabled people whose disability is cerebral palsy at Oakland California. Fleischmann makes the point that to obtain employment it is normal for people not simply to have training but also to have experience. This meant that the training facility had to extend its role to an employment activity to ensure that individuals had actual employment experience. This was done by establishing two small sub contracting businesses, one involved in bookkeeping and the other involved in computer aided drafting. The facilities were supported by a contract procurement specialist who procured paid work for the employees.

Kaplan and Howard (1982) and Foley (1985) report the success of computer training programs for the disabled which placed hundreds of individuals with disabilities in programming jobs nationwide throughout the United States. Kuhlman (1988) extended the training issue further to look at the success of a computer training program which focused on homebound people with disabilities.

Grey (1987) describes how 95% of the graduates of the project "Access to Computer Training" run by United Cerebral Palsy of New York City found programming jobs with an average starting salary
in excess of $20,000. Despite this very high percentage success from this program it should not be assumed that integrated employment is easy to obtain. The attitudinal barriers highlighted earlier are still significant. Bowe (1984) divides employers into those who just do not believe that people with disabilities can and will work as well as persons without any special needs and those who are prepared to give them an opportunity. Fortunately, in the latter category he cites some large organisations such as Du Pont, IBM, AT & T and Control Data.

2.2.3 COMPUTERS AS AN INDEPENDENCE ARTEFACT

The book written by Bowe (1984) provides a detailed presentation of the issues involving computing in facilitating the independence of people with disabilities. His investigations show that the increase in medical and nursing home costs and the continued rapid rise in their cost makes solutions which foster people with disabilities living independently much more urgent. He indicates that micro computers can save disabled people and their families not only considerable amounts of money and time but also reduce worries about accidents, fires and burglaries.

Bowe makes an interesting observation when he draws attention to the exclusiveness of the micro computer in the range of assistance which it can give across all disability groups and says "nothing is as meaningful to as many disabled people as a personal computer". He states that a laser cane might help a blind person cross the street,
but does nothing for a disabled deaf individual; a motorised wheelchair can help a quadriplegic to and from work but offers nothing for someone who is learning disabled. He is of the view that the use of personal computers offers something to almost all disabled people. Not only that, it has the potential to reduce the costs of support which are borne by the disabled person, their families and society at large.

Bowe goes on to stress how important it is that people with special needs must get the information and the experience so that they may make decisions for themselves as to which types of computing technology they wish to utilise. He indicates that people who are paralysed from the neck down can go to school and go to work without leaving home; and that a personal computer can make a difference which transforms a life of passivity, boredom and fear into one of creativity, productivity and safety. Just as important a personal computer can make a person feel much more independent. He argues that the Scandinavian nations, the United Kingdom and the United States sustain huge costs in supporting disabled people who do not work. Governments often spend in excess of $20,000 per person per year on aid programs. He concludes that it would be much less costly to governments to provide many disabled people with modified micro computers and train them for jobs. He is of the opinion that the dramatic reduction in costs and increase in capability have almost suddenly created a revolution in opportunity. Until 1980 those wanting to help deaf people use the telephone used old teleprinter technologies which were decades old; now vastly superior and much cheaper micro computer based technologies are readily available. Workers and people with
disabilities have difficulty in coming to grips with the opportunities created by this change. Bowe believes that it is probably fortunate for people with special needs that their particular requirements converge so neatly with the desires of the general public and the researchers of government and academic institutions in that the devices which they create for their purposes have an almost accidental benefit for disabled people. He argues very strongly for what he describes as general use devices that are accessible to people with special needs rather than special devices for special needs.

This study aims to support, develop and enhance many of the goals and objectives espoused by Bowe which, given the scale of numbers and cost to the community, will be of significant economic and social value.
As in the previous section it is important to maintain the focus within the parameters of this study. Just as an issue such as Computer Assisted Learning could have been allowed to swamp the perspective, so too could a broad approach which attempted to embrace all the issues within the title of this, or indeed any, section. Effort must be made to maintain an objective focus. Such a strategy presents its own problems when the large body of initial references, revealed by the searches undertaken, collapses even more rapidly than normal with the addition of each search variable. This serves to highlight the value of this study in drawing together areas which are very rich in themselves but have so far had little research commonality.

Hiltz and Turoff (1985) consider computer mediated conferencing systems are a medium with their own advantages, disadvantages, social dynamics, problems and opportunities. They believe that conferencing systems should incorporate, in their design, approaches which fostered the emergence of cohesive groups that can exert social control over member's behaviour. They believe that it is important to be aware that like a crowded dormitory, a computer mediated communication system can subject individuals
to an excess of communication stimuli by a dramatic increase in connectivity or what they describe as effective "social density". They argue that in this environment the computing architecture should structure social interaction to make the densely occupied space feel more like a set of small communities.

In earlier work Johansen, Vallee and Spangler (1979) summarise a number of studies with the statement "computer conferencing promotes equality and flexibility of roles in the communication situation by enhancing candour of opinions and by helping to bring about greater equality of participation". This was followed by Hiltz, Johnson, Aronovitch and Turoff (1980) drawing attention to the fact that cognitive and social emotional changes using a computer tend to be different from face to face communication. A number of the differences which they instance are that communication, in terms of sending and receiving, may occur seconds apart or days or even years apart. Using the computer to store information allows the retrieval by topic and the user to filter communication deciding whether, when and how thoroughly to read particular items from material.

Extensive work has been done by researchers based at Carnegie Mellon University into the social issues and interactions which take place on electronic mailing systems. Kiesler, Siegel and McGuire (1984); and Kiesler, Zubrow, Moses and Geller (1984) conclude that electronic mail provides almost no information about the social presence of message partners or the social context of communications. This leads to a situation where electronic responses, in comparison with oral or hard copy responses, tend to
be more extreme, less socially desirable, and characterised by more self disclosure. Siegel, Dubrovsky, Kiesler and McGuire (1986); and DeSanctis and Gallepe (1987) argue that the reduction of social context cues in computer mediated communication should "reduce normative influence relative to informational influence, this should reduce the group member's social approval of one another and increase the importance of arguments or decision proposals".

Another researcher in the same group, Sproull (1986) states that four important characteristics of an electronic message system are its speed, asynchrony, lack of intermediaries, and ephemerality of messages. While these characteristics are important in the ordinary environment, a number of them are of particular value for people with disabilities, particularly the issue of 'lack of intermediaries'.

Sproull goes on to indicate that one of the weaknesses of collecting information using a computer based message system is that there is no social presence creating a pressure to respond. This means that the potential respondent may ignore the request without the pressure of presence. However it could be argued that, for disabled people, this is a very positive advantage indeed, since they then have adequate time to consider a response and avoid much of the threatening, albeit well intended, family or professional pressure to which they are invariable exposed using other mediums of communication.

Finholt and Sproull (1987) define an electronic group as two or more people who influence each other over time through electronic interaction. An electronic group may also interact face to face but it
need not. The most general operational definition of an electronic group, the authors suggest, is all of the people named in any electronic distribution list.

Electronic mail has three general characteristics that condition its use as a communication medium. First it is asynchronous or non simultaneous. That is, like postal mail but unlike conversations, senders and receivers do not attend to the same communication simultaneously. Second it is fast. Unlike paper based communication electronic mail can be transmitted in seconds or minutes across a continent. Replies can flow back just as rapidly as the original communication. Thirdly it is text based. Unlike facsimile electronic mail has no picture or sign components and information is conveyed only through keyboard characters.

Finholt and Sproull consider that there are two types of group, formal and informal. Informal groups can develop within or across formal groups and emerge through voluntary association. In the study presently being undertaken the groupings are formal in the sense that initial membership of the total activity is formal but they are informal in that no requirements or constraints are imposed on individuals from different backgrounds be they therapist, student or teacher. Any groups that subsequently form are therefore informal groupings.

A range of authors have identified issues which may have positive or negative social outcomes for the people with disabilities therapists and computing students who participate in the present study. Rice and Barnett, (1986) found that the different
information needs of different individuals and groups over time led to an isolation of those groups on a well developed computer based network. Kmetz (1984) points out that one of the advantages of electronic groups is the sharing of information which he divides into rapid diffusion of ideas and rapid shared feedback. Used in this way electronic groups become information buffers, devices for pooling current information in a readily accessible form. Cathart and Gumpert (1983) believe that computer mediated communication systems will change the existing concept of friendship. Rice and Case (1983) and Hiltz and Turoff (1981) both found that as individuals became more experienced in their use of computing conferencing systems so to did the proportion of socio emotional content rise.

Kiesler, Siegel and McGuire (1984) believe that extreme socio emotional content (flaming) may occur precisely because of lack of social control that non verbal cues provide. If the process empowers disabled people to the extent that some of them can, for the first time, be implicitly outspoken this could only be of ultimate benefit to their objective of integration as equals in the general community.

2.3.2 PROBLEMS FOR NAIVE USERS

New users in any environment experience a learning curve of varying steepness. To some conferencing system users the sheer volume of information presented, when coupled with their lack of
experience and inappropriate initial strategies, means that they never acquire sufficient operational experience to obtain the best results from the system. Turoff, a veteran of early system developments in conferencing for the White House, has attempted to address this issue in the extension and development of the EIES System at the New Jersey Institute of Technology.

Hiltz and Turoff (1985) consider that experienced bulletin board users develop effective ways of coping with what initially may seem to be an overload of communications. Beginners tend to overextend themselves partly by reading junk mail but more importantly by trying to be fully informed in a multitude activities. On a conferencing system, beginners tend to join all the conferences that sound interesting. When they reach overload they begin to withdraw from some of the discussions and make better use of the material which they do receive.

Hiltz and Turoff make two important suggestions for overcoming the initial difficulties faced by naive users. They propose a default option on conferencing systems appropriate for new users which would assist them in the situation where they were unable to make intelligent choices because they had no experience of the system. Secondly, they argue strongly for designated human leader in a conferencing system as an aid to accomplishing group tasks and facilitating beginners with difficulties.

Such action would be critical in the successful development of any system to aid the majority of people with disabilities because they will have two dimensions of difficulty. The first will be that
identified here of the conventional naive user; the second will be
that their functional limitations will divert effort and energy away
from learning about the system to overcoming basic physical
problems of access. Good support for all naive users will allow
those with other problems to address them less stressfully and
more effectively. Rouse (1975) believes that the human factors
literature supports the view that human performance deteriorates
when either the work load is too great or too small. There must
therefore be an optimal load for individuals in processing computer
based communication. This will vary based on the individual's
experience and competence. Disability of a particular individual
would require to be taken into account.

2.3.3 SOCIAL ALTERNATIVES AND CHANGES IN THE WORKPLACE

For many members of top management the work place emphasis on
computing is either technical or financial performance
improvement. Fortunately there is a rapidly growing interest by
some researchers into the social and human change issues.
Steinfield (1986) analysed the content of electronic messages in a
large organisation and found that a much higher than expected
proportion of those messages contained socio emotional content and
believed that this content was extremely functional particularly for
new employees within an organisation.

Kraut, Dumais and Koch (1989) found that on a number of measures
in examining computing changes within a commercial service
organisation, those using computing believed that their jobs became less satisfying and less interesting. The researchers interview data suggested that although their productivity increased their opportunities for social interaction declined and this allied to other non intrinsic changes in the work place produced a reduction in their levels of personal satisfaction. Many opportunities for interaction disappeared and service representatives felt isolated. In the words of one representative "I do not know what is going on with anybody any more. Just today, I found out that one of the women over there’s husband was in a car wreck three days ago and I haven't even said anything to her" (p.231). However individuals felt more satisfied about their ability to cope with the job and performed more tasks per day and felt less depressed and anxious about the content of the job itself. The researchers believed it was important to realise that change produced by technological innovation is rarely uniform, it will vary between individuals as a function of their personality, their skills and how they utilise the technology.

A slightly different slant of development is what is called "the mosaic message". Markus (1988) studied a Los Angeles firm which made extensive use of electronic mail in 1988, four years after its introduction. As part of her study, she spent a day with a vice president, who on that day handled 110 electronic mail messages. He composed 44 of those himself and he received 66 from others. Of the 66, he received 34 were mosaic messages - that is they contained from 1-6 additional messages attached to them. A mosaic message is created by using a forward command rather than reply. This allows the message to be transferred to a party other
than the original sender or receiver. The mosaic message concept, in effect, created temporary group meetings compiling a trail of comments and discussion leading to a decision and the group then disbanded. Markus found that executives at the company preferred the use of electronic mail in explaining complex or ambiguous issues because the issue could be resolved quickly and the mail system provided a record of the discussion which all could see. While the obvious advantage of this approach is to accelerate decision process it has significant social benefits in making available to a much wider than normal range of people the process and detailed arguments involved in making decisions; whereas historically they were often informed of the outcome but not the case. This would be an even more welcome change to people with disabilities who are almost always ill-informed as to "why" a particular course of action, important to them, is being adopted. In addition the mosaic concept would greatly simplify communication between and by people with disabilities who had direct or indirect communication impediments.

A move to break down the conventional work environment with fairly obvious significant social consequences is described by Judkins, West and Drew (1985) as the "Rank Xerox networking experiment". Networking is a system whereby selected and trained volunteers leave an organisation to establish their own companies. Using microcomputer technology for communications and data processing they provide services to the parent organisation usually related to the jobs they were themselves doing. The objective is to save overhead costs while retaining the services of valuable employees.
Judkins, West and Drew (1985) in describing the company of the future, see it as taking place within an information society based on electronics rather than on an industrial society. They see elements linked by Telecom providing the network and there being four other elements

- the parent company of core managers and support staff
- individual entrepreneurs or networkers
- quasi autonomous work groups, intrapreneurs
- Xanadu style associations between the networkers/entrepreneurs and other company entrepreneurs.

Based on their experience, they believe that for their own company at least, it is unlikely that the permanently employed staff would ever be less than 85% of the present size.

However even 15% of total jobs would create a significant pool of opportunity in a working/social model which would be personally desirable and economically beneficial for many people with disabilities; transport savings alone would be sizeable.
The networking concept, alluded to earlier, is a computer facilitated move away from the conventional office or centralised base. This is further extended by the concept variously described as "telework," "telecommuting," and the electronic cottage. Opinions are divided as to scale, timing, and economic value as well as the social benefits. Specific problems arise when the issue is given detailed scrutiny. Some of these vary across country because they affect location specific aspects such as security, tax and legal issues.

The current range of homeworkers in developed countries falls in the range of 7-10 percent and, of course, not all of these use computing. The UK Department of Employment (1985) estimated that 7% of the work force were home workers. Cross (1986) estimates that 10% of the American workforce work at home for some or all of the time and that this will grow to a maximum of 15% by the year 2000.

Pratt (1984) identified three types of telecommuters these were

- clerical women
- managerial and professional mothers of young children
- male managers and professionals.
Such a division would relate to findings by other researchers who considered the type and continuity of homework. Kraut (1987) discovered that the majority of employees in a high technology operation, who worked at home, found they worked at home in addition to their office based work. Bailyn (1989) in reviewing a range of studies came to the conclusion that telework was an augmentation not a substitution on a regular basis for office work. Olson and Primps (1984) found that for the clerical group who worked at home there was less autonomy but for the professional group who worked at home autonomy increased.

The negative or cautionary view is presented by Gordon and Kelley (1986) who, in summarising their research findings in regard to working at home, believe it is unlikely that the electronic cottage will soon be with us. Their findings indicate that working at home with computers as a regular substitute for office based work is more theoretically useful than actually available despite the many champions that exist in this workplace innovation.

This proposition is supported by Forester (1989) who argues that writers have consistently underestimated the psychological problems of working at home and consumers have generally not found new IT-based services to be cheaper, usable or useful; nor do they fulfil their psychological needs. He concludes that any increase in home based activities is likely to be gradual.

However for disabled people a gradual change is very desirable since it allows time for skill acquisition and social adjustment. So
even the less enthusiastic commentators present an argument which implicitly supports this particular study.

2.3.5 OTHER DIVERSE SOCIAL ISSUES

The literature is becoming rich in its diversity of issues which ultimately may have some bearing in an improved Information Technology model to facilitate the social integration of people with disabilities.

Blackler and Oburn (1987) believe that it is clear that the costs and benefits of information technology may not be equitably distributed within society. They argue that more investigation is required into longer term social psychological benefits for users in terms of quality of work or quality of life outcomes the relative benefits to different or functional groups require much deeper investigation. They propound that a human centred and psychology led orientation to information technology development is essential if the human characteristics and functioning are to be adequately considered especially in regard to personal and social consequences. In examinations of how computers effect work and work life, a significant amount of the research work involves the reaction between individual workers and the computer which they use on the job (Giuliano, 1982; Morton and Huff, 1980; Wallace and Kalleberg, 1982).
Hiltz and Turoff (1985) believe that the concept that one person's junk can be another person's collectables applies with equal truth in the areas of information and ideas. Public conference areas on bulletin boards are therefore quite well attended like flea markets. This has the potential to lead to a great deal of junk when allied to the findings of Chesebro (1985) who studied messages from 14 public computer bulletin boards and discovered that 32% of the messages were of an interpersonal nature. While Meyers (1985) analysed a number of bulletin boards and found that 50% of messages were general discussion including jokes, insults, stories and personal information. Welsch (1982) discovered that when using electronic mail he had a much more interactive class of students who argued for better grades on specific papers and sought to make iterative changes to their assignments.

Three issues which are raised in the general context by three quite separate authors Sauer, Mowshowitz and Papert have an even higher specific validity within the context of the disabled people involved in this study and their very significant cohort group which has been earlier described. Firstly, Papert and Wier (1978) claim that the computer can become an extension of the operator who can then do anything a computer can do, such as draw, compose music, gain access to information libraries, put text on permanent file and so on. Secondly, Sauer (1986) points out that despite the view that many technologists believe technology to be neutral, it is people who apply it and who can chose to apply it to good or bad ends. Such people therefore have the capacity to significantly influence the social and economic environment. Mowshowitz (1981) argues for pragmatic analysis of social change in the computing area.
making the point that "the use of computers is determined in part by the social or organisational settings in which they are introduced". This study is such an analysis.
2.4 CURRENT SOCIAL AND TECHNICAL ISSUES WHICH MAY BE RELEVANT TO THIS STUDY

2.4.1 THE LINKING OF REHABILITATION AND COMPUTING

As new technology has emerged throughout history it has made a varied impact on the area of disability. Newman, Schatzlein and Sparks (1983) trace the history of rehabilitation technology and point out that early man made wooden prostheses from tree limbs. Ultimately a more sophisticated approach evolved in the area of the blind where they describe the development of optical lenses for reading in 1268; Franklin’s invention of bifocals in 1784; and Edison’s phonograph in 1877 with its potential for talking books for the blind. In the United States the Pratt-Smoot Act of 1931 appropriated money for services for the blind. These authors indicate that direct involvement in rehabilitation technology by the Federal Government of the United States began in the making of prostheses for war veterans at the end of the Civil War.

Newman, Schatzlein and Sparks (1983) speculate as to why the technologies which are available are not better utilised to benefit the 35 million disabled people in the United States. Of course there is a relatively simply answer to their question! A need does not become a market until the need has purchasing power - many disabled people and their families simply lack the financial resources to take advantage of the technology which is available.
Cavalier (1987) says "today's advanced technology represents the most powerful set of tools yet devised for human implementation". He provides an extensive review of high technology devices permitting disabled people access to sophisticated technological aids. These range through all birth disabilities to include high level spinal cord injury users of self feeding robotic arms directed by a voice command or a nudge of a chin switch. Cavalier believes that human service provision can be regarded as an act of communication. The type of service being provided and the style of its provision reveal a great deal about the manner in which the provider views a client. In many cases service providers are unaware of the content of the messages they are implicitly providing. Unvoiced premises of which the disabled consumer is aware, often run counter to the ostensible goals of the service efforts. This theme is examined in more detail later.

Ladner (1989) reports on Section 508 of the Rehabilitation Act Amendments of 1986, which is Public Law 99-506, entitled Electronic Equipment Accessibility. Section 508 was developed because it was realised that government offices were rapidly changing into electronic offices with micro computers on every desk. In order for persons with disabilities to keep their jobs, or gain new employment in government, Congress decided it was necessary to make provisions to guarantee accessibility to micro computers and other electronic equipment. A committee was set up to establish guidelines for the operation of these rules and the regulations produced inform federal agencies of what they are required to do to comply with Section 508.
The reaction of the computing industry was mixed, some software and hardware companies were concerned that their creativity and innovation would be restricted if all their equipment had to conform to the needs of a tiny minority of potential users. However a careful interpretation of this particular rule establishes that industry has only to provide equivalent access if the employee can use it and there is a feasible way to provide it. Thus industry does not have to provide access to data bases for mentally retarded users because they would not be using such software and does not have to provide access to software paint programs for blind users because there is no way that they could use that current technology.

Rehabilitation engineers are in favour of the changes because it increases the range of solutions available to them in helping individual disabled people. It will require them to have up to date information on what is available but ultimately it should operate to the advantage of disabled consumers of rehabilitation engineering services.

The reaction of disabled consumers is positive in that they see the guidelines may halt the trend towards non adaptable computer systems. Consumers are concerned that the guidelines currently only apply for use by the U.S. Federal government and believe that the guidelines should also apply to include computer systems purchased with government funds whether the purchaser is a government agency or not.
Ladner (1989) also points out the advantages of Public Law 100-407 entitled Technology Related Assistance for Individuals with Disabilities Act of 1988. He believes this will extend the scope of Section 508 to State governments, since this law provides funding to states to develop a response to computer accessibility for citizens with disabilities. The 1988 law stipulates that states must comply with Section 508 of the 1986 law in order to continue to receive funds.

Ladner (1989) also believes that the current percentage of members of the population of working age with a serious disability is at least 5 percent and growing. The US Department of Education reported in 1984 that more than 10 percent of all children aged 3 – 21 years were served in a special education program of one kind or another. This leads to a situation where young adults with disabilities are more educated than they have ever been and will therefore be seeking intellectual types of employment.

Wobschall (1988) who is the Director of the Minnesota Governor's Initiative on Technology for people with disabilities, identified three reasons why disability related research and development was not taking place as rapidly as it might within their state. These were

no effort is under way to identify and document existing technologies and the unmet needs of persons with disabilities
there is no mechanism to disseminate such information to producers, consumers and to encourage ongoing dialogues between them.

Specialised applications for persons with disabilities are often expensive but no incentives exist to encourage companies or individuals to develop new and existing technologies and technology use for that purpose.

On August 19, 1988 the US Congress enacted the Act entitled "Technology Related Assistance for Individuals with Disabilities Act of 1988". Congress made the following findings stated in section 2:

- There have been major advances in modern technology in the past decade.
- Technology can provide important tools for the performance of tasks.
- For some individuals with disabilities, assistive technology enables them to engage in or perform many tasks which allow them to have greater control over their own lives, interact to greater extent with non-disabled individuals and otherwise benefit from opportunities that are taken for granted by individuals who do not have disabilities.

Apart from the provision of equipment, Congress found that dissemination of information increased public awareness, and that simplified procedures for the involvement of disabled people and
an increase in training and technical assistance were important areas where action was necessary. In particular they wished to encourage the creation of community based organisations to assist individuals use technological devices or services.

In Great Britain, Cornes (1984); Croxen (1984) and Schworles (1983), are concerned that the optimism, that people with disabilities may make advantageous use of computers, may not be realised. Their reasons are firstly, a lower general level of educational attainment, secondly, that the introduction of new technology in the ordinary work force is proceeding at a faster pace than the introduction of new technology in the area of disability.

A number of authors present different slants on the restraints, speed of development and the need for interactive involvement between rehabilitation professionals and the ultimate consumer, all of which are relevant to this study. Growick (1983) says that the rapid growth in the use of computer technology in the area of disability has been a function of the development of software relevant to the rehabilitation process. He indicates that today's Information Society is not, as is generally believed, the result of a revolution but rather the flowering of applications of knowledge we have long possessed. He believes that the expansion of information technology is built on the initial work of Newton, Faraday, Morse and Babbage. Jaffe (1982) argues that any computerised message system for the rehabilitation community should not only involve able bodied professionals but disabled people themselves as active participants in information exchange and dispersion.
In addition to technical and professional papers, the popular press regularly feature articles highlighting the dramatic increase in processing power for a given cost. Even within the domain of the particular group of individuals involved in this study it is possible to make the case quite simply with a startling comparison. Earlier work (Earls, 1979) involved introductory programs for people with disabilities and used an Intecolor computer purchased in 1976 (before the first Apple had seen the light of day). It was one of the first microcomputers, had 8k of RAM and ran a version of Basic, aptly described as Tiny Basic, in 2k of memory. A significant reason for its selection was that it had a software scanned keyboard which allowed a number of functions, particularly the ability to enter a capital and revert to lower case with a single keystroke. This overcame the most fundamental problem experienced by any disabled individual who typed with a head probe. While such solutions are common place now they did not exist at that time.

Due to the successful use by a number of disabled users demand grew for a range of macro, single key functions and the American manufacturers were approached and asked for a board with an additional 8k. This request would have had no success but for the fact that the same equipment had just been successfully used in process control within the electricity power distribution industry due to the colour graphics capability, which was also causing the 8k RAM to experience difficulties due to memory limitations.
consequence a standard 8k upgrade had just become available for $3000 (1976). This is more than the cost of the entire 256k Apple IIe unit including screen, disk drive, software etc purchased at the commencement of this project ten years later and priced in 1986's far less valuable dollars. Thus a window of financial opportunity exists at this time, which ten years ago would have been far beyond the reach of any disabled individual.

This experience is supported by Botterbusch, (1983), who considers that important aspects in the use of computers in education and the area of disability are size and cost reductions, increased speed and increased ease of use.

The current or near current position is reviewed by Erdstein (1990), who shows that the relative decline in the price of disc drives continues. Capacities are getting larger and the drives are getting smaller. 3.5" drives are quite common today, 2.5" drives are just around the corner and 1.6" drives for notebook personal computers are seen as taking over in the 1990s. Desktops and laptops will use 2.5" and 3.5" drives with 40 - 200 megabyte capacity, 15 - 20 millisecond seek time, 8.33 millisecond latency at a price of between $600 and $1500. Notebook systems will use disc drives as small as 1.6", with a 20-40 megabyte capacity costing as little as $900. Such trends will be a boon to people with disabilities, who frequently find their resources to be extremely limited.

Of course since the priority should be on social rather than financial outcomes other views should be taken into account. Blackler and Oburn, (1987) point out that it is a mistake to assume that the
advisability of well thought out changes will inevitably impress others. Problems arise when the technologies are thought of as being important rather than the patterns of the social relationships which exist between the individuals involved.

2.4.3 WHO DECIDES WHO WILL USE - PROFESSIONAL OR CLIENT?

Burkhead, Sampson and McMahon (1986) identify additional human factors that represent significant barriers to computer access for people with disabilities. They believe that the preponderance of computer usage in the rehabilitation setting today is by the rehabilitation practitioner or administrator and not the rehabilitation client.

Earlier the same authors (McMahon, Burkhead and Sampson, 1985) state "there is a belief held by some rehabilitation professionals that client use of computer technology must be guided by a qualified professional who 'understands' both the client and the computer". One erroneous inference here is that each counsellor must become expert in the technical operation of the system. A much more dangerous inference is that the disabled client is not capable of independent computer use; a modern example of negative professional attitudes towards disabled persons.

Others support this viewpoint. DeLoach and Greer (1981) stated that independent client use of computer technology will enhance the quality of the specific application and provide clients with
disabilities with an enhanced sense of control over their futures. Papert (1981) demonstrates that severely physically disabled individuals are often placed in a passive dependent role by their limitations, their actions seldom impacting upon the environment. Being able independently to use the same equipment for the same functions as their able bodied peers in educational and employment settings has a positive impact on self image. He noted that severely disabled adolescents using the local system to perform intellectual "real life" activities experienced a marked improvement in their sense of personal worth.

Owen (1985) argues that social workers should play a very active role in overcoming barriers to meeting the needs of the disabled. She points out that the medical model in particular is inappropriate and should be abandoned. A need exists not only for social workers and social planners to aid the disabled but to urge them to be assertive and to work towards a society where they can function as fully as possible.

Borsay (1987) describes the conventional attitude by government and society towards the disabled as the individualistic model which has the following characteristics:

- Lower public expenditure
- Reluctant state intervention
- Minimum family and community support
service organisations with the characteristics of being segregated, disjointed, more unequal, and dominated by the producer or provider of services.

Borsay proposes that a more acceptable model is her social/structural model which has the following characteristics

- higher public expenditure
- enthusiastic state intervention
- maximum family and community support

with a service organisation structure which is integrated, coordinated less unequal and consumer sensitive.

Borsay presents the view, which is worthy of support, that in the individualistic perspective disability is presented as personal trouble and in the social perspective disability is acknowledged as a public issue. This author identifies the historical role of society, directly or indirectly, in reinforcing the disability by labelling and institutionalising people with disabilities. Of course welfare goals are frequently, although not always, incompatible with economic rationality. The community is suffering other resource pressures from larger groups who consider themselves disadvantaged. As a consequence the social model carries a doubly pessimistic message in that community care reform may be pressing but the resistance becomes much more formidable.
An extremely critical view of the role and judgement of the professional is presented by Oliver (1989) in reviewing the developments in conductive education. He firmly believes that the proposed benefits are theoretically unproven, practically unsubstantiated and ideologically unsound. He goes on to say that the results stem from the fact that almost any intervention system which raises expectations is likely to produce similar results. He points out that throughout human history disabled people have constantly confounded the low expectations of others. To support and accelerate their potential, he believes that it is important that disabled people accept their identity with pride and are given help to understand their place in the world when they are children and their rights as well as giving them practical skills to deal with these issues. He considers that normality has almost become a profoundly disturbing fetish. One of the problems he ascribes to conductive education is that it requires the disabled person to conform to society rather than the physical and social environments of society to change. The claim of conductive education that the motor impaired "should function in society without requiring special apparatus" he considers ridiculous. He expresses the view that "we all use artificial aids of one kind or another; try eating your dinner without a knife and fork or going to Australia without an aeroplane". (p.197)

While such pungent criticism may upset some of those taken to task, it would be unfortunate if this caused the underlying validity of the comments to be ignored. One of the inevitable realities of the successful integrative empowerment of disabled people and their use of computer conferencing systems will be that they have the
right, the knowledge and the opportunity to raise such issues with increasing frequency and effect.

A similar thread runs through the views and findings of many others. A community based philosophy of treatment requires that illness be viewed as implicated in a web of social activities which provide the context for judging the legitimacy of behaviour (Dowell and Ciarlo, 1983). In the community based philosophy of treatment, diagnoses for example, are made "with" a client and are best tuned to the social character of health and illness (Guattari, 1984). Goodall (1988) believes that historically professionals have been accustomed to exercise their expert knowledge in the assessment of impaired individuals and have assumed that they know best what is good for them. The emphasis has been on treatment, care and protection. Brisenden (1986) in arguing against the historical medical model believes that people of independent mind do not want to be professionally assessed and told how they can live and what services they can have. They want to devise and control their own life styles within the scope of their own limitations in exactly the same was as do individuals in the rest of society.

This study aims to be a significant contribution towards encouraging and fostering just such devising and controlling by the individual person with a disability.
2.4.4 THE NEED FOR INTERPERSONAL CONTACT

As people with disabilities overcome the technical problems in computing access, acquire more financial resources and escape the stultifying pressure of historical service delivery models their need to have and expand beneficial personal contacts will increase. Since they will still have transport and communication problems, computing can make an increasing contribution. However it will present its own set of new hurdles and learning experiences to be overcome. Fox (1974); Wynne (1983); and Blackler and Brown (1986) point out that it is limiting to think of computing technology in nuts and bolts terms alone. They stress that it is a whole new pattern of social relationships which require careful consideration.

Rice and Love (1987) analysed several conferencing system user opinions to establish the aspects which participants found the most useful and satisfying and found these to be

- getting to know someone
- persuasion
- bargaining
- resolving disagreements.

Turoff (1989) believes that most computerised conferencing systems that have been offered commercially over the past decade
have largely been examples of singular designs without the flexibility of adaption to differing needs. Each of the systems had certain advantages or disadvantages that made them desirable or undesirable for certain types of applications. The reality of computerised conferencing to date has not come close to the original vision. One problem is that a great many users perceive computerised conferencing as having the attributes of one specific system, probably the one they have used, such as Participate EIES, Forum, Note-pad, COSY etc.

Turoff (1989) believes that the huge expansion in bulletin board systems, with well over 10,000 active bulletin board systems in the United States, is an indicator that demand for personalised communication has not been satisfied. Using a bulletin board it is economically possible for small geographically dispersed groups to set up their own personalised communication process. He reviews a number of recent studies which show that people involved in computer mediated conferencing use about one half of the amount of communication units to arrive at equivalent problem solutions. This of course will be a considerable advantage from the point of view of disabled people who are restricted in their physical capability.

Turoff points out that one of the advantages of computer mediated communication is that it improves the communication potential for women. In face to face meetings women do not speak as much as men and give in to male view points. However research shows that in the CMC environment they are much more outspoken and hold to their views in a much stronger fashion. This type of finding
indicates that minority groups such as disabled people, can be considerably advantaged in this mode of communication.

2.4.5 COMPUTING AS A SOCIAL SERVICE SUBSTITUTE

Brisenden (1986) argues (p.178) "the choice of independent living is not a privilege conferred on us by generous society, but it is the right for all individuals, regardless of disability to live in the community".

Rock (1988) conducted a study on what independence meant to a number of disabled people living in the community. It meant a number of things

- risk taking
- privacy
- decision making
- organisation and control
- encouragement.

Apart from issues in these five areas there were a number of other topics involved in the approach to independence. The first of these was the importance of choice which those with disabilities were
now able to exercise. A second was a problem of loneliness and isolation which disabled people found to be prevalent in the general community. The third was the issue of friendship, where living in the community allowed the individual to make a choice as to who their friends would be, even if the total number of friends was smaller.

Hayles (1987) believes that technological developments under their own control, will contribute greatly to the psychological well-being of the disabled person and are not to be considered only as mechanised full time body servants. Manning and Oliver (1985) present the view that disabled people became segregated not just because of the rise of hospital based medicine and a number of new specialisms but because of the need of society to control effectively disruptive elements in its population eg. the poor, the sick, the disabled and the idle. This produced specialisation in the treatment (and control) of different groups and was therefore a function of the ever increasing sophistication of social control techniques based on the need to render harmless more and more of the potentially disruptive. Such an extreme stance would become unnecessary if some of the earlier views on computing as a social service substitute could be successfully implemented.

Neilson, Pickering and Vella (1989) conducted a survey of current research in the UK into technology and special needs. They quoted (Stevens, 1984; Pickering and Stevens, 1986) in saying 'for many disabled people, computers offer the potential to increase independence and quality of life and to reduce the degree of handicap caused by their disability, however, unless the disabled
person has an effective means of controlling a computer, his potential will remain untapped and in an increasingly computerised society the result may be a relatively greater degree of handicap”.

They also discovered in their survey that there was a great deal of re-invention of the wheel with many researchers unaware of similar systems, though some sought to improve on a particular feature. The few small companies, who were respondents, denied that anything approaching the quality of their product already existed. The researchers found that a great deal of duplication of product development effort had taken place in the past. They hoped that the setting up of data bases such as SEND will help to improve this problem.

Davis (1984) believes that the term independent living is greatly misunderstood by those who do not have a disability. The non disabled interpret it as meaning living without help, whereas disabled people believe it to be able to make personal choice about who will help them, where they will live etc.

Murphy and Callaghan (1988) argue that “citizen participation” in policy making and operation is crucial for the successful delivery of social services. These researchers go on to say that through computerisation the illusion is created successfully in applied social settings that computer space has nothing to do with social concerns. Training social science practitioners to use computers in a socially responsible manner is thus very difficult, simply because the concepts central to computer programs are thought to be asocial and students become enthralled by the speed and accuracy with
which computers can perform routine tasks. It is important therefore the researchers argue, that sociologists introduce social space into the creation of management information systems such as those that transmit knowledge throughout an organisation.

Sproull and Kiesler (1986) believe that a technology that makes it easy to be sociable will be used for sociability. They argue that electronic mail systems have this potential and cite the experience at Carnegie Mellon University where the two most frequently run programs are Joke and Cookie. The first prints a joke on the users screen; the second prints a fortune-cookie fortune. Both these programs are run on average several hundred times per day. Sproull and Kiesler also say that because it is asynchronous it is a relatively efficient medium for sociability. Recipients are amused or enlightened on their own schedule, not that of the initiator: and recipients do not have to reciprocate, they can simply read their entertaining message and get back to work.

Sproull and Kiesler believe that status equalisation on electronic messaging systems may mean that managers have access to information that formerly they might not have received. Equally the more uninhibited behaviour which can take place on electronic messaging systems may lead to more new ideas flowing through electronic mail. Both these factors, if correct, can provide important social and status improvement benefits for the roles of individual disabled people.

Kiesler and Sproull (1987) point out in their extensive studies with colleagues and students at Carnegie Mellon University that
computers change social contact patterns. Despite the views put forward that computing would isolate individuals, Kiesler and Sproull found that their research indicated that people used computers to talk to people. In addition people who use computers to talk to people talk to more people than do people who do not use computers. People have the opportunity to talk with those they would not meet otherwise and exchange information they would not exchange otherwise (p.228).

Kiesler and Sproull say that social contact in the computing environment is becoming much less controlled. Electronic discussions on bulletin boards read like an electronic cocktail party in progress and anyone who has access to that network can participate. They state that their researches indicate that electronic communication is a vehicle for social interaction hence it is relevant to the goal of promoting "community". Since a large number of disabled people would find the issue of attending a cocktail party stressful, rather than enjoyable, a medium such as a conferencing system, which gave them the social pleasure and support without the stress could be very positive. Indeed it could lead to improved social skills to the extent that they would feel much less inhibited about attending a "real" cocktail party.

Rappaport (1981) and Noble (1983) believe that true independent living is far more than a physical provision of accommodation, it is the empowerment whereby people gain control, find meaning and empower their own lives.
Parmenter (1988) studied people with disabilities living independently. When pursuing the issue of quality of life he found that the respondents emphasised autonomy in decision making and freedom to be in control of one's life. All respondents valued friendship networks most highly and also expressed a strong desire to live in regular community settings which afforded them the opportunity to interact with other people. Parmenter argues that the use of symbolic interaction theory as a theoretical base appears to be supported by his findings particularly in the light of the degree of self initiated community interactions and from the high level of life satisfaction expressed.

He believes that there are considerable measurable benefits in improved computing skills and educational capacity. The most subtle but profound effect reported is the significant decrease in the feeling of isolation experienced by the disabled participants. At the same time, almost in contradiction they feel free and independent. Such a contradiction provides a link between the extensive social interaction studies of Kiesler and her colleagues involving tertiary computing students and the extensive work by very experienced professionals such as Parmenter in the area of education and rehabilitation programs for and with people who have disabilities. Both such groups are participants in this study.
Pickering and Stevens (1986) state that while computers and telecommunications will allow the handicapped to participate in society to a far greater extent than previously possible, they could become a barrier to the handicapped in normal life unless special efforts are made to make computers far easier for them to use than is currently the case. They indicate that the able bodied are also using the new technology to increase their efficiency and productivity. While disabled people are using the new technology, it is important to be aware of the longer term risks which will occur if the handicapped take only two technological steps forward while others are taking five. They argue that projects should capitalise on the aspects of the new technology which offer the most liberating opportunities for the disabled.

Pickering and Stevens propose that the cognitive sciences should play a special role in assisting those with communicative difficulties through a process they call information application. They allude to the dangers if individual disabled people become dependent for communication on information amplification through sympathetic human contact and the subtle interpreter skill of a single individual or a small group of individuals.

The practice and products of new technology tend to be concentrated in centres of higher education and in rapidly developing parts of the commercial and industrial sector. As such,
relevant skills and personnel are not generally available in the areas of significant need for people with disabilities. It is a matter of concern that the special societies which involve themselves with a particular disability have a focus that their funds be used in ways that have immediate benefits. Research that is not going to produce usable devices on a short time scale is unlikely to be supported from these sources.

In examining the integration of disabled people into, and as part of, different general computing work-at-home projects Kuhlman (1988) reports that different methods were used to convey work to the disabled people working at home. In one case, the Equitable Insurance work system involved the use of messengers to pick up and deliver diskettes involving non critical projects which did not require a fast turn-round. However the American Express system utilised a central dictation system which allowed managers to dictate by telephone from anywhere in the world with dictation being automatically taped and catalogued. The home worker accesses the dictation queued in the central system which is telecommunicated to transcribing equipment in the home. Similarly written drafts are offloaded using telecommunication from the home to the central filing system.

American Express considered that their implementation costs were comparable or less than those involved in the start up of an in-house clerical unit. Telecommunication costs which were higher for off site workers were more than offset by the reduced office space costs at a central facility. American Express were of the view that offsite clerical staff were viable and cost effective. On the other
hand the program at Equitable was generally considered to be a failure: primarily due to the under utilisation of home workers. The use of state of the art telecommunications at American Express was believed to be the significant difference between the success of their scheme and the failure of the Equitable one which relied on couriers and had extended turn-round times and there were doubts about the physical security of documents in transit.

The key conclusions of the study were that recruiting efforts should be initiated well in advance and should not rely on traditional training techniques or agencies, and that careful planning of and with the prospective employers is essential in relation to the management of the projects. Executive commitment and support for such projects is most important. As a consequence the economic disincentives built into existing disability insurance programs need to be re-examined. Disabled workers were eager for employment although the financial gain were modest when offset against their loss of medical benefits and other cost penalties.

Cooley (1980) and Bessant and Dickson (1981), when considering the United Kingdom situation, all argue that the development and usage of new technology is significantly affected by the behaviour and interactions of the different interest groups. Disabled people seeking to be part of the general community on a basis of equality must be aware that these interest groups will be promoting their own ends and develop coping mechanisms. Effective conferencing skills could be one such mechanism.
Kiesler, et al (1985) are of the view that although user manuals give technical details it is fairly general that people receive no formal instruction in an etiquette of electronic communication and what informal socialisation exists tends to be received haphazardly. Since people with disabilities tend to have lower levels of social skills in any case this could present them with an additional learning problem.

Ward (1984) argues that the impact of automation and computerisation which will be felt by society in general has particular implications for the disabled. An example of such an implication is given by Galbally (1988), who says that the most serious nightmare for educational use of technology is to use it to funnel disabled students into computer assistance and other children out of computer assistance. In its extreme the segregation of disabled children for learning by technology can make attendance at a mainstream school meaningless as far as the integration goal goes. About 60% of disabled students now go to ordinary classrooms, about 23% to special classes in ordinary schools and only 17% to special schools. Technological aids and devices that increase communication can also be transferred to the workplace and should increase employment opportunities. Yet we are still in a situation where only 34% of disabled people of working age and only 26% of severely disabled people are involved in some type of work activity. It is estimated that 15% of severely disabled people work at jobs in sheltered workshops. People with disabilities have the highest unemployment rate of any group in the community. The two principal limiting factors are productivity and prejudice.
Technology for disabled people ultimately becomes a matter of choice and decision. The most profound decision we have to make as a society is whether we want technology to be used to enhance the integration of disabled people into the community, or whether we want the technology to be used to try to further adapt the disabled person to fit a non-disabled society.

A number of investigations conclude that the most important way of achieving a positive long term attitude to disabled people is by regular exposure to them (Donaldson, 1980; Esposito and Peach, 1983; Esposito and Reed, 1986 and Towfighy-Hooshyar and Zingy, 1984). Emerson (1985) in studying integration programs for disabled people believes that one of the reasons for the production of equivocal results is the failure to realise and recognise the social nature of the research involved and to view it as a mechanical activity.

Parmenter (1988) states that there is an almost total absence of sound theoretical bases for much of the research in the disability field and argues more attention should be given to the examination of the concept of disability from a symbolic interactionist viewpoint. Madden and Slavin (1983) and Stobart (1986) both point out that social acceptance can be enhanced where structured social skill interaction is introduced for both disabled and non-disabled and whether there are planned opportunities for meaningful and cooperative contact between the disabled and the non-disabled.
Nezzo (1988) argues that advocates for the disabled must keep in mind that for useful and financially feasible policy to evolve, special needs of disabled persons should be considered in the context of the overall requirements for the system. Some persons argue that making the system optimally responsive to the needs of handicapped individuals could make the design and operation so costly that it would be impossible to implement. On the other hand making the system a general purpose open access one could make it more feasible. The open access strategies necessary to allow individuals with disabilities to optimally use a public system may also benefit a large proportion of the non disabled market as well - especially naive users. Shafer, Rice, Metzler and Haring (1989) believe that the promise of integration lies in the opportunity for workers with severe disabilities to make new acquaintances, to be fully exposed to the non disabled culture of the country and to engage in the type of work that is valued and performed by the mainstream of society. In reviewing a range of research they establish that physical presence or contact is not sufficient to ensure interaction between the disabled and the non disabled. They review a number of studies which demonstrate that focused and intensive efforts are needed for people with disabilities and non disabled people to interact. This study is part of that intensive effort.
2.5 THE NOTION OF A WINDOW OF OPPORTUNITY

Reviewing the literature inevitably leads to the conclusion that, throughout history, people with disabilities have had very limited, if any, power. They have been used directly and indirectly more to meet the needs of others than to have their own needs met. This ranges from the examples of preferment for the bible owning disabled to their role as artefacts within models of service delivery fought over by service providers.

To attempt significant and radical changes from a limited power base is only likely to lead to rapid and aggressive reaction from those who see their own power being eroded. For the disabled to win such battles would not only be difficult but would aggravate their already significant negative feelings of self worth and their inadequate social life. In such circumstances it is much more realistic to channel what effort and resources are available into influencing relatively minor changes of direction and emphasis rather than radical and fundamental changes in direction. It is more effective to lend weight to tendencies than to attempt to reorganise social and economic priorities to deal with minority needs - whether the minority be be people with disabilities or any other grouping.

It is clear that no identical, or even similar, study had been undertaken such as the one proposed. While conventional wisdom might indicate that there was therefore little interest, need or value
this has been demonstrated not to be the case. It is also clear that
there are two areas of parallel research with high levels of activity

the normalisation and integration of people with disabilities
into the general social community

the application and effects of certain sociology and social
psychology issues in the development of Information
Technology.

While these two have been, until now, distinctly separate areas the
review of the literature identifies opportunities and issues which
occur in each stream which could be linked to the benefit of the
community, the interest of researchers - and not least to a
significant improvement in the quality of life for people with
disabilities. The interweaving of these threads can provide a
Window of Opportunity - again not only to the benefit of the
disabled but to the community itself, where those with a disability
can be seen as a potential social asset rather than a begrudged
economic liability.

The Window is at present a little opaque and perhaps its multiple
sides are unequal in length or thickness as well as being misshapen
but such a study as this can establish whether the window is worth
polishing and the framework worth strengthening.

In addition to the many supportive and relevant points which have
emerged as the literature has been reviewed the arguments may
perhaps best be put by some of the key contributors to the two
main areas of research activity commencing with Bowe (1984). He illustrates much of his argument by quoting an old Chinese proverb which says "give man a fish and he will eat for a day. Teach him how to fish, and he will eat for the rest of his life". He argues that this concept applied to people with disabilities and computing is not only economically effective for the community but one which greatly enhances the self worth of the individual.

Pickering and Stevens (1986) support the view that the area of computing and the disabled involves a range of interdisciplinary activities; they focus on the fact that interdisciplinary research is stressful in its coordination needs and the needs for understanding of other techniques by individual disciplines. However they believe the cross disciplinary nature of such work allied to its social value should be strong factors in favour of it being supported by research councils, government and universities. Doenau, (1983) points out a number of areas which are related to the development of integration issues. Two prime aspects are

- the response of bureaucrats to the demands for appropriate human and material resources
- the development of techniques which transform the mere physical presence of students with disabilities into a genuine social partnership.

Hiltz (1986) argues strongly that by systematically trying innovations and evaluating their impacts, we can learn to capitalise
on the strengths of computer areas to minimise and overcome the weaknesses.

Kiesler, Zubrow, Moses and Geller (1985) divide research on the behavioural and social affects of computers into four general categories

- technology assessment
- organisational
- technical capabilities
- social psychological studies.

Technology assessment studies evaluate the potential impact of computers on society or on a given societal institution such as education. Organisational studies examine the impact of computers on jobs and job performance, and organisational functioning. Technical capabilities studies investigate the relative ease or difficulty with which people learn or carry out particular computer operations as a function of equipment or software variables. Social psychological studies investigate such issues as the social context in which people learn to compute and the effects on groups of computer mediated communication. The last of these areas of research is the more recent and the studies are fewer in number. This particular study, therefore, contributes not only in the area of research need but in the area of applied social value.
Nelson (1989) reviews what is described as the contact hypothesis. Expressed simply this states that contact between different social units reduces conflict levels. This concept has been most prominent in the area of race relations but has been applied to a broad range of community and social issues. (Allport, 1954; Amir, 1969, 1975; Coleman, 1957; Levine, 1965; Mair, 1972; Murphy, 1956; Murphy and Kasden, 1959; Oaker and Brown, 1986). In most of the literature cited, the argument is that high frequency of contact is necessary to lead to an improvement in interaction. Such a proposition is a strong argument in favour of integrating small groups of disabled people within communities and ensuring that they have regular contact with other people in their environment.

Wobschall (1988) believes that a wealth of information and assistance on information technology for disabled people is spread throughout the community but it exists in a fragmented fashion that precludes its dissemination on a large and effective scale. Formal and informal networks allow individuals to access the knowledge and assistance of others on a largely random basis.

Hopefully this study will contribute to the ending of that fragmentation and provide a more effective and constructive focus for the future.
3 THE STUDIES AND THE RESULTS

3.1 INTRODUCTION

This study examines the social interactions which take place when three quite different groups share a common communication medium - a computer bulletin board. The aim is to identify the benefits, disadvantages and issues to be resolved in one possible methodology for facilitating the social integration of people with physical disabilities.

The previous section has established that this is an area of limited directly relevant previous research activity, despite a very obvious need. However, there are significant areas of research which have an impact, particularly the broad issues of

- social integration of people with disabilities
- social and personal interaction using computer based technology

This study attempts to draw these two rapidly developing areas of research into a single focus. It would be hoped, therefore, that this research would form a basis for further work and development by others. As a consequence of this broadly based approach, a single formal experimental design was considered inappropriate and the
study considers several sets of quite different types of data with appropriately varied quantitative and qualitative methodologies.

There is a distinct tradition in the social science literature supporting research methods advocating the use of multiple methods. This multiple strategy is described in a number of ways e.g. convergent methodology, convergent validation or what has been called "triangulation". (Campbell and Fiske, 1959; Smith, 1975; Denzin, 1978). A range of authors support the use of multiple methods in a research project with a sociological emphasis, especially where the time frame is longitudinal and the project is multi-disciplinary. For such circumstances combined quantitative and qualitative approaches are recommended by many methods texts (Webb, Campbell, Schwartz and Sechrest, 1966; Denzin, 1970; Smith, 1981; Abrahamson, 1983; Chadwick, Bahr and Albrecht, 1984).

Kraut, Dumais and Koch (1989) argue that using both qualitative and quantitative research methods over time provides an unusually rich picture of the effects of technological change. They point out that use of computing technology by each individual changes over time and studies conducted in this way provide a much more realistic picture of the effects both on technical and social issues.

The sets of data, discussed separately are

1. The possibility of change in attitude as a measure of improved acceptance, integration and positive image.
2 The examination of individual and group system usage patterns to identify areas of commonality or difference.

3 The examination of the textual data, generated or read by each individual during the course of the study, to identify personal social issues.

4 A longer term (after two years) examination of attitude change combined with individual social outcome case studies.

The procedure, design, methodology and data are discussed in detail for each of the areas.

3.1.1 BULLETIN BOARD OPERATIONAL DETAILS

Details of the operation of the Bulletin Board are set out in Appendix 1. This contains the explanatory material provided to all participants prior to commencement of the project together with subsequent updating attachments. This covered all aspects ranging from philosophic and social objectives to procedures for borrowing modems, reporting failures and creating macros.
3.1.2 TIMETABLE OF PRINCIPAL EVENTS

The sequence and timing of the principal events in the study was as follows:

SEPTEMBER 1986 - FEBRUARY 1987
Administration planning, technical establishment and testing, acquisition of software, recruitment of participants and non participant dyads, training, equipment etc.

MARCH 1987
Attitude testing, explanation of data collection procedures, reporting of faults, password issuing, training.

APRIL - JUNE 1987
Operation and data collection

JULY 1987
Post attitude testing (1)

OCTOBER 1987
Post attitude testing (2)

JUNE 1989
Post attitude testing (3)

JULY 1989
Case study interviews with participants with disabilities
3.2 ATTITUDE AS A MEASURE OF INTEGRATION

3.2.1 ATTITUDES TOWARDS DISABLED PERSONS TEST

The test used in this study was the Measurement of Attitudes Toward Disabled Persons Test (Yuker, Block & Campbell 1960; Yuker, Block and Younng, 1970). It was administered as an individual test. The simplified, non weighted scoring method was used as recommended by the authors. Studies have demonstrated significant differences in the results for disabled and non disabled with the latter being lower on all forms of the scale (i.e. disabled people are viewed less positively by non disabled people than they are by themselves). However, on all forms, disabled and non disabled females scored higher than males. The original authors' analysis of a range of studies which had used their test concluded that a "low score not only reflects the fact that the respondent perceives disabled persons as different but also to some degree inferior". The test meets the APA Technical Recommendations for Psychological Tests standards for the major types of reliability, validity and fakeability. While scale results can be used to compare groups of individuals, the authors indicate that the test should not be used alone to make judgements or predictions about single individuals.

Previous studies (Antonak, 1980; Livneh, 1983; Siller, 1969; Siller and Chipman, 1964) have indicated that attitudes towards the disabled are probably population specific and generally negativistic
and rejecting. The positive attitudes revealed in Livneh's study were attributed, at least in part, to the fact that the respondents were postgraduate special education students. English (1971) demonstrated that attitudes varied with regard to specific disability populations.

3.2.2 HYPOTHESES

The following hypotheses were formulated as a means of directing the data analysis:

3.2.2.1 Effect of the Intervention

1. People who participate in the intervention will have a more positive attitude to people with disabilities after the intervention than before, relative to the control group.

2. The above named difference will apply to each of the three groups - therapists, students and people with disabilities.

3. The intervention will have a sustained effect in that the predicted increase in the attitude of disabled people will be maintained at a three months later, follow-up second post-test.
3.2.2.2 Group Differences

People with disabilities will have a more positive attitude than other subjects (suggested by the normative data).

3.2.2.3 Sex Differences

Females will have a more positive attitude than males (suggested by the normative data).

3.2.3 METHOD

Sixty subjects participated in the study. There were 30 people who acted as a control group and 30 people who took part in the intervention. In each group there were 10 therapists, 10 students and 10 people with disabilities. Subjects were matched for age, sex and experience.

All subjects completed form 0 of the questionnaire as a pre-test, and form A as a post-test three months later. People with disabilities completed form B at a later date. All scores were standardised by converting the raw scores to percentages.

Each hypothesis is analysed and discussed in turn.
3.2.4 EFFECT OF INTERVENTION - HYPOTHESES (1) AND (2)

There are three factors in the analysis:

Factor A = Participants (1) and Controls (2)
Factor B = Disabled (1), Therapists (2) and Students (3)
Factor C = Intervention: Pre-(1) and Post-(2)

The most succinct and powerful way to test the data while minimising type 1 error is via a mixed factorial ANOVA. (Keppel, 1982; Pagano, 1981). Factors A and B are completely crossed, and Factor C is a repeated measure. The notation for such a design is A x B x (C x S) where S equals the number of subjects in each cell. Converting the notation to numbers, the design is a $2 \times 3 \times (2 \times 10)$ mixed design which can test the effects of the intervention (Factor C), participants vs controls (Factor A), the different groups (Factor B), and also the presence of any interactions between the three factors. The results of the analysis are shown in Table 1.


**TABLE 1**

OVERALL ANALYSIS OF INTERVENTION USING PARTICIPANTS VS CONTROLS AND THERAPISTS, STUDENTS AND DISABLED

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>SUM OF SQUARES</th>
<th>DEGREES OF FREEDOM</th>
<th>MEAN SQUARE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>82.67</td>
<td>1</td>
<td>82.67</td>
<td>0.42</td>
</tr>
<tr>
<td>B</td>
<td>762.59</td>
<td>2</td>
<td>381.29</td>
<td>1.97</td>
</tr>
<tr>
<td>C</td>
<td>24.48</td>
<td>1</td>
<td>24.48</td>
<td>0.51</td>
</tr>
<tr>
<td>AxB</td>
<td>406.32</td>
<td>2</td>
<td>203.16</td>
<td>1.05</td>
</tr>
<tr>
<td>AxC</td>
<td>0.94</td>
<td>1</td>
<td>0.94</td>
<td>0.02</td>
</tr>
<tr>
<td>BxC</td>
<td>343.01</td>
<td>2</td>
<td>121.51</td>
<td>2.94</td>
</tr>
<tr>
<td>AxBxC</td>
<td>21.23</td>
<td>2</td>
<td>10.63</td>
<td>0.25</td>
</tr>
<tr>
<td>S/AB</td>
<td>10437.88</td>
<td>54</td>
<td>193.29</td>
<td></td>
</tr>
<tr>
<td>CxS/AB</td>
<td>2230.18</td>
<td>54</td>
<td>41.31</td>
<td></td>
</tr>
</tbody>
</table>

Note: No F values were significant at the p = .05 level

There were no significant interactions and no significant main effects. The information contained in the table is interpreted in the following order with the understanding that main effects can be interpreted because the interactions were not significant. (Significant interactions require subsequent analysis of simple main effects to determine the nature of the interaction).
3.2.4.1 Interactions

A x B x C. There was no significant interaction between the three factors. That is, there was no significant difference in the levels of each factor at any of the other levels of the other factors.

A x B. There was no significant interaction between the attitude scores of the participant therapists, students and the disabled, and the control therapists, students and disabled. That is, each group varied without regard to their participant or control status.

A x C. There was no significant interaction between the attitude scores of the participants and the control group over time. That is, the participant and control groups varied without regard to whether it was before or after the intervention.

B x C. There was no significant interaction between the attitude scores of the therapists, students and disabled people over time. That is, the therapist, student and disabled groups varied without regard to whether it was before or after the intervention.

3.2.4.2 Main Effects

1 There was no significant difference in attitude scores between those who participated in the intervention and those who acted as controls.

2 There was no significant difference in attitude scores between the therapists, the students and the disabled.
There was no significant difference in attitude scores between the pre-test and the post-test.

S/AB and C x S/AB are the error terms in the analysis and are not interpreted.

Hypothesis (1) predicted that participants' scores would increase over time as a result of the intervention, while the controls' attitudes would remain relatively stable. This would be represented by a significant interaction between factors A and C. Figure 1 shows a graph representing the hypothesised interaction as well as the actual result. The hypothesis was not supported. There was no significant increase in the attitude of the participants after the intervention, relative to the control group.
Hypothesis (2) predicted that the increase over time would exist for the three sub-groups. This would be indicated by a significant interaction between the three factors A x B x C. The hypothesis was not supported. There was no significant increase in the attitude of the participant therapists, students and disabled after the intervention, relative to their control groups.
3.2.5 MEDIUM TERM INTERVENTION EFFECT - HYPOTHESIS (3)

The hypothesis predicted that the intervention would raise the attitude of the participant disabled people and that the difference would be maintained at follow-up. The hypothesis was tested using analysis of variance.

There are two factors:

Factor A = Participant disabled (1) and control disabled (2)

Factor B = Intervention - Pre (1), Post (2) and follow-up (3)

The data were analysed using a mixed factorial design A x (B x S) and the results are shown in Table 2.
TABLE 2

EFFECT OF INTERVENTION ON THE DISABLED PARTICIPANTS AND CONTROLS

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>SUM OF SQUARES</th>
<th>DEGREES OF FREEDOM</th>
<th>MEAN SQUARE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>179.92</td>
<td>1</td>
<td>179.92</td>
<td>0.67</td>
</tr>
<tr>
<td>B</td>
<td>347.29</td>
<td>2</td>
<td>173.63</td>
<td>3.14</td>
</tr>
<tr>
<td>AxB</td>
<td>45.64</td>
<td>2</td>
<td>2.82</td>
<td>0.41</td>
</tr>
<tr>
<td>S/A</td>
<td>4814.72</td>
<td>1</td>
<td>8267.48</td>
<td></td>
</tr>
<tr>
<td>BxS/A</td>
<td>1993.62</td>
<td>36</td>
<td>5.38</td>
<td></td>
</tr>
</tbody>
</table>

Note: No F values were significant at the p = .05 level.

There was no significant interaction and no significant main effects.

The hypothesis predicted an interaction such that the disabled people who participated in the study would have a more positive attitude after the intervention and at a later follow-up, while the control group of disabled people would have a relatively unchanged attitude. Figure 2 shows a graph representing the hypothesised result as well as a graph showing the actual result. The hypothesis was not supported.

There was no significant difference between the participant and control group at any of the three test times.
The effect for the intervention, factor B, approached significance ($F_{2,36} = 3.135, p < .1$). Figure 2 indicates that although there was a trend in the data towards significance, it was in the downward direction. That is, attitudes held by the disabled towards the disabled decreased over time for both the participants and the control group disabled.

**Figure 2**

Hypothesised and actual results for disabled groups

Attitude as Percentage

<table>
<thead>
<tr>
<th>Hypothesised Result</th>
<th>Actual Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Post Followup</td>
<td>Pre Post Followup</td>
</tr>
<tr>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

---

Participants

Controls
3.2.5.1 Group Differences

The hypothesis predicted, in line with the normative data, that people with disabilities would have a more positive attitude to the disabled (higher scores) than the therapists and students. This would be indicated by a significant main effect for Factor B in the first analysis (see Table 1).

As the main effect for factor B in the first analysis was not significant, the group differences hypothesis was not supported. There was no difference in attitude scores between the three groups. The lack of a significant interaction between sub-groups and intervention (B x C) indicates that the intervention did not alter the pattern of results.

3.2.5.2 Sex Differences

The hypothesis predicted, in line with the normative data, that females would have a more positive attitude than males.

Because there were unequal numbers of males (28) and females (32), it was difficult to perform an overall ANOVA on the data. Separate ANOVAs on males - participant/controls x pre-/post- (see Table 3) and females - participant/controls x pre-/post- (see Table 4) revealed no significant effects over time or between participants and controls. Therefore, the scores could be collapsed across time and/or across participant/control groups. Because the study is a repeated measures design, it is not intentionally sensible to collapse across time. However, as there is no difference between
participants and controls, and because the larger the sample size used, the more powerful the test becomes, it was decided to combine the participant and control numbers for the females (giving 32 subjects) and similarly with the males (giving 28 subjects).

**TABLE 3**

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>SUM OF SQUARES</th>
<th>DEGREES OF FREEDOM</th>
<th>MEAN SQUARE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.98</td>
<td>1</td>
<td>5.98</td>
<td>0.02</td>
</tr>
<tr>
<td>B</td>
<td>0.09</td>
<td>1</td>
<td>0.09</td>
<td>0.003</td>
</tr>
<tr>
<td>AxB</td>
<td>1.23</td>
<td>1</td>
<td>0.23</td>
<td>0.04</td>
</tr>
<tr>
<td>S/A</td>
<td>723.12</td>
<td>26</td>
<td>277.43</td>
<td></td>
</tr>
<tr>
<td>BxS/A</td>
<td>758.83</td>
<td>26</td>
<td>29.19</td>
<td></td>
</tr>
</tbody>
</table>

Note: No F Values were significant at the p = .05 level
**TABLE 4**

**PARTICIPANT/CONTROL (A) BY PRE AND POST DATA (B) FOR FEMALES**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>106.39</td>
<td>1</td>
<td>106.39</td>
<td>0.77</td>
</tr>
<tr>
<td>B</td>
<td>42.09</td>
<td>1</td>
<td>42.09</td>
<td>0.71</td>
</tr>
<tr>
<td>AxB</td>
<td>4.89</td>
<td>1</td>
<td>4.89</td>
<td>0.08</td>
</tr>
<tr>
<td>S/A</td>
<td>4135.14</td>
<td>30</td>
<td>137.84</td>
<td></td>
</tr>
<tr>
<td>BxS/A</td>
<td>1780.71</td>
<td>30</td>
<td>59.36</td>
<td></td>
</tr>
</tbody>
</table>

Note: No F Values were significant at the p = .05 level

The sex differences hypothesis could be tested using a t-test on either the pre or post scores. The largest difference between group means was on the pre-scores (see Table 5). Therefore, if a t-test is not significant on the pre-scores, it will not be significant on the post-scores.
TABLE 5

MEAN ATTITUDE SCORES EXPRESSED AS A PERCENTAGE FOR MALES AND FEMALES ON THEIR PRE AND POST TEST

<table>
<thead>
<tr>
<th></th>
<th>MALES</th>
<th>FEMALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-TEST</td>
<td>66.07</td>
<td>68.43</td>
</tr>
<tr>
<td>POST TEST</td>
<td>65.99</td>
<td>66.81</td>
</tr>
</tbody>
</table>

Note: t-test on male vs female pre-test gave (t[58]= .778, n.s.)

A t-test was performed on the attitude scores of the 28 males versus the 32 females on their pre-test. The result was not significant (t[58] = .778, n.s.). The hypothesis was not supported. That is, there was not significant difference between male and females in their attitudes towards the disabled. As stated earlier, the differences on the post-tests will also be non significant as a consequence.

3.2.6 SUMMARY AND CONCLUSIONS

None of the proposed hypotheses were supported. The intervention did not have a significant effect on the attitudes of those who participated in the study. There were no significant differences between any of the groups who participated and any who acted as
controls in their attitude towards the disabled. The attitudes of the disabled group did not differ significantly from the other groups (therapists and students) and female attitudes did not differ significantly from male attitudes. This is the outcome from what could be described as a classical quantitative approach to the data.

However there are other possibilities which merit some consideration in these particular circumstances. These are based on

How do members of the community form judgements about people with disabilities?

How is "achievement" identified and acknowledged?

What expectations did the different groups and different individuals have about themselves and other participants prior to participation?

Is it possible that, in the short to medium term, the effort and trauma involved in "achievement" act as an offset to the anticipated immediate gain in self-confidence and improved attitude of people with disabilities towards themselves?

Is an extended period of achievement necessary to bring about a significant change of attitude by people with disabilities towards themselves?
3.2.6.1 How do members of the community form judgements about people with disabilities?

The main elements of the answer to this complex issue would include accuracy and extent of knowledge, experience, and personal observation. To a significant extent there is a dependence on visual cues - a white stick, a wheelchair - both of which may be present even when the individual is not utilising them. In other cases visual observation of task performance allows judgements to be made as to the level and extent of the person's disability. In these circumstances improvement in performance can be readily observed and might reasonably lead to an improvement in attitude; the converse would apply if observed performance deteriorated. However, in this study the particular modus operandi makes the disability invisible, those who are conventionally disabled are not actually observed by other participants who are not physically disabled. Some individual participants may make judgements as to other individual participants but they are likely to be in relation to issues such as commonality of interest, perceived knowledge on specific topics, reliability as a respondent to queries, computing/communication competence - but not in regard to physical disability, which is unobserved.

The non-disabled participant's views of disability would only be likely to change if, in some way, the disabled participants were very significantly more or less competent in system use than the non-disabled groups. While the next section demonstrates different usage patterns between groups, there is no evidence to suggest that the disabled were more or less competent in using the system.
In this sense the disabled were, therefore, not visibly different, were integrated as normal individuals and no change in the attitudes of the non-disabled towards disabled people is a supportive rather than a negative outcome.

3.2.6.2 How is "achievement" recognised and acknowledged?

Earlier studies (Earls 1979; Earls & Cranitch 1980; Earls 1981) identified as a significant integration problem, educational patterns of benevolent reinforcement given to people with disabilities by parents and service providers. Such a situation occurs where a lower standard is accepted from a disabled child accompanied by comments of encouragement. While this approach is well intentioned, it creates significant problems in employment or adult social interaction where general community norms are expected if successful integration is to take place. It also leads disabled people to assume that almost any activity will lead to supportive encouragement irrespective of the worth of the activity or level of achievement. Given such expectations a very high degree of visible "recognition-giving" would be necessary to promote a change among disabled people in their attitudes towards themselves. In this study, where their disability was invisible and their achievements considered to be normal, there was no recognition reinforcement. The downward trend in attitude, towards significance, in the post tests undertaken by disabled people might possibly be caused by the lack of benevolent reinforcement which they have been led to expect (Figure 2). As a consequence no change in attitude could be
a reasonable outcome supporting their integration into the composite group of all participants.

3.2.6.3 What expectations did the different groups and different individuals have about themselves and other participants prior to participation?

A change in attitude could be influenced by the extent and direction of changed expectations. In considering the expectations of all groups towards disabled people it could reasonably be inferred that the disabled group were not being invited to participate in order to "fail", rather that the outcomes would be that the disabled are "similar" or "more successful". Since disabled people were not markedly different in performance competence to the total participants, then no change in attitude is a reasonable outcome. Had they been markedly different to the expectations, either positively or negatively, then a corresponding change of attitude would have been a reasonable outcome.

There is no reason to change this view if the groups are considered independently.

Computing students would be likely to make judgements in such a situation in regard to use competence. As they were not visually exposed to the people with disabilities who displayed an adequate level of computing competence then the performance of the disabled would be perceived as unremarkable by the students. As a consequence student attitudes would not alter.
Therapists would be aware not only of the range of individual ability among disabled people but also of the compensating benefits of properly utilised technology. The ability to participate demonstrated by disabled people, would therefore seem unremarkable to therapists and unlikely to change their established attitudes. A possible difference between therapists and computing students might be that experienced therapists would hold established views of disabled people which might well remain unaltered by either failure or a high level of success demonstrated in a single activity such as this bulletin board project.

The disabled people who were participating were using skills in computing and technology which they had already acquired prior to participating in this study. Their views of themselves would not, therefore, be modified either by fresh achievement nor reduced by failure. If any outcome were to be expected it might be a reduction in self image since the medium of a computing bulletin board treats them as normal, is not especially tolerant of their mistakes and provides none of the supportive verbal reinforcement they have historically been led to expect. This could account for the declining trend towards significance in Figure 2.

These results in the study led to the framing of two further hypotheses.
1 Is it possible that, in the short to medium term, the effort and trauma involved in "achievement" act as an offset to the anticipated immediate gain in self-confidence and improved attitude of people with disabilities towards themselves?

2 Is an extended period of achievement necessary to bring about a significant change of attitude by people with disabilities towards themselves?

To investigate these issues an attitude and case study analysis involving disabled participants and controls was carried out after a period of two years had elapsed. The results are described after the grounded theory analysis of the textual data which is contained in a later section.
3.3 EXAMINATION OF USAGE PATTERNS OF THE BULLETIN BOARD BY THE DIFFERENT GROUPS

The operating system on the Bulletin Board was capable of recording basic information in regard to the use which was made by each participant. This material was analysed to establish whether different patterns of usage had taken place by the different user groups.

3.3.1 SUBJECTS

There were 30 participants in all. The total was made up of 10 people with disabilities receiving programmes from The Queensland Spastic Welfare League, 10 therapists and 10 students at Griffith University. Five of the therapists were associated directly with the organisation in which the study was carried out and five were not. Five students were 2nd-year and five were 3rd-year in their Informatics course. All the disabled people were organisation-related while all the students were not. There were 4 male and 6 female disabled participants; 2 male and 8 female therapists; and 8 male and 2 female students. Both female students were in their third year.
3.3.2 MEASURES

Six measures of computer usage were recorded for each of the subjects.

- total number of logons to system ...(logon)
- total minutes logged-on ..........(minon)
- number of time up disconnects ......(timeup)
- blocks saved to disk ..............(disk)
- number of times communicating through system .....cite)
- whether contact had been made with another participant

The first five of these measures were included in the analysis. The personal contact measure, a categorical variable was unsuitable for inclusion in the multivariate analysis. A separate between-groups analysis for this variable was not conducted, since an examination of the data showed clearly that no differences would be found as each group had two members with whom personal contact was made.

3.3.3 METHOD USED FOR ANALYSIS

Discriminant analysis was the method used for all analyses (Norusis, 1988). It is considered particularly relevant in studies where criteria are taxonomies of occupations and predictors which are traits of the individuals (Bohrnstedt and Knoke, 1988; Cooley and
Lohnes, 1971; Fisher, 1936; Lohnes, 1988; Rao, 1952; Timm, 1975). This is a powerful and succinct method of testing between-groups differences on multiple dependent measures. This method deals with all the dependent measures at once, and finds a direction in the space of the dependent variables (i.e. a weighted linear composite of dependent variables) which gives the best discrimination between groups (Tabachnick and Fidell, 1983). It has the advantage of providing an omnibus test of all dependent variables at once and thus guards against an inflated Type I error rate which would result from separate univariate analyses of the five measures. (Since the five measures used are related, the probability of finding at least one significant difference between groups purely by chance is greatly increased).

Generally a larger sample size is desirable for multivariate analyses with several dependent variables. Discriminant analysis requires that scores within each group be normally distributed and that variance-covariance matrices for the groups be homogeneous. However, the test is robust to violations of these assumptions if sample sizes are equal across the cells of the analysis, as is the case with these data (Tabachnick and Fidell, 1983). A potentially greater concern are outlying scores which lie more than three standard deviations from the mean for the group. Tests for univariate outliers were included in the analysis and none were detected.
3.3.4 OVERALL DIFFERENCES BETWEEN GROUPS

Means and standard deviations for each group on each variable are set out in Table 6.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>LOGON</th>
<th>MINON</th>
<th>TIMEUP</th>
<th>DISK</th>
<th>CITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISABLED</td>
<td>54.9</td>
<td>624.4</td>
<td>15.6</td>
<td>740.7</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>[23.8]</td>
<td>[279.3]</td>
<td>[13.6]</td>
<td>[576.2]</td>
<td>[1.2]</td>
</tr>
<tr>
<td>THERAPIST</td>
<td>33.8</td>
<td>272.6</td>
<td>3</td>
<td>371.8</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>[15.5]</td>
<td>[143.3]</td>
<td>[3]</td>
<td>[231.2]</td>
<td>[1.5]</td>
</tr>
<tr>
<td>STUDENT</td>
<td>18.5</td>
<td>221</td>
<td>7.7</td>
<td>157.5</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>[19.0]</td>
<td>[239.6]</td>
<td>[8.6]</td>
<td>[175.7]</td>
<td>[0.8]</td>
</tr>
</tbody>
</table>

Note: Standard deviations are in parenthesis

A discriminant analysis of the five measures of bulletin board usage (logon, minon, timeup, disk, cite) for the three groups (disabled vs therapist vs student) yielded one significant discriminant function which accounted for 75 percent of the variance between groups.
(λ = .328, df = 10, p < .005). Four variables (logon, minon, cite, disk) define this function. Figure 3 shows the relative position of each group (i.e. the group centroid) on the discriminant function.

**Figure 3**

Discriminant Function Showing Group Centroids

<table>
<thead>
<tr>
<th>Low scores on logon, minon, cite, disk</th>
<th>High scores on logon, minon, cite, disk</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram of group centroids" /></td>
<td></td>
</tr>
</tbody>
</table>

Overall, disabled participants' scores were greater than therapists' scores and therapists scores were greater than students' scores on the four measures represented by the function. This indicated that disabled participants logged on to the system more often, spent more time on the computer in all, communicated through the bulletin board more often and filled more disk blocks than either of the other groups. The significant function indicates that this difference was significant overall, and therefore the maximally separated groups (disabled vs students) were significantly different in their use of the bulletin board. Post hoc comparisons would be required to determine whether therapists as a group differed
significantly from either student or disabled groups. This aspect is considered later but before doing so it is appropriate to consider two other issues.

Firstly, an examination of the data revealed that the low scores for students on all measures of computer usage were due to the inclusion of 2nd-year students in the study. This sub group made minimal use of the bulletin board during the three month period, whereas the use by 3rd-year students was roughly comparable to that of therapists. Thus, the overall difference in scores between disabled participants and student participants is due in a large measure to the very limited level of participation by 2nd-year students.

From a statistical viewpoint this indicates that 2nd-year and 3rd-year students are not a homogeneous, normally-distributed population, but should be considered as two distinctly separate groups. Thus a more effective analysis would involve four groups of participants - disabled, therapist, 2nd year students and 3rd year students. This is not possible in this case due to the small and unequal sample sizes which would be involved in such an analysis. As has been earlier indicated, equal sample sizes for each group would be necessary to ensure the robustness of the statistical test where the sample numbers are so small.

The second issue to be addressed in considering post-hoc tests is the assumption of homogeneity of variance - covariance matrices across groups. A test of this assumption in the 3 group analysis yielded a significant Box's M, indicating that the 3 groups do not
have similar patterns of variance and covariance as required for the
discriminant analysis. While, given equal cell sizes, violation of this
assumption is tolerable in this 3 group analysis, it indicates that the
error term generated from the pooled variance - covariance matrix
should not be used in post-hoc 2-group comparisons.

When these two issues were considered in conjunction (Tabachnick
and Fidell, 1983)

the fact that the student group should really be treated as 2
separate groups but that such an analysis is prohibited by
the small and unequal sample size; and

the fact that the overall error term and pattern of scores in
the 3 group analysis cannot be reliably applied to pair-wise
comparison

it was decided that the only meaningful post-hoc comparison which
can be reliably undertaken is a disabled group vs therapist group
comparison, and that this should be done by means of a separate, 2-
group discriminant analysis.

3.3.5 DIFFERENCES BETWEEN DISABLED AND THERAPIST GROUPS

A discriminant analysis of disabled vs therapist groups on the
measures of computer usage yielded one significant discriminant
function (λ = 0.438, df = 5, p < .05). Three of the variables (minon,
timeup, logon) correlated >.4 with this function and so define the discriminant dimension.

Disabled participants logged on to the bulletin board more often than did therapists, they spent longer overall on the system, and they had more time-up disconnections than did therapists. The means and standard deviations are set out in Table 6.

3.3.6 DIFFERENCES BETWEEN MALE AND FEMALE PARTICIPANTS

Overall sex differences in bulletin board usage were assessed by discriminant analysis of male vs female participant's scores on the same 5 measures. The 2nd-year students were excluded from the analysis, since they were all male, and their scores would have systematically affected the result.

No significant differences in participation, between males and females, were found.

Due to the small sample size it was not considered appropriate to conduct a more detailed analysis of between sex differences within each participant group.
3.3.7 OTHER POSSIBLE COMPARISONS

Due to the sample sizes it was not practical to undertake comparisons between therapists related to the organisation and therapists not related to the organisation. Similarly, comparison of organisation-related vs non-organisation related was not undertaken, since this factor was confounded with the major grouping – all disabled participants were organisation related while all students were not related to the organisation.

3.3.8 DISCUSSION

The analysis of the use variables from the 30 participants of the bulletin board identified a significant difference in use between therapists as a group and disabled people as a group. The analysis does not provide any reasons for the differences. There are a number of possible reasons, which may be present individually or collectively.

Firstly, people with disabilities may be less competent or less dexterous and therefore take longer to perform similar tasks.

Secondly, disabled people may have a greater number of uses or activities for which a computing bulletin board provides either the optimum or the only solution as compared with alternatives available to therapists.
Thirdly, disabled people may have more available time while the approach by therapists may be to make effective use of the limited time at their disposal.

Fourthly, disabled people may perceive the bulletin board as an important part of their recreational, education or social activities while therapists may see it as a work related artifact.

Fifthly, therapists who participated may have used the bulletin board less because they were less competent than the group of participants who were disabled.

These issues will be further explored during the qualitative data analysis of the individual textual material which will follow using the grounded theory approach.

The study numbers were limited by the number of available disabled participants and the restrictions of the system. A greater number of participants of equal sample size would have allowed further post hoc comparisons to be made.

The initial discriminant analysis established a significant difference between disabled participants and student participants. However this finding was considered questionable as examination appeared to indicate that the students were not a homogeneous, normally distributed population. While 2nd-year students appeared to participate minimally 3rd-year students participated at a level similar to that of therapists. The extreme paucity of textual data
available from the limited level of 2nd-year participation does not allow a grounded theory examination of the text as a means of identifying the cause(s) of the limited participation.
All usage by individual participants was automatically collected by the communications software on each person's computer. Disk contents were collected weekly by either recovering and replacing the disk or the participant using communications software to transfer the files. This is an extremely accurate and effective method of data capture which also provides information on individual competence as well as "to whom" and "about what" each interaction is concerned. The data are examined in three ways. This section examines interactions between groups. The next section examines interactions between individuals followed by a section which undertakes a quantitative grounded theory analysis of the textual content.

In each of the three examinations the subjects were 10 people whose disability was cerebral palsy, 10 therapists and 10 computing students, making 30 participants in all. All the people with disabilities were associated with the organisation while all the students were not; the therapists were evenly divided with five being associated with the organisation (The Queensland Spastic Welfare League). There were 4 male and 6 female disabled participants, 2 male and 8 female therapists and 8 male and 2 female students. Both female students were 3rd-year.
3.4.1 MEASURES

For each participant, the number of communications via the bulletin board was recorded for 4 receiver categories:

communication with disabled (talkdis)
communication with league-related therapists (talklt)
communication with non-league therapists (talknt)
communication with student (talkstud).

To avoid confusion, the term "sender" will be used to denote group membership of the subject initiating the communication, and "receiver" to denote the group to whom communication is directed.

3.4.2 METHOD USED FOR ANALYSIS

The ideal method of analysis for this design is mixed model (sender group x receiver category) ANOVA, with repeated measures on the receiver factor - A x (B x S) design, as depicted in Figure 4. The dependent variable is the number of communications, measured for each sender over each receive category, i.e. the number of times participants communicated with disabled (talkdis), with league therapists (talklt), etc.
However, the statistical assumptions underlying the mixed-model ANOVA are quite restrictive. As with all ANOVAs, scores in each cell should be normally distributed. ANOVA is robust to violations of normality due to skewness if cell sizes are equal, but is sensitive to outliers (scores whose extreme values disproportionately influence the mean for the group) (Norusis, 1988). In addition, mixed-model ANOVA requires homogeneity of variance-covariance matrices across groups and sphericity of the transformed variables which make up the repeated factor (i.e. they must be uncorrelated, and of equal variance) (Norusis, 1988).
3.4.3 TEST OF ASSUMPTIONS

Histograms and statistics for each cell were inspected for normality and outliers using SPSS-X Frequencies. More than half the cells were positively skewed, and several contained outlying cases. Many cell distributions followed the same pattern, with approximately half the participants in the sender group having no communication with the receiver group, while the score for one sender, who had a great deal of communication, inflated the group mean.

Data transformations to reduce skewness and outliers (natural logarithm and square root transformations) reduced the problem in some cells, but the more extreme cells could not be coaxed toward normality. Since the data was not normally distributed, and therefore not suitable for parametric analysis, non-parametric tests were used to assess group differences.
**Figure 5**

Non Parametric Tests

<table>
<thead>
<tr>
<th>Within Subjects Factor Communication with</th>
<th>Disabled</th>
<th>League</th>
<th>Non-League</th>
<th>Student</th>
<th>Totint</th>
<th>Therapist</th>
<th>Therapist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td>Friedman ranks test</td>
<td>--------</td>
<td></td>
<td>Friedman ranks test</td>
<td>--------</td>
<td>Kruskal</td>
<td></td>
</tr>
<tr>
<td>Therapist</td>
<td>Friedman ranks test</td>
<td>--------</td>
<td></td>
<td>Friedman ranks test</td>
<td>--------</td>
<td>Wallis Test</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Friedman ranks test</td>
<td>--------</td>
<td></td>
<td>Friedman ranks test</td>
<td>--------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Non-parametric analysis reduces the influence of exceptionally high scores (outliers) on the group statistic, thereby yielding more reliable, though less powerful, tests of population trends. For example, one disabled participant who had 60 interactions with students (compared to 0 - 6 interactions by other disabled participants) inflates the mean for this group to 7.2 interactions, compared with 1.4 were he not present. Use of rank-order data preserves the relative status of his activity compared to the group, while not allowing the magnitude of the difference to swamp group norms.
Figure 5 gives a schematic account of the non-parametric analyses used. Differences between the 3 participant groups (disabled vs therapists vs students) in number of communications with each receiver group separately (talkdis, talklt, talknt, talkstud), and in total number of interactions (totint) were assessed by means of Kruskal-Wallis one-way ANOVAs. Friedman's ranks tests were used to assess preference within each group for communication with some groups more than others.

### 3.4.4 DESCRIPTIVE STATISTICS

Table 7 shows means and SD's for each sender group across each receiver category. Inspection of the means shows that communication between some groups is minimal or non-existent (e.g. therapists to students, students to therapists). In addition, some cells (marked *) contain outlying cases which disproportionately inflate cell means.
## Table 7

**Means and Standard Deviations for 3 Sender Groups x 4 Receiver Categories**

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Disabled</th>
<th>L-Therapist</th>
<th>N-Therapist</th>
<th>Student</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td>24.9</td>
<td>13.7</td>
<td>9.1</td>
<td>7.2</td>
<td>54.9</td>
</tr>
<tr>
<td>Sender</td>
<td>[14.84]</td>
<td>[10.06]</td>
<td>[15.93]</td>
<td>[18.67]</td>
<td>[28.77]</td>
</tr>
<tr>
<td>Therapist</td>
<td>12.7</td>
<td>10.9</td>
<td>9.6</td>
<td>0.7</td>
<td>33.9</td>
</tr>
<tr>
<td>Sender</td>
<td>[14.47]</td>
<td>[7.06]</td>
<td>[9.45]</td>
<td>[2.5]</td>
<td>[15.52]</td>
</tr>
<tr>
<td>Student</td>
<td>4.1</td>
<td>*0.7</td>
<td>0.0</td>
<td>13.7</td>
<td>18.5</td>
</tr>
<tr>
<td>Sender</td>
<td>[5.82]</td>
<td>[1.88]</td>
<td>[0.0]</td>
<td>[14.8]</td>
<td>[19.05]</td>
</tr>
<tr>
<td>All Groups</td>
<td>13.9</td>
<td>8.4</td>
<td>6.2</td>
<td>7.2</td>
<td>[14.38]</td>
</tr>
</tbody>
</table>

*Note 1: L=League; N=non-league

*Note 2: * = cells containing outliers

As in an earlier stage of this study, 2nd-year students were virtual non-participants in the program. They initiated minimal communication, only with other students.
3.4.5 DIFFERENCES BETWEEN GROUPS

Kruskal-Wallis one-way ANOVA was used to assess between-groups differences in

- total number of interactions (totint)
- number of interactions with each receiver group (talkdis, talklt, talknt, talkstud).

Alpha level was set at .01 to keep experiment-wise error below .05 \([ew = 1-(1-a)^c\text{, where } c = \text{number of comparisons}]\) (Keppel, 1973).

When 2nd-year students were included in the analysis, significant differences were found on all measures. However, when 2nd-year students were excluded, group differences were markedly reduced. Total number of interactions did not differ significantly across sender groups. A significant between-groups differences was found in the number of interactions with students (talkstud) \(\chi^2 [2] = 12.39, p < .01\). 3rd-year students communicated more often with other students than did therapists or the disabled. A marginally significant difference in the separate measures of communication with therapist groups (talklt, talknt) reached significance when communication with both therapist groups was taken together \(\chi^2 = 10.26, p < .01\). 3rd-year students communicated less with therapists than did the other groups. Although disabled participants initiated twice as many interactions with their own
Overall then, the only significant group differences involved communication initiated by students. Students communicated more often than other groups with each other, and less often with therapists than did other groups.

3.4.6 DIFFERENCES WITHIN PARTICIPANT GROUPS

The tendency for participants in one group to favour communication with a particular group was examined, using Friedman's rank test (SPSS-X npar tests). This test ranks the variables for each subject, and compares the mean rank for each variable over all subjects (evaluated as $\chi^2$ statistic). Communication with both therapist groups was combined to make the receiver groups numerically comparable.

For each group there was a significant overall difference in the level of communication directed towards the disabled vs therapists vs students. In each case, this difference centred on communication with students. Disabled and therapists communicated significantly less with students than with other groups, while students communicated significantly more with students than with others. There was no significant difference in communication directed at disabled vs therapists for any group.
3.4.7 SEX DIFFERENCES

Difference between male and female participants were assessed for each category of receiver group (talkdis, talklt, talknt, talkstud), and for total number of interactions (totint), using Kruskal-Wallis one-way ANOVA. 2nd-year students (who were all male) were excluded from the analysis so as not to bias the results. No sex differences were found on any of the measures.

Differences in communication preference for male and for female disabled participants were assessed using Friedman's rank tests. Male disabled participants did not differ significantly in their communication with disabled vs therapists vs students, but the small numbers (n=4) make this analysis unreliable (Norusis, 1988). Female disabled participants communicated significantly less often with students than with other groups ($\chi^2 [2] = 9.33, p > .01$).

3.4.8 ORGANISATION vs NON-ORGANISATION THERAPISTS

Disabled participants tended to interact more with league than with non-league therapists ($\chi^2 [1] = 6.4, p .01$), though this difference does not quite meet the criteria set for experiment-wise error (i.e. $p < .01$).
3.4.9 DISCUSSION

Some differences in participant groups' use of the bulletin board can be inferred from the data presented here:

2nd-year students did not really participate in the project;

Students tended to communicate more with each other and less with the other groups, particularly therapists;

Disabled and therapists, likewise, communicated less with students than with each other;

Disabled participants tended to communicate more with league than non-league therapists.

However, considering the small number of participants in each group and the non-normality of the data (in particular, the tendency for one group member to contribute most of the activity between his/her group and another), an accurate account of the bulletin board program must consider these individual differences.

For example, the fact that students were contacted least of any group in the program should not mask the fact that the greatest number of interactions directed from one person to one group was from one disabled participant to students. Students represented a valuable resource group for this participant.
3.5 NATURE OF LINKS AND INTERACTIONS - QUALITATIVE TEXTUAL DATA EXAMINATION

As has been described earlier, the 30 participants were divided into three groups; 10 therapists, 10 computing students and 10 people whose disability was cerebral palsy. During the period of the study, communication software was used to collect all data which passed through each individual's modem. This was not only an accurate method of data collection but it also served to record additional information on such aspects as errors in use. When the entire data collection file was printed it generated 5937 pages of text, thus creating a very rich source of material for complementary qualitative examination. This examination was undertaken using a Grounded Theory approach.

3.5.1 GROUNDED THEORY

Grounded theory is a particular style of qualitative data analysis developed by Strauss and Glaser (Glaser and Strauss 1967; Glaser 1978; Strauss 1986). It has been used in a wide range of sociological studies involving special or disadvantaged social groups (Biernacki 1986; Broadhead 1983; Bowers 1983; Cauhope 1983; Hoffman-Riem 1984). Hazan (1985) presents an excellent example of its successful use in what she argues is "the ideal method for dealing with the uncharted and ambiguous areas as the interfaces in health and human services. The interactive character of constant
comparison during analysis worked extremely well in the analysis of the textual material from the four different vantages of the populations" (p.20).

3.5.2 THE APPLICATION OF GROUNDED THEORY IN THIS STUDY

Grounded theory utilises the relatively simple but powerful premise that the examination of conversational interaction can provide large amounts of information about the individuals involved in the interaction.

In asking a question an individual conveys information as well as seeking it. In making a reply a great deal more can be gleaned than the literal interpretation of the response. Issues such as frequency and order, as well as what is not said, are valuable aspects to be taken into account. When carried out in the presence of a third party expressions, tone and pauses can be noted as additional information for interpretation. Interaction can be participant observation of equal status subjects or the examination of professional client interaction. In this study interaction assumed a new dimension because visible cues were not present. While this may have reduced the cues which have historically required people with disabilities to adopt a subordinate role, it was also possible that lack of cues may have increased their uncertainty and thus inhibited their reaction. On the other hand it put those who had physical communication problems on a more equal footing, it "equalised" professionals and patients. If equalisation across groups
operated, on either an individual or group basis, and a person (or persons) with a disability was involved in the interaction, then it could be argued that a measure of integration had taken place.

Strauss (1986) proposes that grounded theory analysis should focus on "lines of work". The work task in this study was to use the bulletin board and this approach allowed the posing of a number of questions. How did the different individuals and groups interpret and apply the work task? As a consequence of "working" on the bulletin board did any social integration take place?

In a work environment occupational titles often identify an individual's line of work; in this case the occupational titles were different but the line of work was common. Do the barriers between individuals in different occupational groups remain constant? Was there a role change or a role transfer when a common work task took place in a shared environment?

Grounded theory as an approach, offers an alternative between having a previously defined, researched, specific hypothesis and the other extreme of deliberately minimising explicit preconceptions by not attempting any prior examination of literature, previous studies and other concepts. Glaser and Strauss (1967) argue that iterative immersion in the data leads progressively to the evolution of new theory. To develop a model which would explicate integration identification factors an initial in-depth iteration or review of the data was undertaken. As outlined by the researchers earlier identified, this aimed to use a conceptual framework sufficiently flexible to permit the separation of role identifying activities from
the individual participant. Role identifiers were cues, actions and responses which conventionally or historically were linked to particular groups. A conventional role identifier for a person with a disability was that they should be dependent - therefore they should ask for help. A disabled person who sought help would, therefore, have been displaying an accepted role identifier; a disabled person who offered help would have been displaying an atypical role identifier, especially if this was to a therapist or the offering of help on a computing topic to a computing student.

Integration could be considered to be improving in two situations. Firstly, where people with disabilities effectively displayed an atypical role identifier and secondly where activities took place which were shared across groups so that people with disabilities were not differentiated in their behaviour from the general characteristics demonstrated by the members of other groups. The first iteration of the textual data aimed to identify these two types of situation identifiers.

Since grounded theory uses the approach of preconceptions as "sensitizing concepts" (Strauss 1986), a range of sensitizing concept questions were developed to give focus to the first data iteration. These were:

1. What was the degree of self disclosure; how much did each individual reveal about themselves; were there differences between therapists, students and people with disabilities?
 Were individual attitudes different; did some display a positive attitude or contentment or happiness or were they sad and depressed; were there between group differences?

Did individuals demonstrate "help seeking behaviour"; did this elicit responses; were there between group differences?

Did individuals demonstrate "attention seeking behaviour"; did this elicit responses; were there between group differences?

Has the Bulletin Board made new information available which was not available to them before?

Are friendships created; do these develop or wane; are they within or across groups?

Do individuals use the Bulletin Board to play their "roles", support their roles and sustain their current activities?

Do individuals use the system or the experience of using the system to make changes in their routine or changes in their life goals and objectives?
3.5.3 NATURE OF LINKS AND INTERACTIONS - INDIVIDUAL LINKAGES

The detailed grounded theory examination of the text of all Bulletin Board participant interaction also allowed data to be collected on person/source and person/destination of each individual message. The matrix of interaction linkages is contained in Appendix 2.

3.5.3.1 Possible Attitude Correlations

The total score for each participant's interactional activity was compared with the participant's score on the Attitude Towards Disabled Persons test. It was postulated that a high attitude (i.e., positive) score might result in a high activity score. No correlations were found.

3.5.3.2 Most Prolific Interactions

The most prolific interactions which took place were:

- Disabled #2 (Male) x Therapist #15 (Male) (49,34)
- Therapist #13 (Female) x Therapist #18 (Female) (28,21)
- Disabled #1 (Male) x Student #22 (Male) (27,12)
- Disabled #1 (Male) x Student #23 (Male) (22,12)
- Disabled #1 (Male) x Student #30 (Male) (11,9)
3.5.3.3 Other Sizeable Message Flows (>10) (Disabled x Disabled)

The larger messages flows within the disabled group were all female.

#5 (Female) x #14 (Female) (14,12)
#5 (Female) x #7 (Female) (11,9)
#5 (Female) x #9* (Female) (6,17)
#6 (Female) x #9* (Female) (2,10)

* In both cases where #9 was involved, the high overall level of activity was occasioned by her response level being several times greater than the number of messages she received.

3.5.3.4 Other Sizeable Message Flows (>10) (Disabled x Therapist)

#1 (Male) x #14 (Female) (10,4)
#10 (Female) x #14 (Female) (12,4)
#10 (Female) x #20 (Female) (15,8)
#2 (Male x #20 (Female) (10,5)
#3 (Male) x #15 (Male) (10,12)

Female therapist #14 received many more messages from disabled people, in addition to the two interaction levels cited here, than she initiated.
Male therapist #15, who was not connected with the organisation, only had contact with two disabled people (#2, #3). However, the level of contact he did have was very high; both of his disabled contacts were male.

3.5.3.5 Other Sizeable Message Flows (>10) (Therapist x Therapist)

#11 (Female) x #12 (16,4)

An unequal message flow.

3.5.3.6 Other Sizeable Message Flows (>10) (Student x Student)

#21 (Female) x #29 (Female) (19,9)

There were only two females within the student group and they had only message flow classified as high within their group, although it was unbalanced in the ration 2:1.

3.5.3.7 Moderate Message Flows (<10)

Moderate message flows tended to take place within sub groups within groups.

Disabled male x Disabled male
Third year students x Third year students
Second year students x Second year students
3.5.3.8 General Issues

A number of general issues emerge from the interaction matrix.

1 At no stage did second year students initiate or receive any interactions with any other group.

2 Student x therapist interaction was minimal. Male student #22 sent messages to all five therapists employed by the organisation. Female therapist #16 sent messages to all third year students.

3 Almost all disabled x student interaction was between disabled male #1 and the three 3rd year male students.

As part of the grounded theory approach this initial contact matrix analysis provided a valuable focus from which the textual data might be probed for further insights as the topics, purpose and outcomes of the interactions.

3.5.4 FIRST TEXTUAL DATA ITERATION - CREATION OF OUTCOME IDENTIFIERS

Application of grounded theory requires the development and evolution of a coding paradigm as a basis for further review of the textual data. Strauss (1986) advises that axial coding requires early or predetermination of categories. The initial iteration, therefore,
aimed to define a range of outcome identifiers on which the next iteration of axial coding and memoing could be based. The identifiers which emerged are now described and are presented in the order in which they emerged from the data. The initial identifiers were again culled prior to their application in a further examination of the data and in the ultimate presentation are presented in alphabetical order.

3.5.4.1 Message Hoarding

Message Hoarding was an identifier for the circumstances where users did not delete read messages or files. Rather they hoarded them so that they had an opportunity to review them at a later date. In some cases no attempts were made to remove old files, even by competent and informed operators; it is possible that such individuals wished to experience the satisfaction of "ownership" of a "store" of messages whose content was not especially unique or relevant.

3.5.4.2 Activist

Activist was an identifier for cases where an individual seized the opportunity provided by the Bulletin Board to promote a particular cause or social interest e.g. opposition to world armaments.

3.5.4.3 Competence

Competence addressed the question of whether the user was competent. A competent user would generally be more confident
and therefore more likely to initiate or respond to social integration opportunities. In the context of these particular users it was necessary to distinguish not simply between those who were obviously capable and those who were not, but also those who could be identified as intellectually understanding of the functional process but whose physical lack of functional control might have made them, initially and superficially, appear to be incompetent.

3.5.4.4 Direct Connect

Direct Connect was an identifier for the situation where individuals used the Bulletin Board as an intermediate step to arrange a direct user ←→ user connection at an appropriate or convenient time.

3.5.4.5 "Sticky Beak"

Sticky Beak was used as identifier to describe a participant who logged on to the system and used it as an opportunity to look into the files of other participants. (Operational security was limited to access to the system but not to files). File security would have been possible with the system but would have added to the initial complexity for users and it was decided not to invoke it in this limited experimental study. All users were aware of the detailed operational rules and constraints as set out in the appendix. No specific directive was given to participants not to enter the files of others - however most users indicated that they considered their own files to be "personal".
3.5.4.6 Active

Active was used as an identifier to describe an operation of an individual who used the bulletin board in a competent, speedy and immediately functional manner. Such a person logged on, read or sent their own specific messages and logged off without accessing general messages, other activities or browsing through other material or their own old files.

3.5.4.7 Sport

Sport was used as an identifier to describe the use of the system to comment on shared sporting interests.

3.5.4.8 Message Deletion

Message Deletion was used to identify an approach which was almost the opposite of the "Hoarding" identifier. Some participants frequently, automatically, almost compulsively deleted messages immediately after they had been read.

3.5.4.9 Leisure

Leisure was an identifier to describe the sharing and discussion on leisure interests eg. the collection of CD disks.
3.5.4.10 Encouragement

Encouragement was an identifier to describe the fact that some individuals saw that a part of their participative role was to encourage increased use or involvement by others. It was also used to identify more general aspects of encouragement in life goal activities eg. encouraging other participants in pursuits such as recreation, education and independent living.

3.5.4.11 Macros

Macros was an identifier to describe an interest in, or a competence in, the development of macros.

3.5.4.12 Passive

Passive was used to identify the action of scrolling through material without initiating any positive action. It was more negative or less action oriented than browsing since no decisions were made on branching, material selection etc. Passive simply looked at what the system presented without any attempt at selection or direction.

3.5.4.13 Help

Help was an identifier used to describe requests for help. It covered requests which were genuine, spontaneous requests for help and also requests which were implicitly attention seeking subterfuges or used as a more positive means of initiating social interaction.
3.5.4.14  Equality

Equality was an identifier used to describe a circumstance or situation where a person with a disability addressed a therapist or computing student as an implied equal in status.

3.5.4.15  Disability Act

In 1986 the Australian Federal Government enacted the Disability Services Act. This introduced a five year program of fundamental change in the provision of services for people with disabilities, commencing on July 1, 1987. Naturally these changes were of significant interest to the people with disabilities who participated in this project. Accordingly, "Disability Act" was used as an identifier to cover exchanges on the implementation of changes.

3.5.4.16  Courier Mail

The local daily newspaper, the Brisbane Courier Mail, was sympathetically disposed to the project and the difficulties some disabled people experienced in physically handling newspapers. Accordingly the paper gave permission for their material to be transcribed daily into a designated section of the Bulletin Board. Courier Mail, as an identifier, was used to describe the use of this special feature.
3.5.4.17 Chat

Chat was an identifier used to describe usage which is basically social interaction.

3.5.4.18 Help offered

Help offered was an identifier to describe the offering of help or assistance in regard to any topic. It covered situations where help was solicited or unsolicited and extended to cover situations where the "offering" may have been as much, or more, to meet the psychological needs of the individual making the offer.

3.5.4.19 Browse

Browse was an identifier to describe circumstances where an individual read material but initiated no response or action other than to structure or direct the reading. "Browsing" was perceived to be under some control or purpose; whereas "passive" reading was totally unfocussed by the participant.

3.5.4.20 Thanks

Thanks was an identifier to describe the giving of appreciation for help or information.
3.5.4.21 Games

Games was an identifier to describe the circumstance where the participant utilises the games facility on the Board.

3.5.4.22 Error

Error was an identifier describing a mistake in using the system. Other types of error were not taken into account eg. making a comment which was not correct.

3.5.4.23 Hogger

"Hogger" was an identifier used to describe the circumstances where a participant behaved as if they owned the system and attempted either to monopolise its use or personally direct or control its operation.

3.5.4.24 External

External was used to describe the use of the communications software to access other systems eg. community based alternative Bulletin Boards.

3.5.4.25 Work Related

Work Related was used to identify occasions where the participant used the system for work or professional activities. Work was interpreted according to the group membership of the participant
eg. a discussion between two students in regard to problems with a computing assignment was classified as Work Related.

3.5.4.26 Interference

Interference was used to identify occasions where the message or the use of the system is being influenced by a third party and not exclusive to the particular participant.

3.5.5 SUBSEQUENT DATA ITERATIONS - APPLICATION OF OUTCOME IDENTIFIERS

The initial data iteration allowed the creation of a range of outcome identifiers for use in the coding/memoing paradigm. These identifiers have been described in the previous section. This section discusses the qualitative information which emerged from the grounded theory approach for the progressively refined subset of identifiers perceived to be significant due to their frequent occurrence or their specific social integration impact on model evolution.

3.5.5.1 Activist

An Activist, within this study, was seen as an individual who seizures on the Bulletin Board to promote a particular interest or strongly held belief. No computing students displayed this characteristic; it was displayed by one person with a disability and five therapists.
The person with a disability promoted two issues, one of these related to disability and concerned his view that access for the disabled was a token concept addressing visible issues on a band aid basis. He not only used the board as a propaganda vehicle, but developed the theme in conjunction with topics promoted by others, eg. he linked into a restaurant study initiated by a therapist. The second issue that he promoted was the value, relevance and use of the Commodore Computer. No opportunity was lost to advocate the desirability and benefits of Commodore. Two aspects of his strategy are noteworthy. He quite quickly built up a bond with two computing students who were Commodore users. This evolved to a situation where they sought his technical advice; thus an integrative activity took place which also allowed the person with a disability to play a superior and positive role. The second noteworthy aspect was that he was prepared to break the rules in pursuit of his objectives. Due to the limited line/connection time capability, the up and down loading of software was not allowed - as the individual concerned well knew! Nonetheless to extend the Commodore propagation he frequently distributed programs in this fashion to promote use.

The five therapists who used the board in an activist fashion were all female and four were related to the organisation. Three were speech therapists, two occupational therapists and they promoted five themes, addressing very different topics.

One therapist promoted a speech therapy special interest group, dealing with severe communication impairment. This activity was
extremely successful in that it resulted in not only interest but membership application and subscriptions. A feature of this use was the very speedy response by the proponent to the least sign of interest by anyone - and continuous follow up. A bulletin board is an ideal medium for a speedy, economical and personalised approach when used in this manner. However the response was professional specific and, while a valid use, it could be argued that such an approach had features which actively deterred across-group integration.

A second therapist promoted the use of the ACROD film and information service. Such a topic was of interest to therapists and people with disabilities. However it could hardly be classified as a topic facilitating social integration. It was of no interest to computing students and examination of the interpersonal message dialogue indicated that it reinforced medical model type behaviour between professional (therapist) and patient (person with a disability).

A third therapist promoted the cause of world disarmament. While such an issue generated interest across groups, the approach adopted was somewhat different to the two other topics outlined in the next sections. The approach was essentially directive and evangelical. This meant that the sharing of the interest created a class bond rather than a social bond. The class bond is based on a very sharply focused and specific area of interest with the individuals committed to a plan of action and change. It could well be made up of individuals who, from a social viewpoint, might have characteristics which would not draw them together. An action
oriented group could be extremely short term if it succeeded in achieving its specific objectives - although this is unlikely to be the case in this instance. It elicited supporters and followers, the discussion was focused on facts to reinforce a view rather than debate concerning the validity of the issue. Disabled people who participated were thus integrated in an intergroup cell - but neither they nor the others who became involved conducted an equal social exchange.

A fourth therapist sought expressions of interest from fellow poets. This brought no response from computing students but differing levels of response from therapists and people with disabilities. All those involved were female. The interaction took place as friendly, supportive social interchange. It resulted in a particularly strong bond between the original initiator and a woman with a disability which has ultimately facilitated the latter in having a book of children's stories published. Thus an activist intervention by the therapist resulted in a number of beneficial and socially integrative outcomes.

The fifth therapist created a local restaurant database on the system and invited participation in the addition of new places and objective critiques. This provided a very effective, socially integrative forum and a wealth of useful information. Some issues eg. type of cuisine were quite independent of group membership, while some were a product of group or personal interest and circumstances. People with disabilities and therapists shared an interest in collecting data on access, which was not addressed by computing students. While such a shared interest might have been
easily forecast, it was interesting to note that there was an even stronger bond between people with disabilities and students on the question of cost - an issue not, apparently, significant to therapists. The ultimate benefit of this approach was some across group shared restaurant visits, in the course of which two students were exposed to the fact that they were unable to communicate directly with a disabled person with whom they had had an articulate Bulletin Board dialogue. The bridging interventions by a therapist lead to further cooperative, across-all-group effort on specialised communication software.

An "Activist" approach can therefore create a range of integrative and non-integrative outcomes if allowed to evolve in a non-directed free flowing Bulletin Board environment.

3.5.5.2 Browse

Browse was an identifier to describe an individual reading text and to a greater or lesser extent controlling the rate of flow and direction but not initiating any response.

Grounded Theory examination of the data indicated different approaches by the groups involved. The therapy group did not browse. People with disabilities were significant browsers but in a very unstructured and ill directed fashion. Computing students were highly structured browsers and browsed with goals that were clearly indicated by their route; their clear objective was an understanding of the bulletin board's computing structure, operating system, protocols and communications.
Considered in these contexts browsing, as a work task, made little contribution to social integration. At best it may have expanded the knowledge of people with disabilities and provide a limited increase in confidence through operational experience. People with disabilities may well have been greater browsers because they had more time, conversely therapists may not have browsed due to limited available time, while computing students appear to have viewed it as an operation related to an aspect of their professional knowledge development in system analysis and understanding.

3.5.5.3 Chat

Chat was an identifier used to describe a broad range of differing types of social interaction. It occurred with over three times the frequency of the next largest identifier. All participants had some "Chat" identifiers.

The predominant interaction for this identifier was almost exclusively to their peer group members or if across groups to people already known. Two exceptions were disabled males whose significant social interactions were in one case with a male therapist and in the other case with a male student. However, in neither case did these linkages commence on a social basis. In one instance there was significant initial interaction on shared computing interests and in the other the social interaction evolved from a complex request for accessing assistance from the disabled person to the occupational therapist. In all groups, students, therapists and people with disabilities, there were individuals who shared a high
level of interaction with a single peer friend of long standing. Chat as an identifier, did not, therefore, increase the degree of social integration but where a more specific catalyst initiated significant interaction than that fostered the evolving process.

3.5.5.4 Competence

Competence as an identifier dealt with competence as an operating use of the bulletin board. An important advantage of the detailed examination inherent in grounded theory approach is that it was possible to determine whether an error made by a person with a disability was due to lack of conceptual or understanding competence, or lack of physical competence due to impaired or involuntary motor control. The latter was not considered to be a lack of competence within the context of this study.

In seeking participants for this study all those who participated claimed to have knowledge, interest and experience in computing use. Competence could be expected from computing students. Therapy professionals will have an increasing need for such skills but they, and people with disabilities, will be competent as individuals rather than as a function of class membership.

All computing students were proficient and competent. As a group they displayed a much more structured approach to initial use. In all cases they attempted to determine the structure, operation and branching of the board. They progressed to attempts to change or modify file parameters; one individual probed diagnostic issues and initiated a stream of self addressed variably routed messages. This
approach had the consequence of extending student sessions and frequently resulted in system "time out" terminations. Had the text not been subject to detailed examination, such terminations might be considered indicative of incompetence.

People with disabilities, as a group, displayed a reasonable level of competence with a small number being highly competent. However they were extremely cautious, unwilling to test the unknown or take risks. Throughout the study almost all operated within the limits of their existing knowledge. This meant that competence deepened but skill range did not extend. In most cases apprehension progressively declined and it is possible that given time and structured support, skill range would increase.

Therapists displayed the broadest range of competence, including the extremes in that the best two therapists were more competent than the best computing students and the worst two were less competent than any of the people with disabilities. The therapists who were competent also appeared to direct their competence in specifically productive directions eg. the creation of macros, economical file directories, offline file creation, editing and identification, and use of low demand time slots.

In contrast computing students, while having a high general level of competence, did not optimise their skill and knowledge in specifically directed use.

Less competent therapists were uninhibited in seeking assistance and exposing their ignorance - although, noticeably, they sought
assistance from a professional peer rather than making a general request for assistance or attempting to identify the most knowledgeable person, irrespective of group. Less competent disabled people, even when aware of mistakes they were making, appeared unwilling to expose their lack of competence until confronted with serious restrictions, problems or disadvantages. At that stage they sought either general help - or assistance from a person perceived to be competent, irrespective of group. Apart from the personal disadvantage experienced until help was sought, the delay coupled with continued use, reinforced the non-competent methods of operation and made the provision of assistance more difficult to implement. Unfortunately such a strategy perpetuated the frequently held feelings of people with disabilities of insecurity and low self image.

3.5.5.5 Courier Mail

Courier Mail as an identifier was used to record the access and use of the area on the bulletin board that contained extracts from the local paper. Priority was given to items which might be of specific interest to one or more of the three participant groups.

The section was accessed by all people with disabilities at some stage and by the majority of people with disabilities on a regular basis. As might be expected, those who had the greatest degree of difficulty with the physical handling of newspaper were the greatest users. Indeed this group became dependent on the daily updates to the extent that they took immediate action to critically flag any delays in news information provision. All therapists and
most students entered the Courier Mail area on the bulletin board. However none used it more than once and their use appeared to be limited to a general pattern of exploration.

In the context of social integration the creation of a facility which was only used by one of the groups would have to be considered as a negative aspect of the model. Such a conclusion would apply whether the isolated group were students, therapists or disabled people. However such a general conclusion would require more detailed consideration depending on circumstances. Undoubtedly the news facility did not directly foster across group interaction. It did have a number of social role valorisation benefits including

- broadening the knowledge of people with disabilities
- fostering debate within the group on a broader and more informed basis; comment on the "news" became an active outcome
- stimulating individuals to take action when they experienced any problems with service regularity.

The detailed grounded theory examination of this use segment also identified the fact that Courier Mail reading accounted for more than 50 percent of the time out system termination occasioned by disabled people.
Terminations were thus established to be principally due to inadequate time to read the news segments and not to any lack of competence or understanding.

3.5.5.6 Encouragement

Encouragement as an identifier was considered separately from the issues of giving or receiving help. The giving of encouragement was exclusively female across all three groups. The receiving of encouragement was evenly sex distributed. While therapists were the principal encouragement givers, they were also the group which had the highest number females. Individuals received encouragement evenly across and within groups. Recipients always responded positively - directly to the giver and there was a noticeable increase in the recipients bulletin board activity and participation post encouragement, even where the encouragement was quite unrelated to the project eg. encouragement to persist with an independent living program or a difficult assignment. In many cases those who had received encouragement became givers of encouragement during the following few days.

Encouragement was, therefore, a significant factor in social integration as it stimulated positive, across group activity and interaction.

3.5.5.7 Equality

Equality was an identifier for situations where the interaction between disabled individuals and either a therapist or a student
appeared to function on a basis of equality in both directions. Equality was established by two disabled people and to a limited extent by a third who addressed his interactions as if he believed himself to be an equal but did not have reciprocity. In both cases equality was clearly derived from the person with a disability being respected for knowledge or achievement skill. In case A the basis was the disabled person's computing knowledge and in case B the basis was the disabled person's poetry and creative writing skills. In each case the equality level was established with members of both the student group and the therapy group. While the identified skill was clearly the basis of the equality relationship, it determined the level of all interactions involving these two individuals irrespective of topic. In a number of cases the responses by the two disabled people moved from a basis of equality to one of superiority eg. the disabled person having been asked for advice by a computing student on a computing topic gave the advice and ended with the comment "if you do the system analysis the inefficient way you have described the program will be longer than War and Peace".

The two people with disabilities who operated in a mode of equality also had much higher levels of across group interactions, as a proportion of their total activity than any of their peers. From this, it would appear that the ability to function as an equal increased the level of social integration but that equality required a knowledge or skill precursor. It was also noticeable that neither disabled person disclosed, nor sought to disguise their physical disability which was considerable in both cases. Both their operational knowledge of the system and the grammatical
presentation of their text were equal to, or superior to, that of therapists and students. The only non equal aspect was their slowness stemming from physical impairment. However this could only have been determined from the detailed log and text analysis and would not have been obvious to other participants to whom they addressed messages.

3.5.5.8 External

External was an identifier for occasions where individuals used their communications software and a telephone link to access a connection other than the Bulletin Board within the study. Two disabled people, three therapists and three students made one or two calls each to external sources which appeared to be simply to experiment with the capability. All other students and therapists made no other use of the facility despite the fact that the General Message area had an increasing list of external available facilities. Four disabled people progressively became significant users of external facilities accessing a total of 12 different systems. While one of the four was the disabled person with the greatest computing competence, the other three were relatively naive users at the commencement of the study. In all cases the people with disabilities interacted with other users of the external facilities without giving any indication of their disabilities. With the exception of a well run user friendly system operated by a TAFE College, all the other facilities were implicitly intolerant of new users in their cumbersome, unfriendly, technically oriented presentation. While recognising that these services operate on a largely free and voluntary basis, it appeared that they functioned to
meet the achievement and social needs of the system operators rather than the dial-in users. In a sense these other bulletin boards functioned as an assault course for the disabled aspirants and a positive outcome was not only the high level of normal social interaction achieved by the few high volume users, but significant gains in skill, confidence and general knowledge.

3.5.5.9 Games

Games as an identifier was used to describe occasions where individuals entered the games area and played a game. Almost all participants undertook some games. A majority of students and people with disabilities were regular "gamers" while a minority of therapists were regular "gamers". Students and people with disabilities tended to quickly select and play the games with the greatest challenge and persist to success or a high level of skill. Therapists presented as "game" samplers and two therapists appeared to have considerable difficulty with game operations. Games were a valuable stimulant of social interaction because scores were reported, challenges made and friendly competition undertaken across group boundaries with little inhibition.

3.5.5.10 Help

Help was used as an identifier for occasions where help was clearly and explicitly sought and offered, i.e., a cry of distress rather than casual assistance.
A majority of people with disabilities were help seekers. While almost all their requests were open, not to specific individuals and could have been answered by at least one person in each group, including their own, the help respondents to people with disabilities were a minority group of therapists. In cases where students or therapists sought help they did so from a nominated member of their peer group, although again most queries could have been answered by at least one person in each group. Help, therefore, was a reinforcer of existing dependencies and social models rather than a social integrator.

3.5.5.11 Leisure

Leisure as an identifier describes occasions where leisure and recreation were topics of discussion or activity. Leisure was a frequent topic raised by the majority of members of each group in some form ranging from CD collection through concert attendance arrangements to gem stone fossicking. Interactions took place between

- Therapist ←--→ Therapist
- Student ←--→ Student
- Therapist ←--→ Student
- Therapist ←--→ Disabled

There was no interaction on leisure involving all three groups and none between students and people with disabilities. Remarkably there were no leisure interactions between people with disabilities. If significant, long term social integration was taking place on a
continuing basis sharing leisure interests and time would be an accepted outcome not present at this stage.

3.5.5.12 Macros

Macros was an identifier to describe occasions where individuals created or used macros. A majority of each group made some attempt to create macros. Therapists and students were not significant users of macros even where their general level of use was high and there would have been considerable savings in time with consistent macro use. Six of the ten disabled users were regular macro users. It would appear that their interest in macros stemmed from the opportunity to reduce involuntary errors occasioned by their disability rather than to speed up operation. For the experienced users macros appeared to disguise their physical limitations when using external systems and allowed them to make more effective use of such integrative opportunities as presented.

3.5.5.13 Passive

Passive was an identifier which described a passive, unstructured situation where the participant allowed material on the screen to scroll without any responsive input. Passive differed from browse in that the latter was perceived to have structure, purpose, branching and other cues indicating positive control despite a lack of input. Passive was a fairly aimless, time-filling activity although participants may have gained some knowledge and satisfaction. No therapist or students displayed this identifier. A majority of
disabled people had some passive sessions and for four this was a significant component of their system time. Passive sessions would appear to reinforce social isolation rather than social integration.

3.5.5.14 Work Related

Work related was used as an identifier to describe the use of the systems for activities related to a participant's profession or employment. All therapists were practising clinicians or academics; all students were enrolled in a computing course; all people with disabilities were either tertiary students or in either sheltered employment or employed within the open work force.

No person with a disability made any use of the system for their core work related activity despite the fact that all sub categories ie. disabled students, open employees and sheltered employees, had ready access to appropriate computing facilities which would have facilitated and encouraged them on request. Computing students used the facility regularly to work on assignments, share assignment information, discuss administrative matters related to their studies and to give each other encouragement in work related activities. Therapists were regular work related users, using it particularly across the two therapy disciplines to exchange information in program planning for shared clients eg. an occupational therapist and a speech therapist collaborated and shared information on a client's hand function difficulties in communication.
There were no across group work related interactions and the pattern which evolved was of group separation and reinforcement nature rather than of social integration.

3.5.6 DISCUSSION

In discussing the information which was revealed by this detailed grounded theory analysis of the textual data, it must be remembered that participants were given a very high degree of individual autonomy of operation. The only commitment sought was a minimum number of weekly logons by each person. Prior to commencement all had, or were assisted to, a reasonable level of technical competence and understanding. Technical assistance was always available if requested. Participants were then free to use the facility as they wished. While there were no restraints there were also no instructions, so the patterns of use and behaviour which evolved were undirected. As this approach continued throughout the study, no reinforcement was provided for identifiers which might be perceived as social integrators and no discouragement was given to non-participative or isolationist actions. As indicated earlier, there were no preconceived identifiers. These emerged through the grounded theory analysis; the initial set of identifiers further evolved to a small sub set which were generating the richest quality of information.
Viewed in the context of social integration identifiers could be considered as:

POSITIVE
NEUTRAL
NEGATIVE

A valuable finding of the analysis was that these three general positions for each identifier occurred across participant groups. The variation occurred not only in presence or absence and position but also in strength or intensity. An identifier could be absent for one group, have a weak <-> neutral presence for the second group, and a strong neutral <-> positive presence for the third group.

A significant questions to be asked in this grounded theory data examination was

"Did the work task behaviour facilitate the social integration of people with disabilities?"

It was not concerned with the social integration or the behaviour of therapists or students per se, only with how the behaviour of therapists and students affected the integration of people with disabilities. Thus therapists and students might have displayed positive integrative behaviour between or within their groups which might be negative in regard to the integration of people with disabilities. Figure 6 sets out the Negative, Neutral and Positive presentation of each identifier for each group in regard to the presented impact on the social integration of people with disabilities.
### FIGURE 6

**SOCIAL INTEGRATION ASPECT OF IDENTIFIER**

<table>
<thead>
<tr>
<th>IDENTIFIER</th>
<th>GROUP</th>
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<td>THERAPIST</td>
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<td></td>
<td>STUDENTS</td>
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</tbody>
</table>

**STRENGTH OF IDENTIFIER AS AN INFLUENCE ON SOCIAL INTEGRATION OF PEOPLE WITH DISABILITIES**

- **HIGH** = 
- **MEDIUM** = 
- **LOW** =
The key identifiers are in Figure 7. In addition to a position across the negative-positive spectrum, the appendix data indicate a balance of strength/quality of each identifier within each group, ranging from High to Low. High is defined as an "obvious, frequent and continuing presence" of a particular indicator within a group. This can be satisfied by two or three individuals with a particularly frequent level of persistent presentation of the identifier throughout the study, or a much lower level of that specific identifier by a greater number of individuals which has a similar outcome in sustaining the persistence of that identifier within the group over the same period. Only the rigor and methodology of the grounded theory approach would enable these complex qualitative distinctions to evolve from the data.

The data in the appendix reveal a fairly normal distribution. The majority of identifiers are relatively neutral and of medium to low strength or quality. Within the socially integrative focus of the study there are a small number of key identifiers. These are set out in Figure 7.
<table>
<thead>
<tr>
<th>Negative</th>
<th>Positive</th>
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</thead>
<tbody>
<tr>
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<td>COURIER MAIL</td>
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<td>ENCOURAGEMENT</td>
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<td>MACROS</td>
</tr>
</tbody>
</table>
3.6 LONGER TERM ATTITUDE CHANGE

During the two year period immediately following the three month three group study, the group of ten people with disabilities continued to make regular use of the Computer Bulletin Board.

The control group members of each disabled dyad continued with their normal activities and made no use of the Bulletin Board. At the end of this period the Measurement of Attitudes Toward Disabled Persons Test was given to each disabled participant and their control. The version of the ultimate test was that used in the immediate post test to the initial three month study. As was demonstrated earlier there were no significant differences as a result of the three month study, either on its conclusion or a further three months later.

3.6.1 LONGER TERM ATTITUDE CHANGE HYPOTHESIS

This element of the overall study predicts that using the Bulletin Board for an extended period, will have a significant positive effect on the disabled participants' attitudes towards the disabled.

Specifically, disabled participants will have a more positive attitude toward the disabled (dependant variable) after using the Bulletin Board for two years (the intervention) than prior to the intervention.
This element of the study also predicts that the disabled participants will have a more positive attitude than a control group of disabled subjects who did not use the Bulletin Board.

In statistical terms, the study predicts a significant interaction between time and group, explained by a significant effect over time for the participants but not for the controls.

3.6.2 METHOD OF ANALYSIS

The experimental design is a mixed factorial design which is best analysed using ANOVA in the form A x (B x S) where A represents the presence or absence of the Bulletin Board; B represents the time factor (1987 and 1989); and S is for the subjects in each 10 subject group (Keppel, 1982; Pagano, 1981).

3.6.3 RESULTS

The results of the analysis are shown in Table 8 and set out in Figure 8. The raw scores in which this Table and this Figure are based are contained in Appendix 3.
TABLE 8

THE EFFECT OF INTERVENTION (FACTOR A) AND TIME FACTOR (B)
ON ATTITUDES TOWARDS THE DISABLED

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>SUMS OF SQUARES</th>
<th>DEGREES OF FREEDOM</th>
<th>MEAN SQUARE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1625.63</td>
<td>1</td>
<td>1625.23</td>
<td>27.71</td>
</tr>
<tr>
<td>S/A</td>
<td>10735.85</td>
<td>18</td>
<td>596.44</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>931.23</td>
<td>1</td>
<td>931.23</td>
<td>13.55</td>
</tr>
<tr>
<td>AxB</td>
<td>1134.23</td>
<td>1</td>
<td>1134.23</td>
<td>*16.51</td>
</tr>
<tr>
<td>BxS/A</td>
<td>237.05</td>
<td>18</td>
<td>68.73</td>
<td></td>
</tr>
</tbody>
</table>

Note: *p = <.001

There was a significant interaction between time and group - F(2,28) = 16.504, p<.001. The main effects in Table 8 cannot be interpreted because the significant interaction compounds the results. Following on from the significant interaction the four simple main effects were analysed.

1 There was a significant difference over time for the disabled participants (F1,9) = 18.18, p<.001.

2 There was no significant difference over time for the controls F(1,9) = .21, N.S.
3 There was no significant difference between the controls and the participants in 1987 $F(1,18) = .06$, N.S.

4 There was a significant difference between the controls and the participants in 1989 $F(1,18) = 7.825$, $p<.025$.

**Figure 8**

Hypothesised and Actual Result Over Time

The results fully support the hypotheses. There was a significant interaction as predicted, in the direction predicted.

Disabled participants had a significantly more positive attitude towards the disabled in 1989 than in 1987, after using the Bulletin Board for two years. A control group who did not use the Bulletin Board reported no significant difference in attitude over the two year period.
Furthermore there was a significant difference between the control and participant groups in 1989 in terms of their attitude, a difference which was not significant in 1987.

The case studies in the next section probe the changes in self-confidence and social behaviour which had led to the significantly greater positive attitude displayed by those who participated.
Since participation in the Bulletin Board project had demonstratively improved the attitudes of those who had participated, it was decided to probe the social consequences of participation in greater depth by means of individual interviews.

Research has shown that people with disabilities have particular problems and reactions in interview situations. They have a general tendency to provide the interviewer, particularly those perceived to be in a position of authority or influence, with the response the interviewee considers to be desired. Locander, Sudman and Bradburn (1976); and Woods and McNamara (1980) found that the stronger the social presence of the person carrying out a research project, the more likely people are to report positive or socially desirable responses. To lessen this possible impact the interviews were conducted by an independent psychologist who was formerly employed by the organisation, known to the participants and perceived to be non-threatening. This also increased the objectivity of the data collection.

In addition, the majority of those involved as participants had significant communication problems, could spasm when under stress and easily tire. The interviewer's previous experience reduced the communication difficulties and the interviews were conducted on a semi-structured basis to facilitate participant relaxation. The semi-structured pro-forma used is set out in Appendix 4.
3.7.1 CASE STUDY 1

T is a 30 year old man whose disability is cerebral palsy. He works in the office area at Centrecraft Industries, a sheltered employment facility. In the last year he has been nominated as a representative of the disabled people working at his work facility.

T states that one of the personal benefits of his participation in the Bulletin Board project has been the opportunity to resume communication with people with whom he had lost contact. In addition, he sees that being able to talk to other people with disabilities about work issues as well as his own thoughts and feelings as being a great strength of the Bulletin Board. The fact that he is able to talk to individuals using their private mail box is particularly good; especially when he wants to discuss a problem at work and wants to be assured of privacy. Its use as a public forum, allowing the discussion of issues relevant to the disabled consumer group, has been very helpful in his role as a consumer representative. It has enabled him to get different people’s ideas, discuss matters with them and report them to the consumer group at Industries.

In T’s opinion, his involvement in the Bulletin Board has enabled him to better express his thoughts and opinions. In effect, it has made him more confident in talking to groups both via the Bulletin Board and also face to face. In addition, it has made him more
willing to consider other people's viewpoints. He reported that prior to his use of the Bulletin Board, he was probably "one sided" in his attitudes. Now, he is more able and prepared to consider the attitudes and feelings of the group as a whole. In addition, T feels that his involvement with the Bulletin Board has resulted in staff looking at him "in a much more positive light".

During his participation in the Bulletin Board project, T was initially loaned a computer, modem and communications software by the organisation. He has subsequently purchased his own computer and equipment and reports that this is a direct consequence of his involvement with the Bulletin Board. He uses the computer not only for communication purposes but also word processing. He is currently writing a book and has begun to see other possible uses for his computer.

T is now accessing a community bulletin board as well as that run by the organisation. T reported that this board extends his information capability and there is more opportunity to communicate with people you do not know. It also has a variety of different interest areas covering topics such as sports, politics and hobbies. Although T has not yet communicated with people in these areas, he enjoys reading the comments of others and feels that one day he will want to share his own thoughts on some of the different areas.
3.7.2 CASE STUDY 2

V is a woman whose disability is cerebral palsy. She works in the office area of Centrecraft Industries sheltered employment facility. Although V is able to communicate verbally, she is quite difficult to understand. She has completed a book which has recently been accepted for publication. She is a disabled consumer representative for Centrecraft Industry employees.

V reports that the bulletin board has been particularly helpful in enabling open discussion between disabled people. "Consumers meet only once a month", V said "but in between meetings, the bulletin board gives us the opportunity to raise and discuss issues. We are able to check up on meeting times and discuss the agenda. This is cheaper, more effective and very much easier for many consumers than using the telephone". V reports that the use of the bulletin board makes actual meeting times much more productive.

In V's opinion the bulletin board is a very valuable method of communication for people with speech and hearing difficulties and those unable to use a telephone independently. She sees the bulletin board as providing an avenue for communication and discussion which has been unavailable before.

V feels that as a result of her use of the bulletin board, she is more confident about contacting other people and more willing to express her views. She also feels that the bulletin board has helped her to better understand the opinions of others. V is particularly
appreciative of the opportunity the bulletin board has given to her to take a very active role in the changes taking place under the new Disability Services legislation and for the assistance it provides in her role as a facilitator/representative of the consumers of Centrecraft Industries.

In addition, V thinks that being able to express herself in writing through the bulletin board, has caused people to see her abilities and as a consequence their respect for her has grown. V stated "staff have been more willing to come and talk with me on a basis of equality rather than to me as a subordinate person".

V had already bought her own computer before the bulletin board project commenced. She used it initially almost exclusively for word processing. Although V has had some experience with computers, in her opinion, the use of the bulletin board has given her a much greater appreciation of computers. She can see much wider social applications for them now, especially in the areas of disability. V herself would like to be able to use the bulletin board as a tool in her research and writing. She envisages using it to make contact with people and for checking information.

V's only real problem with the bulletin board has been the difficulty she sometimes experiences actually getting on to it due to its single line. She reported that on one occasion it was particularly frustrating. She needed some information that was available before going out. However as she was unable to get on, she did not get the information to tell the person she was going to visit. Apart from
this, the only other problem has been that when her sister calls the phone is always engaged - it has become a family joke.

V would like to see the organisation expand the current bulletin board. She suggested that adult people with disabilities maybe able to help the parents of young children with disabilities through communication via the bulletin board.

3.7.3 CASE STUDY 3

D is a woman whose disability is cerebral palsy. She attends a day activity therapy centre in a Brisbane suburb. Two years ago she started studying towards a humanities degree at Griffith University. She has discontinued this project at present but plans to return to it in the future. D is a very quiet and reserved woman. Because of her speech problems, D can be very difficult to understand and supplements her verbal speech with the use of a small communication board.

D has particularly enjoyed the opportunity the bulletin board has given her to contact her friends. Because of her speech difficulties, D has never used the telephone before in the conventional manner. Her feelings about the bulletin board are best expressed in her own words. "The bulletin board has enriched my relationships with my friends because I am able to communicate regularly with them - rather than just getting to talk to them occasionally when we happen to meet at something like a sports day". D said that when
she was first on the bulletin board, she did not really know what to say. Now, however, she thinks she has developed much better skills and confidence in communicating with people.

D has also liked being able to read what other people have written in the public message area. She reports that the contribution and discussions about the new disability legislative changes have been particularly stimulating. She enjoys reading other people's comments.

D sees a potential future use for the bulletin board when she does decide to return to her studies at Griffith University. Perhaps she could send her assignments this way and also communicate with her tutors. D thought that maybe it would be even possible to have her tutorials via the bulletin board.

D has bought her own computer since commencing participation in the bulletin board project with borrowed equipment. Having her own computer has also meant that as well as communicating via the bulletin board, she is able to use it for creative writing and letter writing. She states that it is much better and very much less frustrating than the typewriter she used before as she is now able to correct her many mistakes -which she was unable to do in the past.
In D's opinion, her use of the bulletin board has made her much more confident in all the things that she does but especially in talking and socialising with people. She says that this in turn has made her feel very good about herself. Her family also seem to think and act with more respect towards her because of the computer generally.

3.7.4 CASE STUDY 4

J is a woman whose disability is cerebral palsy. She attends a day activity therapy centre. J has found the bulletin board particularly good for finding out when meetings are and what is going on around the place. She also likes being able to talk with friends using their private mailboxes and to read, as well as contribute, to the comments in the public area. J says that she likes to have a say on the bulletin board about things that are happening as well as about comments she reads.

J says that it has always been impossible for her to use the telephone in the conventional sense because of her speech impairment and her physical disability. As a result of the computer bulletin board, she has been able to re-establish friendships with both staff and people with disabilities within the organisation with whom she had lost contact. She commented that in the past that when people have moved from one centre to another within the organisation, you usually stopped communicating with them.
because of the physical difficulties. The bulletin board has been a great help in re-establishing friendships.

J feels that as a result of her communication on the bulletin board, her English language skills have improved. She also feels that she is relating better to people and has much more confidence. J reports that her mother says she is coming out of herself - she is more willing to talk to people, even strangers.

Since her involvement with the bulletin board, J has been given a computer and equipment by a computing firm. She says that had she had the money she would certainly have bought one for herself. Her computer is a different one from the one she learns on, but because of her previous experience and the experience gained on the bulletin board she did not feel nervous about learning the new system. She feels increasingly more positive about computers and would like to learn more about them. She now feels that they present no difficulties for her - only opportunities.

3.7.5 CASE STUDY 5

M is a man whose disability is cerebral palsy. He attends a day activity therapy centre and lives in a residence for adults who are disabled. Because of his speech problems, he is very difficult to understand. He has studied some computing courses at tertiary and further education colleges and is interested in pursuing open employment in the computing area. M says that he uses the
bulletin board to interact and keep in contact with people from other centres. He says this is an alternative to the telephone which he is unable to use because of the difficulties people have in understanding him. M says that he has been able to independently arrange appointments and meetings with staff based at other centres. Before the bulletin board, he had to communicate through a third party. He has even sent forms over the bulletin board to other people. This was much quicker and easier than sending it through the mail.

According to M, the bulletin board has also been of use in finding out about meetings and its facilitation of discussion between people. M has found that if some people expressed their ideas in a practical way, others benefit from reading these ideas and they in turn get ideas of their own which they can share with others. In this way, M says, the whole group benefits. However, he is concerned when the bulletin board is simply used for "bitching". He feels that it is better when people are making constructive and practical statements.

M feels that one personal outcome of his use of the bulletin board has been a change in his feelings about others and himself. He says, "before the bulletin board started I didn't have much interest in interacting with people. I always kept to myself. Now I am interested in interacting with other people. I feel happier with myself". He also feels that some staff treat him with much more respect and consideration. He said he thinks that before they had read some of his contributions on the bulletin board they had no real idea of his capabilities.
Since commencing the bulletin board project, M has purchased his own computer, modem and communication software. Although this decision was also influenced by the other potential uses of a personal computer, his experience with the bulletin board significantly contributed to his deciding to buy. M reports that he spends a great deal of his spare time on his computer. As well as using the organisation's bulletin board he also accesses Brisbug which is a bulletin board for IBM computer users. He now attends this group's meetings and so meets people with whom he is communicating on that bulletin board. M feels that to really form and develop communication with someone you still need to meet them face-to-face but the computer bulletin board has given the stimulus in this direction.

M, who is studying subjects by correspondence, would like to be able to use the bulletin board to send his completed papers and assignments to the secondary correspondence school. He feels that in this way students could get the results quicker and papers would be easier to manage. Unfortunately, at present the correspondence school has no computer or access to the bulletin board.

M feels that the skills, knowledge and social competence he has learnt to date have greatly improved his ultimate work options.
W is man who is very severely disabled. He attends a day activity therapy centre and he is studying a tertiary course externally. His ultimate goal is to be an accountant.

W finds that the organisation's bulletin board is good for communicating with friends at home and at other centres. According to W the bulletin board also allows you to talk to people you haven't met without difficulty. It is also particularly good in the provision of a public area which can be used as a notice board and a discussion area. He reported that in his opinion most people find it easier to start communicating when they read the comments of others in the public area. The public area has the advantage, too, in allowing a large number of people to take part in the discussion, each having an equal opportunity to have their say. People with speech difficulties are not disadvantaged like they can be at meetings.

Another way in which W uses the bulletin board is to transfer text from home to work by putting it in his own mailbox and getting it out when he gets to work. In this way he is able to continue work that he has started at either place from any place where he has a computer and modem access. He believes that this "advantages" him when compared with ordinary people - whereas previously he was disadvantaged in relation to them because of his physical disability. As a consequence of the research project W is now employed by the local Municipal Library under the Access Australia
Award granted on project evidence. While he still attends the same Activity Centre, he does so as a paid worker rather than a service recipient.

W has, through his use of a community bulletin board, made a great deal of contact with other people. These people, even those with whom he has regular contact, do not know that he has any disability. He feels that his use of bulletin boards has made him much more confident in talking to strangers both directly and via the medium of the bulletin board itself.

He would like to see the organisation's bulletin board being used as a library for public domain software. Individuals could access programs through the bulletin board and take a copy if they felt it was useful for them. He suggested that the organisation could specialise in software for the disabled population.

3.7.7 CASE STUDY 7

M is a woman whose disability is cerebral palsy. She attends a day activity therapy centre and is also studying at the Alexandra Hills TAFE College. She lives in a small group home with several other ladies with physical disabilities. M feels that the bulletin board is an excellent way in keeping in contact with people. She said that it has helped her maintain friendships with people when either they or she has moved to another workplace. She has also seen it as an invaluable tool during the new legislative transition program as it
has been a way for everyone to keep in contact and know what is happening.

M had already purchased her own computer before becoming involved in the bulletin board project. She does not have her own modem and communication software but is now considering buying this equipment. M reported that as a result of her use of the bulletin board, she has learnt more about computers, how they operate and what they are capable of. This, in turn, she believes has made her feel more competent with her computing equipment and with other types of equipment. She said that before the bulletin board, she felt very timid about machinery generally.

3.7.8 CASE STUDY 8

M is a woman with a severe physical disability. She lives in a supported accommodation situation with three other people with disabilities. When the project commenced she was attending a day activity therapy centre but has since left and become involved as a peer advocate with disabled people using the attendant care scheme.

M uses the bulletin board to communicate with people who cannot use the phone and also to keep up with what is going on within the organisation. In her opinion, the bulletin board is particularly good for people, who because of their disability cannot use a telephone independently.
Because M finds it difficult to physically manage reading the newspaper, she found reporting of the "news" on the bulletin board particularly good. M said that this facility is no longer provided and that she would like to see it reinstated. As has been described in Appendix 1, the local newspaper, the Courier Mail, gave permission for its contents to be made available on the bulletin board for the period of the research project without charge. M also felt that another possible use for the bulletin board would be the reporting of the minutes of the consumer representatives meetings and also consumer association meetings.

M already had her own computer before becoming involved in the bulletin board project. She used this only for word processing and now sees that there are significant other work and social benefits to be derived in the computing area. One result of her learning how to use the bulletin board was the broadening of her computer skills and increasing her use of her own computer.

3.7.9 CASE STUDY 9

G is a man whose disability is cerebral palsy. Until recently he attended a day activity therapy centre part time. In the last year he undertook the Bachelor of Humanities course at Griffith University. Last year he moved from a residence for disabled people to a supported accommodation situation which he shares with three others with physical disabilities.
G uses the bulletin board to communicate with other people within the organisation. He also enjoys reading and contributing to the public area. G sees the bulletin board's use as a notice board extremely helpful "It is a much easier and less expensive method of making meeting arrangements".

G also feels that using the bulletin board has given him a lot of confidence, both socially and educationally. He feels that he is communicating more with people than when he first started. He said that he believes that it has been especially good for those who cannot use a telephone "It has opened up a whole new area for them". G also feels that it has helped in improving people's educational skills. He said that he has noticed an improvement in many of the users spelling and grammar. In addition, G has noted that some people are using the bulletin board to arrange to do things socially together.

Another advantage in G's opinion has been the fact that it has enabled staff and consumers to communicate with each other on an equal level. He thinks that it is very good to see that so many staff are becoming involved in the bulletin board. Communication with staff in this way has resulted in G building a better rapport with individual staff members.

G found that learning how to use the bulletin board was quite frustrating. There were constant changes in how things were to be done. However, G does feel that as a consequence he has learned far more about computers as a result of his use of the bulletin
board. He also feels that he spends more time on the computer than he did previously. As a result of participation G has bought his own computer and is presently in the process of buying a modem and communications software.

G would certainly like the bulletin board to continue and grow. He thinks there should be more than one line as it is sometimes quite frustrating to try to get on. He would like to see more variety in the files and also the "news" to be re-established as a facility on the board.

3.7.10 CASE STUDY 10

N is a woman whose disability is cerebral palsy. She works at Centrecraft Industries employment facility, 3 days a week and also at a day activity therapy centre one day per week. She is involved in teaching people with disabilities how to use the bulletin board and also acts as a go between for people who want to send messages to others but do not know how to or are unable to use the equipment. Until recently, N lived at home with her parents. She is now living independently in a flat. N sees the fact that people can keep in touch with their friends and family is a particular strength of the bulletin board. She feels that it has "widened the horizons" of a great number of people with disabilities. She thinks this is a good way of having social contact with others and making new friends; particularly for those who are severely disabled.
For N personally, involvement with the bulletin board has given her work skills. Since February 1989 she has been employed as a tutor to teach consumers how to use the bulletin board. N said "I feel it is an achievement being able to pass my knowledge onto other people". She says "it also makes me feel more confident and very good about myself".

Although N had some experience with computers, having been employed at Centrecraft Industries for a number of years, she still feels her involvement with the bulletin board has taught her more about computers, their capabilities and their social potential. She does not have her own computer but would be interested in buying one if there was a possibility of getting some paid work in the computing area that she could do at home.

3.7.11 DISCUSSION

The discussion considers Positive and Negative Issues arising in the case studies.

3.7.11.1 Positive Issues

The case studies reveal a significant growth in self-confidence throughout the group of disabled participants. This not only applies to the use of the bulletin board and the necessary related skills but to a much wider range of social issues. Individuals expressed themselves as "more confident in dealing with people", "prepared to
go out more", "my interaction with staff is greatly improved and much more comfortable" and "I have not only renewed old friendships but made new ones".

Individuals identified improved attitudes towards them by peers, staff, family, friends and others with whom they came into contact. They felt positive about the opportunity to strengthen their political and lobbying activities; to have an effective and private means of communication on issues which were sensitive or personal in contrast to the previous need to use an intermediary.

Participants highlighted areas of improvement in competence such as improved grammar and spelling gained in extended practical operation; even more beneficially they identified a range of activities which they had not undertaken previously - or were unable to undertake. These included:

- becoming a political lobbyist
- using a telephone - where lack of confidence had previously inhibited use
- using the Bulletin Board as a telephone substitute where speech was impossible
- attending an IBM PC Community Users Group
- reading the newspaper daily - where they had been physically unable to handle printed material.
Two people enrolled in tertiary courses and two others gained financially and intellectually rewarding employment. One individual, who gained employment, used the board to transfer material from work to home and indicated that he could work, accessing his material, from anywhere that had a telephone. He believed that he was "advantaged" in flexibility of work in comparison to the "normal" people with whom he interacted daily.

3.7.11.2 Negative Issues

In the context of the study there were no negative social issues. A problem perceived by the participants was the limitation of a single line, this was a particular difficulty for those who could not access the daily newspaper by any other means. An individual participant expressed concern that she was unable to fully capitalise on her newly acquired skills since the Correspondence School did not have a computing communications facility by which she could transfer assignments to and from her tutor.
4 OUTCOMES: ACTUAL AND POTENTIAL

4.1 OUTCOMES ATTRIBUTABLE TO THE STUDY

The outcomes attributable to the study are considered in two ways. The literature review identified as separate issues, individual attitudes and societal attitudes towards people with disabilities and their integration within the general community. As a consequence the consideration of the outcomes of this study are considered within two similar types of division

those within the study itself and directly affecting the individuals who participated in the study, especially participants with disabilities (described as Internal Individual Changes).

changes in the community of individuals, organisations and public bodies who were exposed to the participants with disabilities (described as External Broader Community Changes).
4.1.1 INTERNAL INDIVIDUAL CHANGES

A range of qualitative and quantitative changes took place as a consequence of the interaction and experience of participation.

1. Measures of attitude after a three month period showed no change. Possible reasons have already been discussed in detail in 3.2.6.

2. Measures of Bulletin Board use showed that people with disabilities were, significantly, the highest user group. The students participating were shown not to be a homogeneous, normally-distributed group, but that 2nd year and 3rd year students were two distinctly separate groups. The latter finding supported the views already held by faculty members in regard to the unusual lack of homogeneity within a particular year of students.

3. There was a significant difference in use between people with disabilities and therapists. The former logged on more frequently, spent longer overall on the system and had more time up disconnections.

4. Examination of the interactions between groups showed that

   2nd year students were virtually nonparticipants

   3rd year students interacted more among themselves and least with therapists
5. Examination within groups showed that
disabled people and therapists communicated significantly less with students than with other groups

students communicated significantly more with students

6. Examination, in detail, of the interaction matrix showed that

at no stage did 2nd year students initiate or receive interactions with any other group

student x therapist interaction was minimal. Male student #22 sent messages to all five therapists employed by the organisation. Female therapist #16 sent messages to all 3rd year students

almost all disabled x student interaction was between disabled male #1 and the two 3rd year male students.

7. Grounded Theory analysis identified a number of Key Social Integration of Disabled People Identifiers. These were:

Positive - Courier Mail, Encouragement, Equality, External, Games, Leisure and Macros

Negative - Browse, Passive and Work-related.
These are described in detail in 3.5.4 and 3.5.5.

8. The measures of attitude of disabled participants after two years compared against people with disabilities who did not participate showed

there was a significantly more positive difference over time for the disabled participants \((F_{1,9}) = 18.18, p<.001\).

there was no significant difference over time for the controls \(F(1,9) = .21, \text{N.S.}\).

there was no significant difference between the controls and the participants in 1987 \(F(1,18) = .06, \text{N.S.}\).

there was a significantly positive difference between the controls and the participants in 1989 \(F(1,18) = 7.825, p<.025\).

9. Detailed, independently conducted, case studies revealed very positive changes in the quality of life of people with disabilities as viewed by themselves. Examples included

the opportunity to resume contact with old friends without cost, travel and communication trauma.

the privacy to discuss contentious issues without professional or family knowledge or intervention.
the opportunity to have a public forum enabling a coherent group viewpoint to be established as a precursor to change action attempts.

a view of a more competent self in the socially appropriate requirement to consider the views of others.

improved literacy skills which greatly fostered participation in the bulletin board's integrative processes with non disabled individuals.

very positive feelings of greater social effort productivity and at much lower cost in terms of emotion and trauma

the creation of an environment of equality of conversation when the practical and social penalty of a range of different communication impairments are removed. These range from no speech to the physical inability to dial a number or hold the telephone to one's ear

the opportunity to become a very competent facilitator and advocate for the view of others despite a significant speech impairment

the ability and facility to use the bulletin board and computing skills and technology as a creative writing medium, including negotiations brought to successful fruition with a remote publisher.
the ability to comment on legislative change in a constructive manner before it is enacted rather than receiving third hand, post implementation information.

the facility to transfer work done at home to an alternative work place without physical difficulty. Indeed the very disabled person concerned considers that his work practices are thus superior to the majority of non disabled people engaged in similar accounting and commercial activities

the opportunity to live independently in a house in the community and not feel isolated - nor afraid of the inability to summon help in emergencies.

much more positive feelings of being the intellectual equal of service providers - indeed in some cases deriving great satisfaction from feelings of superiority never before experienced.

The only negative view expressed in all the case studies was the inability to maximise the opportunities due to the limitation of a single dial up line. This issue is addressed in a subsequent outcome.

10. The detailed case studies also produced suggestions for other types of use within the community of services for people with disabilities including

support for parents of young children with disabilities by adult disabled citizens using a bulletin board
the development of a facility for making available to disabled people specialised public domain software relevant to their needs.

4.1.2 EXTERNAL BROADER COMMUNITY CHANGES

The broader community is perceived to commence with individual members of the peer group of the disabled people who participated and progress ever more widely to community and government services and departments. A range of examples of such community changes, as a consequential outcome of this study, can be clearly identified.

1. A rapidly growing number of other consumers, who have had contact with the disabled participants involved in this study, have made individual changes in their life styles as a consequence. Since these are individual changes they have varied widely in type and degree. An important aspect of this change has been that it is self directed, based on observation, and not professionally directed. This increases the individuality and in some respects adds to the difficulties in implementation but is much more likely to provide a progressive growth in self confidence for each individual concerned. A published example is contained in Appendix 5 which highlights the changes which Shane MacFarlane has made to his life. It says "two recent developments have resulted in dramatic changes in the life he leads". These changes have enabled him to leave a residential
institution and return home confident that he will not be a physical burden to his ageing parents and assured that he can maintain and extend his social contacts. The first development was the introduction of the Attendant Care Scheme. The second "development resulting in dramatic change" was his purchase of a computer and ancillary equipment based on his observations of the social benefits obtained by his friends who had participated in this study. Shane now spends at least twenty hours a week at home using the computer for education purposes, writing letters, communicating via the League's Bulletin Boards, and designing and producing greeting cards for relatives and friends.

A number of others have initiated similar positive action which supports the integrative and independence thrust clearly identified in the literature review.

2. There were a number of positive affective outcomes within the structure and environment of the organisation itself - and these continue to be developed.

The exercise of running the Board was deemed to be so successful that the organisation invested in a License for the Cosy Conferencing System developed by the University of Guelph, Canada. This has resolved a number of the technical difficulties experienced by users who are disabled. It has additional features which are of considerable advantage to special users but at the same time is simple to operate. Recognising the limitations of a single line, the new system has four incoming lines with a single number on a rotary switch. This means that there is a four times greater chance of
logging on but only one number needs to be saved within a macro or remembered by a disabled user.

The new system has extended the individual and collective power of disabled consumers. One example of this has been the first election of a disabled person as a member of the Board of Directors of the organisation. The bulletin board was used by disabled consumers to mobilise their peers, canvas their views, develop platforms on issues and exchange opinions in ways previously impossible to many due to their inability to communicate, lack of transport, lack of funds and especially lack of self-confidence. Two aspects were particularly significant:

the high level of activity was invisible to their conservative, non disabled opponents

in cases where they identified support they were able to arrange an exceptional level of formal proxies which were ultimately critical.

Published information on these changes is set out in Appendix 6. This outlines the benefits which have been obtained by replacing the existing Apple single line Russ BBS system by the four line Xenix operating system and COSY (Conference SYstem, University of Guelph).

The Appendices documents relating to this and the previous section allude to the establishment of two new Divisions within the organisation. These are Technology Services and Information and
Development Services. While the study is not entirely responsible for this outcome, it provided a key element of the argument and ultimately determined the shape and staffing of the new divisions. A disabled participant in the study is now employed as a staff member to act as moderator of the Infolink Conference on the new system.

3. The Federal Department of Community Services and Health, having monitored the success of the pilot project, arranged for one of the disabled participants to be linked directly to the Department's internal electronic mail system. This allowed this individual direct access to departmental officers creating a very important avenue for individual and collective consumer opinion on a wide range of issues. Previously intermediaries had been necessary in addition to the conventional difficulties experienced by those who have communication difficulties. Apart from overcoming the practical problems, the gains in self esteem are significant to both the person involved and to her peers who now have a superior form of contact in matters, to them, of considerable importance.

4. In conjunction with Redcliffe City Library a proposal was put forward for an Access Australia award. This aimed to extend the Fido-net node at the Library to the local Activity Therapy Centre and encourage its use by any disabled member of the general community. An award was received in open competition for funds on an Australia wide basis, again due to the success demonstrated within this study. The grant not only covered hardware, software, line rental etc. but the major element was a salary component to meet the costs of employing one of the disabled participants in this
study as sysop and another as a tutor for naive public users. General public participation in this project has not only fostered integration but enhanced the self esteem of the disabled participants. Details of this successful project are contained in Appendix 7.

4.1.3 OUTCOME SUMMARY

The disabled people who participated have demonstrated such integrative enhancement attributes as

- improved personal attitude and self esteem
- willingness to help and encourage others
- movement out of institutions to live independently
- greater social independence and self confidence
- employment for more than half of the participants
- a more active political role.

The organisation has benefited in improved operating and social effectiveness. The broader community, in the exemplar of two archetypal community bodies such as a Government Department and a Municipal Library have volunteered their participation in two
imaginative projects which can only serve to foster the movement towards community integration by people with disabilities.
This thesis is entitled "Social Integration by People with Physical Disabilities - the Development of an Information Technology Model Based on Personal Growth and Achievement." The literature review considered two research streams which might, with benefit, be interwoven and concluded that a "window of opportunity" existed for the conducting of this study. The study outcomes have demonstrated that given opportunity, choice and information the embryonic model can provide considerable benefits not only to people with disabilities but also to members of the community and community institutions. The question then becomes not

"Is this Model of Value?"

but

"Given the value of the Model, how may it be improved and by whom?"

4.2.1 HOW AND BY WHOM SHOULD THE MODEL BE ENHANCED?

It is argued that if disabled people wish to be part of an integrated community then they should, as part of their strategy and tactics, use general community strategies, tactics, facilities and tools wherever this is in any way possible. As examples this should include the
politics of power; tactics by other pressure groups; special techniques, physical facilities and devices used to solve either general or other group specific issues outside the conventional parameters of knowledge or use by the disabled movement.

As a normal part of mainstream society it will also be desirable for people with disabilities to recognise and adopt strategies demonstrating that part of their role is to meet the needs of others as well as having their own needs met. This is not meant in the sense that they are artefacts within a professional model—rather that they meet normal social interactive needs on a basis of dignity and equality. The research program undertaken shows that this capability is present within the group under study.

It would appear that "Integration" requires a redefinition which takes account of three separate sub-types which emerge from a combination of the review of literature and the study itself

systemic integration such as the integration of children within the educational system

self activated integration where the initiative is as a consequence of one way initiative by a disabled person, or in some cases by a third party; in both instances with varying degrees of success and where integration is the prime objective

bonded integration where the integration takes place on a basis of interaction between individuals or groups establishing a
relationship which meets individual social needs and where the issue of disability is either submerged or not significant.

In considering the outcomes, a number of needs can be clearly identified if the significant progress which has commenced within this study is to be continued. These needs will include:

the need for a more comprehensive model since the "window of opportunity" as initially perceived and utilised in the study is perhaps somewhat simplistic.

the need to extend the best aspects of legislation in each country to other areas. The US Congress 1988 legislation, on modification of devices within public bodies to ensure equal access by people with disabilities, needs to be extended not only to other countries but to the use of public funds in non-government areas and ultimately to industry and commerce. This represents an excellent example of where the disability movement should harness changes which are taking place, since it is inherently easier to channel effort which exists than to overcome resistance or inertia.

the need for technical legislation to be extended to support social integration issues.

the need, in the establishment of any bulletin board system, for a more formal induction model which addresses some of the practical problems identified in the study. This would cover loan of equipment for trial, training for disabled consumers as conference moderators, induction training not simply for initial
naive users but also for people at different stages of use and experience as identified not only here but in other studies which have been cited earlier such as those conducted at Carnegie Mellon University. In particular this would aim to address the fostering of the integration-positive issues identified in the grounded theory examination and the reduction or suppression of the factors which inhibited integration.

the need for sociologists to address the formal study of disability. There appears to be very limited research which covers people with disabilities as a significantly disadvantaged group, to the extent that other divisions are clearly defined as areas of significant investigation effort such as race, women and the poor. Yet the explosion in numbers allied to the potential for increased empowerment are going to make this an expanding area of total community resource allocation - by whatever means! - and therefore worthy of much more attention by sociologists.

While some of the needs should be met by collaborative approaches, which draw on skills independent of ability or disability, the strategy for implementation should take place within the framework of an appropriately enhanced, continually pragmatic, Information Technology Action Model.

Who then should specify develop and implement such a model?

At the formulation stage of this study this might have been seen as a professional or researcher or government or welfare agency role. However, surely one of the key outcomes of this study is that people
with disabilities have demonstrated not only an aversion to benevolent dictatorship but also the competence to develop their own strategies and to choose their own future? Given the experience already gained and the changes in the community environment they are likely to make more permanent long term gains with a less than perfect model to which they feel ownership than attempting to use a, possibly more elegant, model thrust upon them.

Taking this approach it is arguably better to conclude, not with a definitive model, but with some discussion on issues which people with disabilities may wish to take into account in planning their future Integration, Normalisation and Information Technology strategies? This presentation of information rather than definitive directions is the focus of the next section of this thesis.
5. **MODEL ENHANCEMENT - ISSUES TO BE CONSIDERED**

5.1 **INTRODUCTION**

Many authors reinforce the argument that change can be directed; that minority groups who are properly motivated and organised can have a disproportionate effect on change.

Hagen (1964) drew attention to the fact that most change in society emerged disproportionately from individuals originating in a distinctive social group, he suggests that it is a fact of significance for social theory that dissenting groups who innovated in Britain and North America, produced more than ten times as many innovators as the rest of society. Hagen believes that innovation is the essence of technological progress.

However, innovations are not produced because they are useful they are frequently just produced (Hannan and Freeman, 1984). If an innovation turns out to enhance life the chances are it will be retained and spread through the population with a high probability. These authors argue that in this sense evolution is blind and that therefore they believe social change in many cases like biotic evolution is also blind.

Shotter provides a useful broad framework within which people with disabilities might develop their own, and potentially more enduring and effective, model. He states (Shotter, 1984 p.54) that people
direct their conduct in relation not to their own immediate bodily interests and needs but to actual or potential socially constructed ones. In other words people are aware of themselves in their actions in the sense of being aware of their place or position in the larger social scheme of things as they act. He says "by using one's theoretical accounts to formulate a plan, one may extend ones practices, deliberately, into areas other than those in which they were initially developed" (p.76). "For if people are ever to be self determining and act as they themselves require rather than as their circumstances require, they must develop the ability to deliberate before they act".

He goes on to say "for being accorded the right of having most of what they say or do taken seriously and responded to without question is a part of what it is for human beings to be treated as first persons, for them to be accorded their status as full and competent members of their society" (p.154). Clearly this must be one of the most fundamental objectives which people with disabilities should set themselves.

Finally, Shotter (1984) states "one must consider social life to consist in such an ever changing landscape or ecology of action opportunities" (p.186). People with disabilities must use the changes in attitude and the increase in their own skills to capitalise on these "action opportunities" rather than waiting for something to happen.

In the change process strategy development it will be necessary to take account of Webster and Robins (1989), who report on the image of the industrial revolution as being one of vast impersonal mills in
which multitudinous individuals were ruthlessly exploited by distant capitalists. However they point out that it was only in the later years that size became an issue and that initially work took place in smaller units of a dozen or so overseen by one individual. The issues of control in all its aspects including information, only became significant when size dictated a much more formalised approach to the management of work; time and motion study and other management tools were then introduced.

Webster and Robins (1989) believe that the information revolution is not a straight forward matter of technological progress but it is significant, rather, for the new matrix of political and cultural forces that it supports. They believe that too many of the recent innovations in information and communications technologies have been discussed from a narrow technological and economic perspective. They consider that the central question to be raised in the context of the information revolution is the relation between information and the system of political and corporate power. They consider that sociological analysis is naive when it treats computing technology as an innocent technical conception and adjoins individuals to look back to the past and consider the lessons of history.

All planning in such a rapidly changing environment must be highly flexible. Suchman (1987) discusses the difference between the way the Europeans navigate and the Trukese navigate. She points out that the European navigator begins with a plan which he has charted according to certain universal principles and he carries out his voyage by relating his every move to that plan. If unexpected events
occur he must first alter the plan then respond accordingly. However the Trukese navigator begins with an objective rather than a plan and he sets off towards the objective and responds to conditions as they arise in adhoc fashion. He utilises information provided by the wind, the waves, the tide, the current, the stars and the sound of the water on the side of his boat and he steers accordingly. His effort is directed towards doing whatever is necessary to reach the objective. If asked he can point to his objective at any moment but he cannot describe his historical course.

With the significant variability of individual disability and extremely different needs of each individual, it is perhaps more appropriate to act like the Trukese and define a very clear objective but take periodic adhoc action towards achieving the objective rather than have a formal detailed plan which we expect every individual disabled person to adhere to regardless of changing circumstances.

A cautionary note is sounded by Goldsmith (1979) who identifies inconsistencies in the position which disabled lobbyists have adopted. At the same time as they demand non discrimination and normalisation they continue to advocate for special housing, special employment, special transport and special parking privileges. He says that in regard to normalisation in the face of the present practical problems his stance is one of the agnostic. However he recognises that social reforms are more likely to be achieved by confirmed believers than by those who are ready to accept the practical problems.
The work undertaken has highlighted the difficulties which people with disabilities have in obtaining relief from the benevolent professional dependency model which exists. In developing their own future model to maximise the empowerment benefits of Information Technology it is of benefit to state a range of guidelines:

- **Think critically**, in the true sense of looking objectively at the positive and negative aspects of any issue.

- **Think laterally**, so that one is aware of developments which are taking place in areas which they may not have until now seen as relevant.

- **Think vertically**, so that currently relevant issues are pursued to the limit of current research and development in other areas such as commercial applications.

This study, by its nature, follows the first of these guidelines. It gives a valid example of the second by stepping outside the Australian and Western environment to examine the position in Japan and goes on in the subsequent parts of this section to consider in greater depth, or vertically, the extension of the work undertaken in conferencing and related areas.
5.2 CHANGES IN A MAJOR ALTERNATIVE CULTURE - JAPAN

It is important, when considering change and change models, to take account of those in other major cultures - especially where such cultures are not only a force in technology and computing but where they have many differences in social approach.

Morris-Suzuki (1988) cites the growing number of writers who have reacted to exhortations to learn from Japan by arguing that Japan's success represents not so much a model for emulation as a secret conspiracy based on a web of plots and secret agreements that have served Japan's goals since World War II. She believes that the importance of computerisation in Japan was that it took effect precisely in those areas where the pressure of labour shortage and rising wages were mostly felt: office work and the skilled assembly line labour. She states that this helps to explain the eagerness with which the economic advisory council urged the wider introduction of computers in Japanese industry (p.59).

While initially Morris-Suzuki states that at first sight the concept of the information society in Japan is a convergent solution to a complex web made up of economic and social problems, she believes on further examination that everything can be reduced to a single issue. For Japan this issue is simply how to maintain the profitability of private enterprise in the circumstances of the late 20th century. It is this issue alone rather than social or technological forces which have given rise to the emphasis on the information society in Japan. The author states that although new information technologies do bring
many genuine social benefits it is also true that neither the benefits nor the costs are equally distributed throughout society.

While the Japanese see obvious potential for some aspects of the electronic cottage, it is not necessarily embraced by the majority. A survey by the Japanese subsidiary of the US Digital Equipment Company found that in excess of 60% of respondents felt that they would still wish to work outside the home even if opportunities for home based work were available. The degree of control which computerised home work gives to the central employer, therefore leaves one with the impression not of the liberation of the worker from the corporate work place but the extension of corporate power into the home (p.173). A view rarely identified by studies in the Western environment. Such an extension of institutional power into the homes of disabled people would run counter to the whole thrust of this study.

The entry of the corporation into the household in the form of a computer outwork represents the logical extreme of the process of atomisation. The home based computer worker confronts only the machine which is the single link which ties her or him to the corporate system. There is little contact even with the immediate superior and none with fellow employees. There is no means by which the worker can obtain a support in conflicts with management. In this sense computer outwork as practised in Japan, greatly increases the power of central control and weakens the power of the individual.
In Japan the spread of information technology is not affording the majority of people more creative work or increased leisure. The most significant trends are the shift from routine manual production work to routine information transfer work and from service work in the household to service work in the paid workforce (p.202).

Morris-Suzuki believes that technology has both good and bad uses and it is only theoretically ethically neutral. She believes that the uses to which computer related technologies are being used in Japan are not the best possible ones. She states (p.210) "information democracy will be created neither by the forces of technological progress nor by the unfolding of historical inevitability, but by determination to cease control of social knowledge and make it a source not of technocratic domination but of human liberation".

Other changes in Japan are outlined by Galbraith (1990), who describes Sakamura's belief in the need to establish future needs by a careful analysis of the computerisation of society before designing specific equipment. One of the important developments of The Realtime Operating system Nucleus (TRON) Association is the turning of a simple house into an intelligent home - an issue of very vital significance to people with disabilities who wish to live independently.

Engelhardt (1990) also refers to Japanese efforts in this area describing a robotic assistant whose challenge is to automatically transfer a person with a disability between a bed, a chair and a toilet. If successfully combined with the TRON house this would give a very high degree of independence. There are important lessons to be
learnt from the Japanese experiences, for all sections of the community, not simply people with disabilities in pursuit of an effective change model. There are three aspects which are worth constant re-emphasis because they are not normally forcefully visible to the general community.

1. The current magnitude of the disabled population which will continue to draw on community resources as the mainstreamed school bulge moves into the adult environment with an almost normal life expectancy.

2. The increasing survival rate brought about by improvements in a whole range of areas such as neo natal resuscitation, post accident trauma recovery, improved medicine, therapy, pharmacy, and rehabilitation orthotics. These give an arithmetic growth in numbers of people with disabilities but a geometric growth in cost to the community, especially when the present passive, dependent models of support continue to be perpetuated.

3. The growing number of people who are becoming disabled due to longevity (the "greying" of the general community) will lead to a situation within the next couple of decades where those who are aged or disabled will be up to twice the percentage of the total population as compared to the present situation. In these circumstances it is critical that research, government and community effort is focused on the development of long term integrative models of living which maximise independence for the aged and disabled and minimise the recurrent cost to the community. A computer based social support network is a valuable priority in the circumstances outlined.
Continuing on the cautionary note expressed by Goldsmith, people with disabilities would be wise if they considered themselves the exception to the rule expressed by Huntington (1976), who believes that history suggests that the recipients of subsidies, especially groups who have specific interests, are more self conscious and better able to secure access to political decision points. While this may well be true of some specific interest groups it is an area where the disability movement has been much less successful. As a consequence the disabled must be much better informed on issues of power, politics and social inequality if they are to maintain their integration impetus. There are many points which they need to take under review.

Alinsky (1972) points out that people participate in voluntary neighbourhood organisation activities as their interests dictate and leave when they felt the organisation had ceased to serve them. He suggests that organisers should never appeal to people on the basis of abstract values since individuals are motivated by self interest and the sense of personal empowerment gained through collective action.

Lenski (1966) puts forward two propositions. Firstly that in the simplest societies or those which are technologically most primitive, the goods and services available will be distributed wholly or largely on the basis of need. Secondly "with technological advance, an
increasing proportion of the goods and services available to a society will be distributed on the basis of power". Lenski goes on to state that a power class may be defined "as an aggregation of persons in a society who stand in a similar position with respect to force or some specific form of institutionalised power, the members of every power class share certain common interests with one another and these shared interests constitute a potential basis for hostility towards other classes". What unites the members of a class is their common position, control, or utilisation of something which affects their chances of fulfilling their wishes and desires. People with disabilities must become just such an effective power class.

Barton and Tomlinson (1984) support this viewpoint in stating that a crucial task in sociology is to help social participants move beyond "taken for granted" assumptions and begin to question the interests and motives of those with the power to make decisions. They argue that integration is not solely the product of benevolent and enlightened attitudes to children. They consider that the main motives are rooted in economic professional and political vested interests. They believe that the motives behind integration are a product of complex social economic and political considerations which relate more to the needs of the wider society rather than the needs of the disabled population.

Webster and Robins (1989) consider that the appropriation of information and information resources has always been a constitutive aspect of capitalist societies quite outside any technological context. They argue that the information revolution is better understood as a matter of differential and unequal access to and control over
information resources (p.326). The information revolution is therefore not a technological issue but an issue of social change.

Whilst identifying the role of political and material and wealth in the creation and maintenance of social stratification, Rice and Barnett (1986) are of the view that information wealth will interact with material wealth to create new kinds of social stratification. If information is valuable as social wealth, it will be important that disabled people not only make use of it but are seen as what Rice, (1982) and Rytina and Morgan, (1982) describe as "leaders or information carriers" and are considered by others to be extremely valuable social contacts.

Oliver (1986) expresses concern that sociologists have not taken sufficient interest in disability as a topic as opposed to illness, nor that disabled people as a group have received much consideration. He believes that this is unfortunate considering that other special groups such as women and ethnic minorities are receiving increasing consideration within alternative theoretical frameworks. He is of the view that disability is ignored as a social policy issue because the majority of sociologists accept the general view of disability as a personal tragedy. However many disabled people have been pointing out that full participation has not been prevented by personal limitation but by the social restriction imposed upon them by society, leading them to the view that disability is therefore a particular form of social oppression. Oliver indicates that much of the community approach towards people with disabilities is based on blind assumptions. (p.9) "There is almost a blind faith in the rational approach to policy making in that it is assumed that once the
problems are identified and evidence produced, the government will then act. The experience of the last 20 years would indicate that this blind faith is entirely unjustified”.

Much of the reason for computer use and literacy is assumed to be that “business” requires it. The Marxist assumption is that under capitalism business is the definer of reality. Marx said “the ideas of the ruling class are in every epoch the ruling ideas” (Marx 1977, p.19). Unlike Marx many writers give the impression that the power of business is proper and legitimate. Given the business approach as being part of the struggle for power, then the use of computers by disabled people can be considered firstly for the obvious reason as an enhancement of ability but secondly for the social reason as part of their struggle for a realistic position of influence or power.

A broadly functionalist framework for her analysis of disability is provided by Topliss (1979, p7) saying “the history of provision for disabled members of society may be seen primarily as the development of recognition that certain needs of certain groups of the disabled are compatible with promoting or safeguarding the wider interests of society”. The various provisions that have developed are then linked to this framework through the principle of economic rationality (p.9) “sympathy for the handicapped has been translated into effective legislation when, and in so far as, it could be shown that the provisions would in some way bring an economic return to compensate for the economic cost of the resources so committed".
Grabb (1984) says that social inequality can refer to any of the differences between people, or the socially defined positions they occupy, that are consequential for the lives they lead, most particularly for the rights or opportunities they exercise and the rewards or privileges they enjoy (p.4). Social inequality can be based on a number of aspects:

- The concept of class whether it be divided by money, wealth, property or other form of status.

- The concept of power, where power occurs some people are able to control social situations as they see fit, whether other people accept or oppose this control.

If the state is supposed to be the official representative of the general will, at least in nominally democratic societies, it therefore has the responsibility for creating and implementing those laws and policies that can either entrench or reduce inequalities in society.

Grabb divides the means of power into three. Firstly, the control of the material resources and production which gives control of the economic structure and areas such as extraction, production, finance and commerce. Secondly, the control of human resources such as people which gives control of the political structure or state and control of the judiciary civil service police, military, etc. Thirdly, the control of ideas and knowledge which allow the control of ideological structures such as religion, education and the media. He divides bases into two categories, those which are class related and others. "Others" includes sex, race, language, location, age, religion and party-
affiliation but surprisingly does not include disability. While he concedes that his list of bases is not exhaustive, this presents further evidence of the low level of interest in "disability" as an area worthy of effort.

Becker (1983) said "social groups create deviance by making the rules whose infraction constitutes deviance" (p.9). From a symbolic universe perspective rules arise in society as a result of society's need to maintain an orderly view of the world. The anomalous position of people with disabilities in the universe has led to the property of deviance being assigned to those individuals. As a consequence there often follows a power struggle to determine whose rules should apply. Since people with disabilities are fragmented and uncoordinated groups of individuals they are relatively powerless in such a conflict. In the area of interpersonal relations, the lack of congruence between a personal and socially assigned identity often prevents the person with a disability developing as an authentic human being. This in turn has adverse affects upon the quality of interpersonal relations. In addition organisational structures often produce and foster deviance through their attempts to regulate and control those groups that are perceived as a threat to the natural order of things.

Oliver and Zarb (1989) are of the view that in recent years the issue of disability has been transformed from a purely medical problem to a political one in Britain at least. Unfortunately they say that this politicisation of disability has not resulted in the development of a new understanding of the position of disabled people in society. It has seen the politics of disability reduced to consideration of pressure
group and party political activity. The authors believe that this is an inadequate basis for understanding either the historical significance or the current relevance of the disability movement. They believe it is only by understanding that the disability movement is centrally placed within the rise of the whole range of new social movements that its significance can be grasped.

5.4 STRUCTURAL CHANGES AND SOCIAL INNOVATIONS WHICH COULD BE HARNESSED BY PEOPLE WITH DISABILITIES

There are areas of structural changes and social innovation, described by a number of authors, which people with disabilities might consider harnessing to their advantage. This would again lend weight to the strategy, which cannot be too strongly emphasised, that it is much more effective to add to the impetus of general community movement than to attempt to take radical new initiatives which require a disproportionate resource and effort allocation.

Flynn and Nitsch (1980) divide a process of social innovation diffusion and adoption into 6 stages. The 6 stages are split into two categories. The first category is adoption in theory and this covers

conceptualisation

initial acceptance

legislative legitimation.
The second stage of adoption in practice covers such issues as

resource allocation and reallocation

widespread implementation

societal institutionalisation.

Tomlinson (1982) points out that in the structural – functionalist approach used in special education in western Europe, the USA and Australia, the process is epitomised by concern for order, balance and equilibrium in society. In this approach the dominant concern has been the “fitting in” of the handicapped people, both adults and children, into society. However functionalist approaches are based on the notion that consensus in society is a normal state of affairs and much of the literature and special education and vocational training omits notions of conflict. The belief that there is a “consensus” over integration in Britain is very strong in recently published work. Farber (1968), used organisation theory to develop the notion of disabled people as a “surplus population” whose level and amount of education was likely to be determined by the economic state of a particular society.

Kling and Scacchi (1982); Kling and Scacchi (1980); and Kling (1980) describe six theoretical perspectives used by analysts of computing. The four which they believe predominate are formal-rational, structural, interactionist and political.
They consider that the remaining two, human relations and class politics, only influence small segments of the literature and they do not consider them as helpful as the other four perspectives for relatively wide ranging analyses. Since their work concentrates on the organisational aspects of social analysis their view may well be correct - but the human relations aspect may well be more relevant as far as the area of disabled people are concerned.

the formal-rational perspective focuses on the formal goals of organisations

the structural approach has organisations and their sub units as entities pursuing multiple goals in uncertain environments

the interactionist and the force perspective political are usually analysis aimed at descriptive accuracy rather than normative description. In addition interactionist and political analysis do not assume the possibility of consensus on goals or effective arrangements among groups or individuals. Rather both perspectives view organisations as aggregations of differentiated groups with colloquial interests which are often in conflict.

In his vision of the Information society, Bell (1974) sees it embrace the growing role of organised theoretical research in industry, the increasing importance of information as a source of value, the shift of employment from agriculture industry or services to the information sector, the computerisation of society and diffusion of computer and communications technology.
It will make a valuable contribution to their strategies if the disability movement learns from other movements such as those concerned with peace and the environment. Klandermans and Oegema (1987) discuss the mobilisation of social movements with particular regard to the Dutch peace movement. They believe that to create effect a social movement must win attitudinal support. The formation and activation of recruitment networks must increase the probability that people who are potentially mobilisable become targets of mobilisation attempts. They advocate that at an individual level there are four steps in a participant becoming involved in a social movement

- becoming part of the mobilisation potential
- becoming a target of mobilisation attempts
- becoming motivated to participate
- overcoming barriers to participate.

The first two steps are necessary conditions for the arousal of motivation. Motivation and barriers interact to bring about participation: the more motivated people are, the higher the barriers they can overcome. They review the literature and establish that such mobilisation attempts as mass media and direct mail for social movements are rarely effective. In summarising a range of studies they establish that the most effective way of recruitment is friendship networks. The extension of a bulletin board would therefore have a considerable potential for mobilisation processes.
within the disability movement since it offers a medium not only for people to share information but to share friendships and provide mutual support. Oliver (1984) and Walsh and Warland (1983) both show that the biggest problem in the mobilisation process is the free rider problem; that is non participation by people who sympathise with the movement goals but do not participate.

Klandermans (1986) believes that a review of the social movement literature shows that movements like peace movement draw from new mobilisation potentials created by modernisation and industrialisation. This would mean that the use of information technology to mobilise activity in the area of disability would fit within that framework.

Studies which review the operation of self help groups or self health groups in the United States, identify the problem of collaborating with professionals. In these circumstances co-optation often takes place. Co-optation involves the taking over of the group by the professional. This undermines, of course, the self help essence of self help groups and destroys the complementarity of the partnership. While the professionals may operate from the best of intentions, this is a considerable danger for individuals with disabilities whose self esteem is already low and have considerable experience of operating under a medical model. (Silverman, 1980; Frowland, 1980; Gartner and Riessman, 1982; Marieskind, 1984; Mowrer, 1984).

Self help strategies, especially utilising computing technology, are another important area for consideration. Madara (1985) reports the development of the Clearing House as a computer based system
which encourages the expansion of self help groups or mutual aid support groups (MASH) as they are described. Madara and Meese (1986) refer to the extension of the Clearing House into the Compuserve national computer network which makes available contacts for those in the self help movement throughout the US and in some Canadian and European cities.

Despite the lack of participation by one particular year of students in this study, particularly strong bonds of interest and equality developed between three students and one disabled person, who had a common interest in a special aspect of computing. Disabled people, who frequently suffer resource constraints, should bear in mind that students, as a general rule, are on the look-out for innovative, low cost solutions. The development of effective networks with students would allow the disabled to tap the student resource - to the advantage of both parties. Knecht (1989) describes the efforts of students at the University of California, Berkeley, to introduce a low cost dormitory network for computing linked to the main computing systems on the site. He points out that a number of university campuses (eg Dartmouth, Stanford, Princeton, Brown and Caltech, among others) have student networks and major networks exist on large development sites such as MIT and Carnegie Mellon. However the emphasis of the Berkeley project is to keep the cost as much as possible within the bounds of possibility for the students' pocket. It also aims to give them a degree of control over the system and experience in applying their skills. In this type of environment, the needs of students for a low cost effective computing system are no different to those of disabled people. In developing any future
strategy this avenue of support for the needs of the disabled should be harnessed if at all possible.

5.5 SOCIAL CONTROL AND INTERACTION

Tjosvold (1986) discusses the dynamics of dependence within organisations, putting forward a number of models of interdependence. It is possible that the integration of people with disabilities might be more effective if the model involving their participation in communities was one of positive interdependence rather than integration. In such an approach they would acquire a role which is not only of value to the disabled individual but seen to be of value to the other members of the community - and thus much more likely to be effective. Whyte (1980) defines a social invention as "a new and apparently promising strategy, designed to solve some persistent and serious human problems. It may involve a new set of procedures for shaping human interactions and activities and the relations of humans to the natural and human environment".

In addressing some of the serious problems in telecommuting Gordon and Arsdale (1986) believe that work models examine the social context in which a computer based system is adopted, developed or used. They consider that an important advance in using web models as compared to the more conventional "discreet-entity" models is that web models do not make the assumption that an adequate infrastructure of support will always be available as needed. While this argument is based on support within organisations it is even
more critical in a social community based model of computing utilised by disabled people. Web models view computing developments as complex social objects constrained by their context, infrastructure and history. They argue that web models are most applicable to computer based services which couple many different groups in their operation and use.

Despite Meier (1982) pointing out that sociologists do not agree on any single conception of social control and Hollinger and Clark (1982) stating that traditional definitions of social control focus on compliance with norms, Kling and Iacono (1984a) analyse social control in the work place as an "institutional control" model. They (Kling and Iacono, 1984b) considered it an interesting finding that middle level staff within the organisation enjoyed their jobs more during the period that workplace disciplines were tightened. Such staff valued their job enlargement and broader knowledge of the organisational practices that accompanied the tighter discipline. In this case participants believed that the discipline increased the social control over selected behaviours which made the function more effective.

Hartman (1987); and Bikson and Gutek (1983) both draw the conclusion that if individuals work for an organisation with a positive orientation towards technological change then individual users are more likely to be satisfied with their use and experience in the area of computing.

While physical impairments set the parameters in which the definitions develop, the way in which people determine their
definitions depend upon a variety of factors including personal and community attitudes towards people who appear different. Definitions and labels are influenced strongly by the degree to which people have had the opportunity to interact at a personal level with people with disabling conditions.

5.6 SOCIAL COGNITION THEORY

It is possible that the establishment of a normal system such as a bulletin board which has a semi structured process, can form the basis of an environment for disabled people to improve their skills through what is in effect an application of social cognitive theory. Rosenthal and Zimmerman (1978) indicate that almost all learning phenomena resulting from direct experience can occur by observing people's behaviour and the consequences of it. Observational learning is governed by four component processes. Attentional processes determine what people selectively observe in the whole range of modelling influences and what information they extract from the modeled activities. It is obvious that people cannot be much influenced by observations if they do not remember them. A second major sub function governing observational learning involves cognitive representational processes. Retention involves an active process of transforming and restructuring information about events in the form of conception and rules. Retention is aided when individuals transform the information into coded memory and mentally rehearse the coded information. The third sub function is behavioural production processes, in which symbolic conceptions are
translated into appropriate courses of action. Carroll and Bandura (1987) state that individuals then modify their behaviour based on
the information in the comparison in order to achieve close
 correspondence. The fourth sub function in modelling is motivational
 processes. What they actually do is influenced by three major types
 of incentive motivators - direct, vicarious, and self-produced.
 Bandura points out that mastery modelling has been widely used
 with good results to develop intellectual social and behavioural
 competencies. The method producing the best results has three
 major elements

 the modelling of appropriate skills to convey the basic competencies

 guided skill mastery

 a transfer program aimed at providing self directed success.

This type of program would be ideal for improving the social competency of disabled people and at the same time integrating them with other groups in a shared community environment such as the operation of a bulletin board or conferencing system. Whilst much of the work of Bandura and his extensive range of colleagues, involves managers, supervisors and the commercial environment, the strategies which they have developed are likely to be extremely appropriate in the area of disability not only because they provide a formal guided model, and a role for disabled people, but they also create a model role for other groups of individuals who are interested in assisting disabled people to improve their own social skills.
Wood and Bandura (1989) state that "social cognitive theory provides explicit guidelines about how to equip people with the competencies, the self regulatory capabilities, and the resilient sense of efficacy that will enable them to enhance both their well being and their accomplishments" (p.380). They consider that the exercise of control impacts on one's view of one's personal efficacy to effect change by creative use of capability and enlistment of effort. If people have a low view of their self efficacy, then their ability to develop solutions to their problems is likely to be much lower. Unfortunately people with disabilities often fall into this low self efficacy category and are therefore likely to benefit from any strategies to aid improvement.

Bandura and Wood (1989) indicate that social environments vary in their potential controlability: the more the system constrains the individual, the stronger the perceived self efficacy needed to effect changes. Resiliency of self efficacy has considerable functional value because major accomplishments are rarely achieved through quick successes. Bandura and Cervone (1986); Loche and Latham (1984); Mento, Steel and Karren (1987) all demonstrate that goals are very good self motivators and that self set goals of those with a controlability orientation had individuals exceeding their attainments. Self set challenges can enhance accomplishments provided they are not completely beyond reach. The thrust of this section is to argue that people with disabilities do set their own challenges and do not allow them to be set or determined by others - no matter how well intentioned.
Kirakowski and Corbett (1988) used in their study the Computer User Satisfaction Inventory (CUSI) which provides an indication of an individual's feeling of satisfaction along the two dimensions of competence and effect. The two subscales of competence and effect work in accordance with what is hypothesized on the basis of the self efficacy theory of Bandura. The longitudinal profile of user adaption to a computer system which they studied, found an initial period of rapid development accompanied by an increase in satisfaction, which led to a plateau during which feelings of competence lagged behind those of effect. After the plateau stage users began to try experimenting with more advanced features of the interface. This scale might provide some additional valuable insights in the area of disability.

5.7 GROUP DECISION AND COMMUNICATION SUPPORT SYSTEMS

The emphasis, in this initial study to link research into the integration of people with disabilities and research into the social aspects of computing, has been on communication. A related and even more rapidly growing area has been group Decision Support Systems (GDSS). If disabled people are to give full effect to their strategies for integration then GDSS is an area for immediate consideration.

Pinsonneault and Kraemer (1989) have conducted an extensive assessment of the empirical research which has been done on the impact of technological support on groups. They define two broad
groups of technological support which are group decision support systems (GDSS) and group communication support systems (GCSS). Siegel et al. (1986) have shown that computer support fosters a democratic approach to the decision process with more equality of participation among members. They point out that although most of the literature concerns GDSS there is no consensus in the literature on what exactly constitutes a group decision support system and they therefore make the distinction that it is better to consider two separate categories, one which is communication support and the other which is decision support. They consider that group communication support systems are systems that primarily support the communication process between group members even though they might do other things as well. Their main purpose is to reduce communication barriers. Examples of GCSS are teleconferencing, electronic mail and local group networks. On the other hand decision support systems are those systems that attempt to structure the group decision process in some way.

Pinsonneault and Kraemer (1989) found that group communication support systems effected processes in four major ways

they increased the depth of analysis

they increased the total effort put in by group members

they increased the participation of group members and decreased the domination of the group by a few members
they also decreased the overall cooperation and consensus reaching.

In reviewing the major work undertaken in research projects, Pinsonneault and Kraemer found that group communication support systems decreased consensus and increased the time needed to reach a decision. However they considered that these findings might also be limited to the early stages of development. Studies which focused on an advanced stage of the development found no change. An important point to be borne in mind is that they found that most group communication support system studies were conducted with students at universities; whereas GDSS studies involved students and managers thus providing greater external validity to the findings.

Turoff (1989) sees computer mediated conferencing to have evolved in many cases into computer supported cooperative work systems (CSCWS). He believes that it is unfortunate that most group decision support systems, (GDSS) are designed as alternatives to support face to face meetings. He considers that GDSS will not succeed properly until they are designed to support asynchronous communications as well as synchronous communications. The argument for asynchronous communication is desirable for the general community but essential for the disabled community because it allows them a non threatening opportunity to marshal their thoughts without stress and to present their arguments at a pace which is comfortable in relation to their physical ability. Turoff presents an important argument for the strategy of this study, and for the extension by disabled people now proposed, when he says that "the proper investigation of these systems is truly an interdisciplinary
undertaking" (p. 112). He cites examples where informal groups have been able to have significant impacts using computer mediated communication. One example is where 40 technical people scattered around the world wrote a counter proposal report to an already stated policy and had that policy completely reversed. In another situation top management felt so threatened by the existing message system giving power to the workers in the organisation that they came close to removing it. Both these examples indicate the potential for giving power to minority groups such as disabled people.

Turoff concludes that it must be recognised that the design of a computer mediated communication system within a specific context is the design of a social system.

Rice (1987) indicates that computer based systems are providing a new environment for social structure and as a consequence diversity of social networks. He draws attention to the fact that many of the "markers" normally available to individuals or group members, on which they make judgements on status are missing in an electronic environment. In addition the ability of users to enter information into the system at any time tends to reduce the impact of differences in member's sociability. Thus, social differentiation is likely to decrease in computer based networks, resulting in greater equality of communication participation. As a consequence of this increased equality, decision making and consensus may take longer but the quality of the group's decision making may improve.

Rice concludes that individuals are free to search for contacts on computer based communication networks because they are less
constrained by physical, temporal and status components of most communication channels. This is of considerable advantage to disabled people who suffer severe restraints in these areas.

McGuire, Kiesler and Siegel (1987) have examined group decision making and an extension of prospect theory to a social context about the influence of group communications and group decision processors on group decisions. Some group decisions were reached during face to face discussion and an equal number were reached during real time computer mediated discussion. Group decisions during computer mediated discussions did not shift in the direction of prospect theory predictions while in the face to face discussions the group decisions did shift in the direction of prospect theory predictions. The researchers found that when groups met face to face they exchanged more arguments and they shifted toward prospect theory predictions more than when they met via computer mediated means. The authors believed that the difference in the results in the face to face discussion reflected the ability to sense how strongly others felt as when the group might be ready to reach consensus. They caution the extension of their results to a generalised theory due to the size of their groups.

Gallupe and McKeen (1990) believe that it is important to draw together two major streams. One stream is the area of computer messaging or computer mediated communication (CMC) to support geographically remote group members. The second stream is the attempt to investigate means for supporting the group's actual decision processes and this area has come to be known as group decision support systems (GDSS). Moves to bring these two issues
together would create a position of considerable potential benefit to people with disabilities who have needs both to communicate and to support one another in group decision making. Both of these needs lead on ultimately to computer negotiation which would greatly strengthen the negotiation power of people with communication difficulties. The two researchers found in their studies that dispersion of group members made no difference in terms of decision quality but significantly increased the time for groups to reach a decision. They found that decision quality was not impaired by group member dispersion and may even be aided by the use of group decision support systems. This would undoubtedly be true in the case of people with disabilities.

5.8 NEGOTIATION SUPPORT SYSTEMS AND SOCIAL MESSAGES

The emphasis on a sensible balance between developing an effective social system and yet one which allows the disabled user more power and equality in negotiation cannot be too strongly emphasised. The two issues must be blended together to give social comfort and practical utility.

Richardsen and Danielsen (1989) point out that the systems of today are based on the messages as passive objects. In these systems it is possible to perform operations on the messages but it is not possible for the message itself to initiate and manage operations. They refer to today's messages as "vanilla flavour" messages. They argue that
the message of the future will be an active message with the following characteristics

is a living object

has a restrictive self determination

is allowed to make its own decisions

is allowed to have children

has knowledge regarding its own family.

They describe the active message as a living object which is not simply a content in the envelope but the courier itself. They liken reading an active message to running a computer program where the performance may depend on the input of the user. In a similar way the active message depends on the answer from the receiver. The user of a system should be able to select either ordinary or active messages. They give as an example a situation where the generator of the conversation on the E-mail or conferencing system has bought 8 tickets for a concert. He wants to distribute information about the concert and announce for sale the tickets he has left. In this process the message in regard to the conference circuits a number of people who are informed, make decisions, have their decisions included in the message and ultimately the active message terminates and returns to the original sender indicating to him the people who are accompanying him to the concert. Once again a concept which was of value to the non disabled would be a boon to disabled people with
physical difficulties and impaired communication allied to difficulties in transport and travel. The next stage they developed is an intelligent message which is a message of higher rank to an active message, in addition the intelligent message is able to make associations on behalf of the receiver prior to involving the receiver in the process. Intelligent messages are objects which operate themselves. An intelligent message is able to

give a presentation of earlier communication

give basic information about the subject of communication

select interesting information during the internal communication

be the receiver's guide whilst making up their mind

list possible solutions and vote for the best.

The main difference between an active and an intelligent message is that an active message interrogates the receiver whereas an intelligent message interrogates the receiver's information base and archives prior to interrogating the receiver.

The authors stress that their discussion is more a description of future research direction than a description of implementation. When they have gathered more information on the general communication process which they have started, they hope to
achieve a suitable representation scheme. Such a technical solution would be invaluable to people with disabilities.

Frisse (1988) believes that electronic mail will aid the development of collaborative work allowing the development of hypertext programs and systems. This approach could be of considerable benefit in employment and social opportunities for people with communication, transportation type problems.

Jelassi and Foroughi (1989) describe negotiation support systems (NSS) as a special class of group decision support systems which emphasise computerised assistance for situations in which there is a strong disagreement on factual or value judgements among group members. Despite the concept having been developed for a commercial environment, the approach of negotiation support systems used in a computing environment could create opportunities for disabled people to enhance their negotiating abilities with service providers and others in authority. Raiffa (1982) takes the view that negotiation is an art based on "interpersonal skills, the ability to convince and be convinced, the ability to employ a basketful of bargaining ploys and the wisdom to know when and how to use them" (p.8).

Since most successful negotiators pick up their skills haphazardly and cannot explain the reasons for their success, there is little opportunity for disabled people with poor communication skills to acquire such skills in the ordinary course of their daily activities.
Kerslen and Szapiro (1986) see that negotiation skills and abilities are no longer a matter of personality and creativity but the negotiation process should be seen as having a rational and knowledge based explanation. The Mediator NSS developed by the authors helps each negotiator formulate their initial bargaining position, it then guarantees privacy of the constructed view by providing unique access rights. Experience in the use of such a model would not only assist disabled people in negotiating with bureaucrats and service providers via this medium, it would also enhance their skills in ordinary life negotiations. Mediator both protects the privacy of negotiators and helps them directly as well as through a third party in reaching a consensus.

5.9 DISABILITY ISSUES RE-VISITED

Booth (1981) in providing a critique of what he calls "the authorised version of events" observed that while central government made noises for 20 years concerning integration, the reality was that segregated provision for disabled students had grown dramatically and certainly up until 1981 there were an increasing number of segregated educational places.

Hahn (1985) says that "ironically the growing emergence of disability policy as a significant field of study has been promoted both by the prior neglect of this subject by many professions and by its relevance to most disciplines. An unusually wide range of academic fields could either make valuable contributions to the study
of disability or benefit significantly from such investigation. Hahn hopes that the expanding tendency of disabled citizens to join service providers as participants in the policy making process should have a crucial effect on disability policy. Relatively little attention has been devoted to the opinions and perceptions of disabled persons or their own assessment of problems they encounter in their every day lives.

Burbach (1981) believes that it is irrelevant to ask whether we should or should not label anomalous individuals. He is of the view that labelling and categorising people is a normal process of organising and apprehending our world. He concludes that it is more important for us to consider firstly how we label people and secondly with what consequences (p.376). Burbach continues with the opinion that disabled people have at the same time to deal with the negative aspects of their personal condition and also to cope with the negative aspects of being labelled and stigmatised. In trying to establish a coherent meaning for life and establish and maintain self esteem, the conflict between the two types of message being received often present insuperable problems. They are faced with a position on one hand where they can live an isolated existence built on socially invalidated meanings, or on the other, they can conform to conventional patterns of behaviour that society expects of them. Neither of these approaches allows the individual to arrive at a satisfactory resolution to the issue of how they define their own meanings. This is the crux of the quality of life issue for a disabled person. Quality of life represents the degree to which each individual has been able to meet their needs to create their own meanings so that they can establish and sustain a viable self in the social world. Burbach believes that the resolution to this problem draws upon the
basic principles of symbolic interactionism. That is there is a need for consensuality whereby humans help each other unfold and establish contact and unity in their social existence. The operation of a bulletin board with such diverse groups could be a contribution towards this symbolic interaction process.

Davis (1986) and Oliver (1983) draw attention to the fact that the essence of a social model of disability is that adjustment is a problem for society not for the disabled people as individuals. While Fry (1987) established that 27% of the British public polled, had a member of their family disabled and that 9% of the public over the age of 18 were themselves disabled. In aggregate this gave a total of 36% of voters who were interested in disability issues. However many disabled people did not appear on the electoral register and were denied access, in many cases, to the information necessary to make an informed choice. It was also difficult for disabled people to participate within the political party system due to the inaccessibility of local constituency offices.

Liggett (1988) in reviewing the American situation argues, however, that if disabled people are accepted as a minority group in the political environment, then they are also reinforcing the distinction between the disabled and the non disabled which presents a conflict with the argument or proposition that they should be an integral part of a normal society. "In order to participate in their own management, disabled people have to participate as disabled. Even among the politically active, the price of being heard is understanding that it is the disabled who are speaking" (Liggett, 1988 p.273).
Oliver and Zarb (1989) believe that the disability movement must develop a relationship with the state so that it can secure proper resources and play a role in changing social policy and professional practice. However it must remain independent of the state to ensure that the changes that take place do not ultimately reflect the establishment view and reproduce paternalistic and dependency creating services. Services should be based upon changing and dynamic conceptions of disability as articulated by disabled people themselves. The use of computing technology as in this study and its development from this very successful theoretical and practical base can facilitate the relationship proposed by Oliver and Zarb and the many other authorities who have been referenced in this thesis.

As a prelude to conclusion it is perhaps wise to sound a cautionary note. Every reasonable encouragement and support must be given to enable people with disabilities to become integrated members of the widest possible general community but it would be foolish to assume that it will be easy, without the need for significant effort and without the regard for the important imperative that all individuals have varying individual needs. This highlights the fact that people with disabilities do have different needs to other groups within the community - as well as many common needs. In particular they lack social confidence and to embark on such a social adventure with limited social confidence is a potentially daunting task. In this context it is useful to make a contrast with the valuable study undertaken by Siegal (1988) which addressed the issues of communication and telecommunication technology use by managers. Part of the reluctance by a significant number of managers to use
telecommunication means stemmed from their reluctance to forego some of the functions of paralinguistic social feedback such as (p.8)

regulating social interaction: people determine who will speak when and for how long on the basis of visual cues

attention: message recipients usually indicate to others whether the are attending with eye gaze and head nods

responsiveness: to track affective reactions of other parties

comprehension: physical gestures to improve the clarity of messages

social control: means exercising influence over the opinions or actions of others."

The reasons which are negatives to managers in the use of telecommunication are, in almost all cases, positives to disabled people. Managers, again perhaps with the best of motives and intentions, behave like parents, teachers and professional caregivers. As a consequence people with disabilities would view these issues quite differently

"regulating social interaction" - independent asynchronous communication allows the disabled consumer to avoid regulation
"attention" - computing as a medium allows disabled consumers freedom to make their own decision about whether they wish to pay attention, to what and when

"responsiveness" - for most of their lives people with disabilities are tracked for a conditioned, desired response; which they can escape in an asynchronous medium where immediate physical presence is not a pre-requisite

"comprehension" - for people whose disability is cerebral palsy the issue of physical gestures normally expected in support of social interaction presents an even more acute problem. Not only have they little ability to make the conventional gestures but stress frequently induces spasm and as a consequence the physical gestures which they make disrupt, inhibit and confuse the communication process

"social control" - people with disabilities have a much greater opportunity to avoid social control by others if they are not physically present at a synchronous interaction.
6. **IN CONCLUSION**

The prime objective of this study was to test the efficacy of a model which used the rapidly developing interest in the social and interpersonal aspects of computing as a means to accelerate the social integration of people with disabilities.

While the short term benefits were inconclusive the benefits over a longer period of two years were demonstrably significant. Even more importantly the gains have been ongoing, resulting in greatly improved quality of life for the people with disabilities who participated. Just as valuable have been the positive changes for their disabled peers and in a number of community facilities, public utilities and Government departments.

The study sought to develop an improved model and the groundwork for this has certainly been laid. However the literature review and the study itself highlighted the issue that people with disabilities, like other normal members of the community, wish to make their own choices and have the satisfaction of their self created achievements. Choice, is perhaps, too easily taken for granted by those to whom it is readily available. For this reason the ultimate approach has been not to define an enhanced model, but to offer some further information which disabled users may (or may not) wish to take into consideration in developing their future strategies.
As a basis for further development it is valid to conclude with a skeletal model which draws into focus the elements which could be included and which are derived from the work done in this study.

The consumer with disabilities requires a model which

- is asynchronous
- integrates transparently with normal community developments
- captures innovative change from as wide a range of sources as possible
- is both simple and inexpensive to use
- creates as wide a range of opportunities as possible eg employment, education, emergency support as well as social interaction
- harnesses existing movements within society rather than originating completely new and unique issues
- addresses the inclusion of the positive elements identified in the grounded theory analysis which were Courier Mail (ie the provision of news from the local daily paper), Encouragement, Equality, External, Games, Leisure and Macros
excludes or minimises the negative elements in the grounded theory review which were Browse, Passive and Work Related

ensures that consumers have an equal say in the direction and management of the activity

establishes new national and international supportive linkages not only to other disability groups but to other groups involved in the movement for constructive social change

provides adequate training, especially for naive users

provides adequate technical support which meets the particular needs involved

emphasises the use of low cost, generally available techniques with simple inexpensive modification potential rather than expensive "disability only specials."

While such a model is desirable for people with disabilities it will also become economically essential for the community at large, since it represents an opportunity for significant ongoing savings in the social support of the rapidly growing numbers and needs of both the aged and the disabled.

Another aim of the study was to provide a vehicle for the blending of two significant, but, as yet, barely related streams of research
Normalisation Theory and the Integration of People with Disabilities

Sociological Aspects of Computing

Again the success of the study, coupled with a review of current developments, reinforces the view that continuing this blending can provide rich research opportunities with ultimate social and economical benefits. There are obviously areas of considerable value such as the development of negotiation support systems which would be a boon to many people with disabilities who have problems with communication, live independently or lack social confidence. Equally there are areas where work must be undertaken if the disadvantages are to be avoided. An example is the Japanese experience where telework extends institutional power to the home and ultimately reduces the independence and choice of the individual. People with disabilities will not want physical independence replaced by social control.

The future can present an interesting and rewarding challenge for the community, service providers, researchers, computing students and most importantly people with disabilities, especially if their efforts are integrated.
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APPENDIX 1

INFORMATION FOR POTENTIAL PARTICIPANTS

SOCIAL INTEGRATION BY PEOPLE WITH DISABILITIES USING A COMPUTER REMOTE BULLETIN BOARD SYSTEM

Introduction

The purpose of this project is to examine how and whether a computer based Remote Bulletin Board System (RBBS) can be used by people with disabilities to facilitate their social integration.

Normal social integration involves people in the community having a wide range of contacts. Naturally each person spends more of their time with individuals with whom they have a common interest. Most people take their ability to move about, communicate and form temporary or permanent friendships very much for granted. People with disabilities are no different in desiring the same type of social interaction within the general community. They would wish to make contacts and friendships based on shared interests rather than shared disabilities.

Despite significant changes much still needs to be done before these integration hopes become a practical reality. The reasons are many and complex. In some cases they involve problems of money, transport, physical access or technological difficulties. Other difficulties are less tangible, but often more daunting, such as community attitudes towards disabled people, lack of community knowledge about disabled people and problems experienced by disabled people themselves. Such problems could include poor speech or communication skills, poor social skills, inadequate knowledge or educational competence and general apprehension.

Over the last decade people with disabilities have been able to make increasing use of computer based technology. Much of the technology is almost an accidental outcome of developments for Defence or commercial use. As the cost has progressively come down the technology has become accessible to the general community.
Two separate, but related areas of development and investigation could have an impact on the social integration of people with disabilities.

Firstly, there is the use of computers to access and share information locally, nationally and internationally. This includes private networks, public networks, access to VIATEL, electronic mail, bulletin boards and access to the huge and varied range of data bases which are now available. An important and related extension of computer based communication is the ability for people to confer and be employed from their office, their home or even their hotel room.

Secondly, and in some respects related to the first, is the growing need to examine the social consequences and effects of computing and computers, ranging from the impacts on society at large to the effects on individuals. Whilst some of the changes are obvious and readily identified some of the changes, like the introduction of new drugs, have important side effects which need to be carefully examined and clearly understood. Some of these are beneficial and should be optimized, those which are potentially harmful at least require to be identified and understood.

Bulletin boards have existed for some time. The question might be asked why should people with disabilities not just use the ones which exist? The reason is that, like anyone else, they require assistance in undertaking new and strange activities. In addition, there is a wide range of special problems such as physical inability to cope with equipment and lack of communication skills.

While the establishment of a bulletin board for disabled people would be a step forward, improving communication in this way, if only between the disabled themselves, might service to reinforce their isolation from the community at large.

The initial establishment of this particular bulletin board aims to draw together, in a sharing of social interaction, knowledge, expertise and experience, three separate groups who have their own background of interest in this new technology – yet are quite different segments of the general population.

Since these groups are so different this general explanation aims to cover issues which may seem simple and readily understood to one group and yet quite new to one of the other groups.

After the trial experimental period the aim would be to have the bulletin board freely available to any individual, disabled or non-
disabled, who wished to make constructive use of it. However during the trial period the use would be restricted to ten representatives of each group, making a total of 30 people in all.

The Three Groups Involved

Group A would consist of 10 individuals whose disability is Cerebral Palsy. All would have access to, or own, a micro computer where they resided. In addition they would attend, on a part-time or full-time basis, a Queensland Spastic Welfare League Day facility where there was micro computer access to the bulletin board. In view of their past computing experience the concept of the bulletin board should not be difficult to grasp, but each individual may have certain specific accessing problems.

These would require to be identified and resolved either prior to or during the project.

Group B would consist of 10 people who were qualified as Occupational or Speech Therapists. By definition they would have a knowledge of the problems of disability although not all would necessarily have worked with adults whose disability was cerebral palsy. This group of 10 would be further sub-divided in that half would be employees of the Queensland Spastic Welfare League and half would be employed or practise elsewhere.

Group C would consist of 10 students from the School Administration at Griffith University undertaking computing subjects as a major element of their course.

The groups represented are thus those who are disabled, those who have a professional experience of disability and those who have a professional experience of the computing/communications technology involved. The composite group has a further overall even division between those who are involved directly with the Queensland Spastic Welfare League and its programmes and those who are not.

What is Cerebral Palsy?

A precise definition of cerebral palsy is difficult but a reasonable one is "a none progressive disturbance of motor function which results from an insult to the developing brain". While it would be possible to give more detail, the acquisition of additional information about cerebral palsy is a function that might usefully be left to be shared or communicated through the operation of the bulletin board itself!
What is a Remote Bulletin Board System (RBBS)?

Here is a summarised answer, Attachment 1 contains a more detailed description of Remote Bulletin Board System (RBBS) operation and configuration.

Using a microcomputer, a telephone line and a small amount of additional hardware and software, an individual at home or work can access a whole range of computer communication activities. The hub of the Bulletin Board System is a central computer, not necessarily a large one - although a reasonable amount of disk space is desirable, on which an individual can leave messages for other people to read. In concept it is something like a blackboard on which messages can be written on or ready by anybody who passes by. The advantage of this system is that you physically do not have to pass by and of course for disabled people that you physically do not have to be a good writer. Not only does distance become irrelevant but time also, since bulletin boards can be left on-line 24 hours a day, seven days a week so that individuals can access them at any time that is convenient to their work and leisure patterns. Bulletin Boards can operate on a local basis, a national basis or a worldwide basis; they might also be described as the cousin of sophisticated electronic mail systems.

Since bulletin boards are usually run by enthusiasts with particular or special interests, the charge for accessing is often either very nominal or no charge at all. To the user therefore, once allowed access, the cost is that of any additional equipment and software required plus the telephone charges. Obviously it is cheaper to access a bulletin board where the telephone charge is a local call. However apart from cost there is really no barrier to accessing bulletin boards in overseas countries.

Equipment Required by Participants

More extensive detail is given in Attachment 1 entitled "Remote Bulletin Board Operation".

Each individual participant will need to own or have easy and frequent access to a micro of any make, with a serial outlet either standard or added, a telephone line, a modem and suitable communications software.
For the period of the project the League will lend any participant who requires one, a modem and cable with a 25 pin D connector at each end. In most cases it will be an inexpensive, robust, standard 300 Baud modem. Where the person has difficulties due to disability a more sophisticated auto dial, auto answer, variable speed modem will be provided free of charge for the period of the trial project. This modem will be satisfactory with most makes of micro but individual users will need to check their particular equipment.

Where the remote terminal is an Apple IIe, the League will provide a disk containing a communications programme called "TALK BACK". This programme, or series of programmes, contains PRODOS, an Editor and various utilities on one disk allowing an individual with a single disk drive to undertake a wide range of activities e.g. communicating, transferring and editing files, printing, and recording an entire session without the need to change disk.

Where the remote terminal/micro is an IBM PC or compatible the League will provide a disk containing PC TALK, which has similar utilities as "Talk Back", together with documentation covering all aspects of use. A participant with another type of micro such as Commodore would have little difficulty and probably no cost in obtaining a public domain communication program from a user group, fellow user or other source.

This communications hardware and software will, of course, allow participants to access other systems and communicate directly, with each other as well as accessing the League's Bulletin Board.

Information Sought from the Project

Although it is hoped that the bulletin board will become a permanent feature accessible by all, during the initial stages it will be run as a project with the three groups of ten individuals involved. The purpose of this initial stage is to collect a wide range of data which would be useful in further social and practical developments. Apart from the social integration objective as the main thrust, there will be a series of practical problems which need to be identified and resolved. These can only be sensibly addressed by keeping the numbers small, identifying the problems, looking for new ideas and exploiting the opportunities which come up. Examples of this would be:

Participants would be able to experiment with different types of modem and gain experience before making their own
purchase. Even if they did not wish to continue accessing this bulletin board it is inevitable that most people who are home computer users will wish to purchase their own modem for computer communications within a relatively short period.

Acquisition of information in regard to the various costs of operation. If the project can be demonstrated to be successful and accurate data is acquired, it might be possible to approach Telecom with a view to obtaining preferential rates for disabled users.

While the collection of data involves additional effort it is nonetheless essential if continued support is to be sought for projects of this nature.

Fortunately the bulletin board software that has been selected will retain a considerable amount of the information in the system log automatically, e.g. who has dialled the bulletin board and at what time. However a range of other useful information is necessary and this is set out in more detail later.

Timescale

The project is seen to have three stages; development, operation, review.

The development stage is considered to be the remainder of 1986. During this stage the following activities will take place:

- the establishment of the system and the resolution of any hardware or software problems,
- the introduction of an additional Telecom line into League centres at Redcliffe, Rocklea and Sevenoaks,
- discussion and training of possible participants; to allow us the opportunity to resolve any practical problems each individual may have in the way of modem access, software use etc.

The operational stage which would operate for a three month period at the beginning of the Griffith 1987 first semester, probably over the months of March, April and May.

The review stage which would take place immediately the operational stage had been completed.
Operational Rules

The aim would be to keep the operational rules as simple as possible. Whilst these would be refined and developed prior to operation, it should be stressed that the operation is to encourage use and therefore openness and minimal control are seen to be important.

1 Each participant would be expected to log on to the bulletin board at least four times a week. They would be welcome to log on more frequently but this is a matter of individual choice. Equally what they did is a matter for each individual to determine. Some might simply wish to read the information which was there; some might wish to copy information which was there; some might wish to add information either for an individual or for a group of individuals or for all other users.

2 Each individual would have a password which allowed them access to the board. Whether they wished to declare their identity is a matter of individual choice. All information on the Board would be freely available to anyone else who had the opportunity to log on. For the period of the exercise it would be desirable that individuals did not make their password available to anyone.

3 The system will automatically log contacts which are made with it. However individuals would be asked to keep a separate simple log in which they recorded:

- problems which they had in using their hardware and software,
- other uses which they had made of the equipment,
- other details or experiences which they wished to record.

This "log" should, where possible, be a computer file which is added to during each week. Apple users using the "Talk Back" software can do this quite easily using the editor supplied and simply transfer the file to the bulletin board addressed to the system operator (SYSOP), or print out and return as hard copy.

For those who are using the Talk Balk or PC Talk programmes there is also another alternative for complete and simple log collection. If they wish they can be provided with an extra couple of disks with the communications programmes on them. Provided you remember to save each logged on connection of any type, to either the League
Bulletin Board or any other system, as a separate incoming file then this disk can form a log itself. If you note the 'blocks available' as the disk fills you can replace it, when full, with one of the spare copies. All you need to do is send the full disk to the SYSOP, who will copy the relevant files which have recorded your activities, delete them and return the disk to you for re use. This will avoid any need for keeping a separate log either as a file or on paper.

Two points must be stressed:

- you will need to 'save' each session you are connected as a newly named incoming file so that the previous file is not over written,

- you will need to copy to a disk of your own, any files you wish to keep before you send the disk to the SYSOP for recording.

Additional space disks can be supplied to users of any other make of end user equipment if their communications software will also allow them to collect data for recording in a manner similar to TALK BACK and PC TALK.

Finally, it should be stressed that your mistakes and your problems are probably more valuable than your successes. This form of 'log keeping' will identify your problems and record your mistakes. No information regarding an individual will be ultimately recorded by name - so your mistakes will be known to you and not to others. However in developing the systems further the difficulties experienced during this trial stage can be addressed and eliminated for the benefit of all future users.

Participants should not be afraid to ask for help. The purpose of this project is to share experiences and share help, all with the aim of individual support and integration.

Material Place on the Bulletin Board

During the trial period material would be placed on the Bulletin Board in two ways.

Firstly, individuals who had access using their own password could place any material they wished either for individual people or other groups of participants. No initial limitations are placed on topic or file size. However it should be borne in mind that very large files consume considerable disk space; if these are really for a single
individual it is much more practical to leave a message on the Bulletin Board which arranges a future time for person-to-person linkage and transmitting the file directly.

Secondly, the System Manager would introduce material of interest to all, smaller groups, or single individuals on a regular and frequent basis. This could include information ranging from general world and local news - to information from Therapy Associations, Griffith University and the Office of Disability - to messages/mail for specific individuals.

Information displayed would be read by all, copied by all but not changed or deleted by other than the SYSOP. This strengthens the value of editing a file properly off line before placing it on the Board.

To avoid obsolete or redundant material being left on the Board it will be periodically purged by the SYSOP.

Avenues for Future Exploration

As earlier indicated at the end of the operational stage it would be hoped, finance and problems permitting, to make the bulletin board and computer based communications more readily available to a much wider range of individuals, disabled and non-disabled. The opportunities for future use are very extensive and hopefully more will emerge as an outcome of the operational stage, some possible examples are:

1. The maintenance of social groups by electronic means especially where lack of transport, lack of resources, poor hand function, inadequate speech and other disabilities occur.

2. Increased opportunities for work, study and recreation for disabled people. The concepts of Flexiplace and Telework have, over the last five or six years, become increasingly accepted as avenues for the ordinary work force; once such social change is generally accepted the opportunities can then be taken to exploit these as avenues for disabled people. Cottage or home based industries have been discussed for a long time.

However it is only when they are part of the total community structure that the community will readily accept their use by disabled people. These opportunities are now a reality.

3. It would be hoped to experiment with a number of other related issues. It will be possible for two individuals to make an
appointment on the bulletin board for direct private communication at a specific time. At that time they can conduct, through a modem and a Telecom line, screen to screen interactive communication or the transfer of files between their two microcomputers. In this context, "homework" becomes a practical reality; equally the transfer of files by students studying at tertiary facilities, which have computers, can just as readily return their assignments by electronic means. It would be hoped that experimentation on these issues could take place as part of the overall project.

4 Disabled people are very disadvantaged in their ability to maintain individual friendships. Hopefully the disadvantages of distance, transport, poor speech and difficulties in communication can be overcome using a bulletin board or direct micro computer access.

5 All these changes of course will not be accomplished easily nor without specific problems. An important part of the project will be to identify not simply equipment needs which are different from individual to individual but whether differing support mechanisms are necessary for such groups as:

- disabled people in their own home,
- disabled people at home with their own family,
- disabled people in residential.

These and other interesting issues offer considerable scope not only for more effective social integration but a more challenging future for disabled people using micro computer based communications.
REMOTE BULLETIN BOARD OPERATION

Since the majority of the Queensland Spastic Welfare League micro computers are Apple IIe's, this explanation is based on operating a Remote Bulletin Board System (RBBS) where the "Bulletin Board" is an Apple IIe and the micro computers which are accessing it are also Apple IIe's. However it should be stressed that this is simply for ease of explanation, the fact that the central computer running the bulletin board is an Apple in no way inhibits other micro computer makes from accessing it. Indeed other micro computers which have a serial port built in as a standard part of their equipment, will find it less expensive, and probably easier, to access the system provided they have suitable software. There is plenty of suitable software available for most makes, readily and cheaply available through individual user groups.

Perhaps it might be easier to say a little about computer communications and how the Apple will communicate with another computer before discussing the bulletin board itself.

In addition to the basic Apple IIe the following is required for computer communications:

. a Super Serial Card. This is an additional card which goes in the slot inside an Apple beside the card which normally runs to the printer.
. a cable which connects the card to a modem
. an external telephone line
. suitable software

What is a Modulator/Demodulator (Modem)?

To allow two computers to communicate with one another across a telephone line, it is necessary for the signal to be changed while it is transmitted across the telephone line and then change back again to allow it to communicate with the computer at the other end. There are many and varied types of modem, however since one of our objectives in this project is to keep things inexpensive and to keep
them simple the modems which are being used are an inexpensive as is practicable possible.

Two types of modem will be used. The first version, a CICADA 300, is a very inexpensive but sound and robust modem which will only operate at a speed of 300 bauds. This will be quite satisfactory for all able bodied users and hopefully for some of those whose physical disability is minimal. However a key purpose of this project is to facilitate the participation of those who have physical problems. For this reason, a number of more sophisticated and costly modems will be available which will facilitate communication by minimising the problems of operation for those who have identified difficulties.

Software

The software can be divided into two parts. The first which does not really concern the remote user (unless it gives problems) is the software which runs the bulletin board itself. The second is the software which each individual user has which allows their remote micro computer to access the bulletin board.

Perhaps it might be helpful to say a little about the bulletin board software itself before discussing that for the remote station.

As with most computer developments there is a wide range of different types of bulletin board software available. The League was concerned with ease of use rather than sophistication. For this reason well tried software produced by Russ Systems of California for the Apple IIe, running under PRODOS, was selected. While apparently simple this is very well designed, user helpful and operates with a series of menus which allow paging through it with a number of single key stroke commands.

As earlier indicated the central bulletin board is rather like a large blackboard which can be dialled up and on which individuals can place messages; in computer terms this involves uploading and downloading files in a manner similar to copying files to and from a micro computer's own disk. Bulletin boards have been used for a wide variety of activities and the extent and use have grown very rapidly.

Operating systems allow bulletin boards to be run in a number of ways, normally a password is necessary for an individual to gain access either to the bulletin board or particular sections. Bulletin boards can also be partitioned as either a security or a time saving
device so that individuals with particular interests do not need to read more material than they want to on each occasion of accessing.

An important part of this project will be that there will be no partitioning of the board during the initial three month period. Since the purpose of the operation is to stimulate integration any subdivision would really be counter-productive to the overall objectives. It should therefore be remembered that any information which you place on the bulletin board can be read by anybody else who has access to the board.

However one point that you should bear in mind is that the equipment which you will be using will not only allow you access to the bulletin board but can also access to a wide range of other systems. You will be able to dial other computers which have a dial up facility; you will also be able to communicate directly (not through the bulletin board) with other people participating in the project. The bulletin board can therefore be a useful vehicle which will link individuals together by leaving messages about contact times and availability, subsequently allowing individuals who wish to make particular contact to do so directly.

Let us now turn to the end-user software. Each participant using an Apple IIe can be supplied with a disk entitled "Talk-Back" which contains a complete and very extensive, easily used range of software. This disk contains so many extras that once it is inserted in a single disk drive by the end-user no other software is necessary. The disk contains PRODOS so the basic operating system will be automatically loaded. Once again it operates on a menu basis with a whole series of single key stroke commands which are very simple to use and minimise the amount of physical activity necessary.

Apart from managing all the communication activities in a simple fashion the disk will automatically record everything that has passed across your screen during the period of communication. It will also allow you to suspend communication, while remaining connected if you wish to make changes or access other parts of your own system. It contains it sown editor which allows you to formulate messages, prior to transmission, or reformulate and edit files you have read before final storage and printing. These capabilities are very important because it allows connect time to be kept to a minimum yet maintains all the information in a form which allows casual "off-line" browsing and amendment. A demonstration will make things much clearer but this software is extremely easy to learn and operate.
Similarly each participant using a IBM PC or compatible can be supplied with a disk containing "PC TALK" and the relevant utilities, together with documentation covering all aspects of use.

Any participant who already has a modem and software for accessing external facilities such as VIATEL is unlikely to need any additional equipment to be supplied. Where the end-user only has a micro a modem will be supplied for the period of this project but individuals will need to acquire the software necessary to operate their particular systems if it is other than an Apple IIE, IBM PC or compatible. As earlier indicated such software for an end-user is fairly readily available e.g. the Commodore Users Group would supply it free to a member of their group.

INFORMATION TO BE COLLECTED

The general aim of this project is to look at how this type of operation can facilitate the social integration of disabled people. Examination of this will be addressed in a number of ways.

It should be stressed at this stage that any information collected will not identify any individual by name. The aim is to look at whether disabled people, therapists and students effectively submerge their group identities, whether they have similar problems and whether they make similar uses of the bulletin board.

Attitude

Different people and different groups have different attitudes towards disabled people, this includes the attitudes of disabled people themselves. Since the operation of the bulletin board does not identify specific individuals, or their disability, unless they wish to identify themselves, then it is an environment without many of the normal cues which exist in social contact. This should allow equality of use and operation by all participants. It is postulated that all those who participate will gain experience, competence and confidence. In this environment the experience should improve the attitude of disabled people towards themselves and the attitudes of others towards disabled people. To validate this hypothesis it is planned to test all those who participate with a simple test of attitude prior to the commencement of operation and after the three month trial period has been completed. In addition to the three groups of ten participants, it would also be planned to test three similar groups of none-participants to see whether their attitudes had changed over the same period without participation in the
will not be identified by individual but collectively by group, e.g. therapists, students. At the same time a non participant group will be tested for comparative purposes. There will probably be two post tests, one immediately on completion and one 6-8 weeks later.

The period until the end of February 1987 will allow potential participants to receive equipment, any necessary training and resolve identified problems.
project. Social integration will obviously be facilitated if participants ultimately have more positive attitudes than those who did not participate.

**Interaction**

Analysis of the logs which are kept will identify interactions between groups, within groups, between individuals and between individuals across groups. This will also allow some form of integration measure. Naturally it would be desirable if there was a considerable level of across group interaction.

**Use Analysis**

Use Analysis would look at whether there were different times and different types of use by individuals within groups or across groups. Attempts would be made to identify what caused such developments and, more positively, can any be subsequently developed to increased social integration.

**Operation Analysis**

It would be very important to identify general and specific problems which occurred in operation such as:

- general hardware defects,
- general software defects,
- specific problems for disabled users; including what type of action had been taken to resolve these problems in the course of the project. For this reason elements of the project should be seen as an action research activity rather than awaiting solution until completion of the operational phase.

At the end of the project the views of individual participants would be sought by questionnaire and individual discussion on specific issues.

**Period of Information Collection**

The period of information collection will be a 10 or 12 week period commencing 16 March 1987. In the two weeks prior to that, which are the first two weeks of the Griffith semester, the final administrative arrangements will be made and participants will receive a very simple test on attitude towards disability. The results
RBBS UPDATE (Distributed to Participants - 9 March 1987)

Introduction

In the process of acquiring competence some new users have identified problems to be resolved.

In addition some more information is provided on the field study due to commence shortly.

Detailed Instruction

A more detailed instruction sheet has been developed for some activities where participants have had difficulties. These, and any others developed in future, will be made available to all participants.

Time Limit

Most participants have limited their calls to the RBBS to around ten minutes. To allow for increased access for all users, a time limit of 15 minutes has been imposed. This should prevent frustration for many users who have found difficulty in logging on.

File Names

During the study, all information needs to be recorded and each session saved separately. A protocol for filenames has been developed. When saving the session the filename should be as follows:

The first two letters of the day, followed by a stop, followed by the number of the session for that day, i.e.

MO.1 - for the first session on Monday
SA.3 - for the third session on Saturday

Collection of Information

Floppy disks will be provided and collected on a weekly basis. To make sure there is no confusion, the disks used in each week will be a different colour. Colour will change at midnight each Monday and arrangements will be made for the new colour to be available a day or two prior. Different arrangements will apply for collections from the different groups and locations.
1 Griffith students should return all the disks used up to the previous Monday midnight to the School of Administration office on Tuesday. They can collect additional disks for the current week whenever necessary and an initial disk for the following week towards the weekend.

2 Clients should return and change disks in a similar name and time span through their particular ATC Supervisor.

3 League staff therapists can collect and return disks either through our ATC or to the DP area at New Farm. Non League therapists will have individual arrangements made with them by Mike O'Leary.

Name Change

In a further effort to prevent confusion, some of the names appearing on menu's have been changed.

News Information

Regular news articles will now be placed in the News section of the RBBS.

General Information

Items of interest will be placed in the information area and notices will appear after logging on to let users know of any new additions.

Names

A brief description is available for each participant's name. This is available by choosing (E) expanded list. Requests for changes to this description should be directed to the SYSOP.

Copying Information

Files which are of interest to the user should be read after disconnecting from the RBBS by using the EDIT function of the Menu.
APPENDIX 2

THE FOLLOWING PAGE IS

"MATRIX OF INDIVIDUAL PERSON INTERACTION LINKAGES"

(the data are so dense that the "EXCEL" document will not convert to a single page "WORD" document)
| PERSON | TOTAL | GROUP | SEX | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|--------|-------|-------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01     | 104   | DISABLED | M   | X  | 7  | 4  | 6  | 6  | 5  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 02     | 82    | DISABLED | M   | X  | 2  | 2  | 3  | 1  | 1  | 7  | 4  | 9  | 3  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 03     | 58    | DISABLED | M   | 3  | 2  | 3  | 2  | 2  | 7  | 3  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 04     | 34    | DISABLED | M   | 4  | 2  | 3  | 1  | 1  | 1  | 3  | 2  | 9  | 5  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 05     | 46    | DISABLED | M   | 5  | 3  | 1  | 4  | 1  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 06     | 46    | DISABLED | M   | 3  | 1  | 2  | 2  | 2  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 07     | 39    | DISABLED | M   | 2  | 5  | 3  | 9  | 5  | 4  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 08     | 25    | DISABLED | M   | 1  | 1  | 3  | 1  | 1  | 7  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 09     | 54    | DISABLED | M   | 1  | 1  | 7  | 1  | 0  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 10     | 63    | DISABLED | M   | 2  | 2  | 1  | 1  | 1  | 1  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 11     | 50    | THERAPIST | F   | 2  | 3  | 7  | 1  | X  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 12     | 17    | THERAPIST | F   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 13     | 30    | THERAPIST | F   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 14     | 28    | THERAPIST | F   | 4  | 1  | 1  | 2  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 15     | 59    | THERAPIST | F   | 3  | 4  | 1  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 16     | 46    | THERAPIST | F   | 1  | 4  | 5  |    |    | 2  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 17     | 15    | THERAPIST | F   | 2  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 18     | 27    | THERAPIST | F   | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 19     | 19    | THERAPIST | F   | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 20     | 47    | THERAPIST | F   | 1  | 5  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 21     | 40    | STUDENT   | F   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 22     | 50    | STUDENT   | M   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 23     | 42    | STUDENT   | M   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 24     | 2     | STUDENT   | M   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 25     | 3     | STUDENT   | M   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 26     | 1     | STUDENT   | M   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 27     | 7     | STUDENT   | M   |    |    |    |    |    |
| 28     | 1     | STUDENT   | M   |    |    |    |    |
| 29     | 29    | STUDENT   | M   |    |    |    |
| 30     | 20    | STUDENT   | M   |    |    |    |

**APPENDIX 2**

**MATRIX OF INDIVIDUAL PERSON INTERACTION LINKAGES**

- **PERSON**
- **TOTAL**
- **GROUP**
- **SEX**
- **01**
- **02**
- **03**
- **04**
- **05**
- **06**
- **07**
- **08**
- **09**
- **10**
- **11**
- **12**
- **13**
- **14**
- **15**
- **16**
- **17**
- **18**
- **19**
- **20**
- **21**
- **22**
- **23**
- **24**
- **25**
- **26**
- **27**
- **28**
- **29**
- **30**
APPENDIX 3

RAW SCORES FOR ATTITUDES OF PEOPLE WITH DISABILITIES ANALYSED IN SECTION 3.5.3

<table>
<thead>
<tr>
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<tr>
<td>Disabled Participants</td>
<td></td>
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<tr>
<td>126</td>
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<td>96</td>
<td>114</td>
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<td>118</td>
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<td></td>
</tr>
<tr>
<td>1115</td>
<td>1318</td>
<td></td>
</tr>
</tbody>
</table>

| Disabled Non Participants | 117 | 115 |
|                          | 117 | 103 |
|                          | 118 | 125 |
|                          | 66  | 68  |
|                          | 118 | 124 |
|                          | 89  | 86  |
|                          | 129 | 135 |
|                          | 109 | 110 |
|                          | 116 | 113 |
|                          | 115 | 105 |
|                          | 1094| 1084|
Thank you for agreeing to have this discussion with me. I have asked you to be involved with this because of your use of the Bulletin Board.

The aim of this discussion is to determine what the outcomes of your use of the Bulletin Board have been.

After I meet with you and the other people who have agreed to discuss their thoughts and feelings on the Bulletin Board, I will be putting the information gained from each person into a number of reports called case studies. These reports will not identify you or any other person by name.

Do you have any questions before we start?

You can stop the discussion at any time to ask me a question, or if you need a break.

I would like to begin by asking you to think about all the ways you have used the Computer Bulletin Board. If I spent a typical day with you, what would I see you using the Bulletin Board for?

What other ways have you used the Bulletin Board?

Are there other things you would like to use the Bulletin Board for? What is stopping you from doing that?

Now, I'd like to ask you to think about the Bulletin Board's strengths and weaknesses, then to suggest possible improvements and changes. First then, what do you consider are the strengths of the Bulletin Board?

Okay, what about weaknesses?

What changes would you recommend to improve your use of the Bulletin Board?
I would like to find out if you think you have gained any new skills or knowledge from using the Bulletin Board? Some people say that they know more about computers and what they can do. Other people might say that they have learned more about talking to people they don't know well and others might say that they have not learned anything new.

Firstly, what skills, then, do you think you have now that you didn't have before using the Bulletin Board?

Prompts: Work skills
Social/Interpersonal skills
Computer skills
Recreation skills

What do you know now about computers that you didn't know before using the Bulletin Board?

How has your involvement with the Bulletin Board changed your attitudes towards computers?

Have you got your own computer and modem and communications software? Do you think your experience on the Bulletin Board influenced your decision to buy your own equipment?

If you haven't got your own equipment, would you like to? What is stopping you from buying?

Sometimes the things we do change our feelings about ourselves and others and also the way other people feel about us. I'd like to ask you now about whether you think your feelings about yourself have changed and how and whether you think others see changes in you. Also whether you feel different about others because of your experiences on the Bulletin Board.

To start with then, how has your use of the Bulletin Board affected your feelings about yourself?

Do you think other people have seen any changes in you since you have been using the Bulletin Board? What do you think they see as changes?

- friends who use the Bulletin Board
- friends who don't use the Bulletin Board
- family
- staff who use the Bulletin Board
other staff

Have there been any changes in the way these other people relate to you?

Now, what about the way you feel about other people?

- your friends you communicate with on the Bulletin Board
- your friends who don't use the Bulletin Board
- your family
- staff who use the Bulletin Board
- other staff

Have you made friends with people you didn't know or didn't know very well through using the Bulletin Board?

Now, I'd like to ask you what you would like to see happen with the League's use of the Bulletin Board in the future? Are there other ways the League could be using the Bulletin Board?

I would like to thank you for this discussion. I really appreciate your willingness to express your thoughts and feelings about the Bulletin Board.
APPENDIX 5

THE FOLLOWING PAGE IS PHOTOCOPY OF

"CENTRE NEWS" Vol. 13, No. 3, p10 (sept 1989)

published by

THE QUEENSLAND SPASTIC WELFARE LEAGUE
P.O. BOX 386
FORTITUDE VALLEY,
QUEENSLAND 4006
ANOTHER OPTION
Please see print copy for image
APPENDIX 6

THE FOLLOWING PAGE IS PHOTOCOPY OF

"CENTRE NEWS" Vol. 13, No. 3, p12 (sept 1989)

published by

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P.O. BOX 386
FORTITUDE VALLEY,
QUEENSLAND 4006
APPENDIX 7

THE FOLLOWING PAGE IS PHOTOCOPY OF

APPLICATION BY THE MUNICIPAL LIBRARY,
REDCLIFFE CITY COUNCIL,
QUEENSLAND.

This resulted in an "ACCESS AUSTRALIA" Award providing employment for people with disabilities as system operator and tutor in a program adjunct to the City Municipal Library.
BICENTENNIAL ACCESS AUSTRALIA AWARDS FOR LOCAL GOVERNMENT

APPLICATION FORM

Please see print copy for image