The EIAT project: gender and technology in the Irish context

by

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy, is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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22nd of November 2002

For the Breretons, the Hurleys and the Brereton Hurleys!

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Abstract

This thesis examines the gender/technology relation in the context of the Ennis Information Age Town (EIAT) project and the Information Age in Ireland. We examine the ways that technology impacts on contemporary culture, moulding existing cultural practices and creating new ones. We also examine the reciprocal impact which culture has on technology, influencing its creation and development. In practice, we consider the ontology of technology (what it is), the pragmatics of technology (what it does) and the phenomenology of technology (how it affects our experiences).

We consider the gender/technology relation in Irish society in the context of recent developments in information and communication technologies (ICTs) which offer the possibility of fast communication, universal access to information and a virtual communication environment with unforeseen effects on families, communities and institutions.

We examine these developments in the context of the introduction of ICTs in Ennis, Co. Clare as part of the EIAT project. This five-year project involved the delivery of both the relevant technology and training to enable the people of Ennis to engage with the Information Society. We consider the diversity of responses of the women of Ennis to the project and some of the barriers to their engagement with ICTs. We hypothesise that the informal social networks maintained by many women are an important means of overcoming barriers to women's engagement with ICTs. We compare these women's engagement with ICTs within the context of the project with other Irish women who are engaging with ICTs outside the context of the project.

We also examine the education/technology relation in Ireland in the context of the EIAT project. We consider the use of ICTs in the classroom and the behaviours and attitudes of primary school children towards these technologies. Once again, we make comparisons between the use of ICTs in schools within the EIAT project and outside the project.

The epistemological basis of this research programme is informed by a diversity of disciplines. As a study of gender, it draws upon research in the area of feminist and gender studies, sociology and communication studies. As a study of gender practices in the context of ICT developments, it draws upon technology studies and computer-mediated communication (CMC) studies. We also present data collected over a period of four years, in Ennis and elsewhere. We conclude with a number of recommendations which we believe will enable more Irish women to engage meaningfully with ICTs.

Chapter 1

Introduction

1.1 Background

'It is now a cliché to state that we are living in a time of enormous change. This does not however detract from the truth of the statement. Across the developed world profound changes are occurring in diverse areas ranging from communication, through the nature of work and employment and the structure of organisations, to family life ... Diverse forces are driving these changes with technology, particularly Information Technology, as a key force' (CRITE, 2000: 7).

Ireland, since the 1990s, has been undergoing a profound social change, as a result of developments in new information and communications technologies (ICTs). These ICTs are having an influence on all sectors of society. In particular, they are changing the ways we communicate and this has implications for all aspects of human life: the ways we work, relate to other people and interact as families. The uptake of these technologies is accelerating. They are impacting in ways that could not be predicted even a few years ago. The *Information Society Commission* (ISC) Report (2000) states that 62% of Irish people now use mobile phones (an increase of 39% on 1996), 44% of Irish people now use PCs (an increase of 24% on 1996) and 35% of Irish people now use the Internet (an increase of 30% on 1996).

However, this report acknowledges that so far this uptake is not evenly spread across society, with so-called 'early adopters' being typically 'young, urban, employed, professional, high-income and of high educational attainment', while so-called 'late adopters' are typically 'older, rural (living outside Leinster or in deprived urban areas), outside the workforce (housewives), non-professional (farmers, manual workers), of lower income and of lower educational attainment' (Information Society Ireland, 2000: 16). Quite obviously then, factors such as gender, age and class have a strong influence on engagement with the Information Age. Indeed, there is a danger that the advent of ICTs in Ireland is leading to the creation of a 'digital divide', a new type of class division between those who are unable to access, use and draw the benefits of these new technologies (the 'information

poor') and those who are gaining financially and socially by being able to 'hop on board' the new revolution (the 'information rich'). This research programme focuses particularly on the impact of this technology on the lives of Irish women. We seek to understand some of the multitude of opinions and feelings which Irish women hold in relation to the Information Age in general and ICTs in particular.[1]

Ennis in Co. Clare is Ireland's Information Age Town (see Appendix A). Having successfully won a competition organised by *eircom*, the leading Irish telecommunications company, Ennis received both financial and technical assistance from *eircom* to become a leader in information technology (IT) within Ireland. This project is known as the 'Ennis Information Age Town (EIAT) project'. Ennis now has a technological infrastructure which allows all the people of the town to become technologically proficient, capable of reaping the benefits of the Information Age. Is this in fact the case? We examine the operation of the EIAT project in terms of those who are involved and those who are not. More specifically, we examine the involvement of some of the women of Ennis and reflect on their engagement with the project in general and ICTs in particular. We question whether the EIAT project operates within the existing gender divisions, whether it bypasses gender inequalities or even creates new ones. Taking the EIAT project into account, we examine how developments in digital technologies effect changes (whether positive or negative) within society. We suggest that putting in place policies which encourage and facilitate 'learning with technology, not learning about technology' may ensure that the possible positive effects of ICTs are available to all sectors of society in ways which have meaning in their lives (CRITE, 2000: 8).

Our hypothesis is that while technological advances offer possibilities for blurring gender boundaries, many existing inequalities and barriers remain potent means of excluding women from engagement with new electronic technologies. In particular, we feel that women outside the formal work environment are most particularly excluded from engagement with ICTs. We suggest that existing gender stereotypes act as a powerful demarcation within society and lead many women to perceive technology usage as outside their understanding, knowledge or skills. However, we also suggest that if women are encouraged to breach these barriers, great possibilities exist for benefits to ensue. Whether personal to the women involved in technology or general to the society in which these women live, these benefits are numerous. We also hypothesise that the informal network of social relations and connections which play an important role in the day-to-day lives of women have a crucial role to play in empowering women to overcome existing social and gender barriers so as to undertake technology training and engage with the Information Age. Our suggestion is that women who are not currently engaging with

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[1] Leung and Wei's (1999) study of mobile phone users in Hong Kong confirms the growing gap between the communication rich and poor, with mobile phone users more likely to possess a range of alternative and complementary forms of telecommunication (pagers, answering machines, etc.) while non-users may only have access to one reasonable alternative.

technology should be informed of the benefits of future engagement and encouraged or persuaded to see technology usage as a useful and interesting element of their lives.

1.2 Description of the Research

There are a number of widely held assumptions about the nature of the Information Society. Popular declarations that technologies replace existing social relations and functions contrast with the growing evidence that technologies become most meaningful and lasting in people's lives when they augment existing practice. Much of the 'cyber-hype' which has surrounded developments in digital technologies is now giving way to more realistic assessments of the place of these new technologies in twenty-first century living. This research examines new digital technologies in light of their impacts on society, and attempts to distinguish between the hype and the reality of life in the Information Age. We consider the social, economic and cultural impacts of ICTs and explore a range of issues. These include:

- The ways that ICTs affect daily life and social structures such as the family, work, business, and education;

- The ways that the up-take of the opportunities afforded by ICTs is affected by many factors such as gender, class, age, etc.;

- The need for changes in the ways that technology training is designed, publicised and delivered. Overall, we feel that technology training must evolve from focusing purely on economic goals to taking account of personal, social, and cultural goals;

- How ICTs (a global phenomenon) affect regional identity and community spirit and are re-read and re-interpreted in a local setting;

- The changes occurring in the relationship between humans and computers as evinced by new and evolving forms of computer-mediated communication (CMC) and the greater availability of Internet access.

1.3 EIAT : A Case Study

We believe that in order for the up-take of technology to be evenly distributed across all sectors of society, it is critical that planning and research go hand in hand. The social aspects of advanced technologies must be understood so that people in varied social settings can best utilise them. One of the great difficulties for social researchers and commentators is to find a means of tracking these effects in such a rapidly changing

environment. The social and cultural changes which the Information Age is bringing to Ireland are both magnified and accelerated in Ennis. Therefore, our examination of the EIAT project provides an opportunity to study in microcosm Irish society's relationship with these new technologies and the effects (if any) on gender divisions and boundaries which these technologies create. By examining the experience of women in Ennis, we have uncovered some useful insights into the ways that new electronic technologies affect social and cultural relations in general and their effect on gender relations in particular.

1.4 Methodology

We examine how the EIAT project was developed and how it evolved in the five-year period from 1997 to 2002. We investigate whether the new technology has become meaningful in people's lives in ways they value. In particular, we investigate the uptake of technology by women within the community and examine the factors affecting their involvement in the project. We use this research to understand the changes which the advent of the Information Age is bringing within Irish society. The epistemological basis of this research programme is informed by a diversity of disciplines. Underpinning all aspects of the research is an examination of current thinking on the relationship between technology and society. As a study of people and their communication practices, the work also draws upon research in the areas of sociology, communication studies, feminist and gender studies. As a study of how this communication takes place in a technologically-enabled environment, it draws upon technology studies and computer-mediated communication (CMC) studies. Finally, we position this research in the context of current research in the area of social networks. We evaluate the researcher's personal system of social networks and the various influences of this network upon the focus and progress of the research programme. We use this evaluation to understand the importance of social networks in women's engagement with technology and uptake of technology training.

The majority of the primary fieldwork took place in Ennis, Co. Clare, between 1999 and 2002, while the EIAT project was in progress. Throughout these four years, we conducted a pilot survey, preliminary interviews, questionnaire, focus group sessions and in-depth individual interviews in order to evaluate whether the EIAT project was making significant differences in the engagement of women in Ennis with technology, within their own lives, within their local community, and within the wider society. The focus groups and interviews which form the main focus of the primary research were carried out with a number of women who had taken part in a European Computer Driver's Licence (ECDL) training programme, provided free of charge through the EIAT project. These women were mainly working within the home or combining childcare responsibilities with paid work commitments. As such, this was the first course of technology training that most of these women had undertaken. We then compared the experiences of these women with

those of women in Galway and Sligo, two towns also on the western seaboard where the progress of the Information Age is occurring in a less managed fashion. This fieldwork was conducted in 2002 so that comparisons could be made between the differing experiences of the women following the conclusion of the EIAT project.

A second, supporting branch of fieldwork was carried out to examine technology within the sphere of education. We suggest that the many changes being effected in the Information Age may best be viewed in the education sector where many of the negative ideas about the Information Age are being set aside in favour of positive involvement with ICTs. We also suggest that these developments may be an effective means of involving many women in the Information Age. As children become more technologically enabled and bring positive experiences with ICTs into the home, many women who might have viewed technology as extraneous to their lives may now undertake technology training as an aid to parenting. The technology-in-education fieldwork took the form of classroom observations and interviews with school pupils, teachers and principals. This formed part of the preliminary fieldwork in Ennis in 2000 and was carried out in full in Ennis and Sligo in 2002. Once again, this allowed us to compare our findings in Ennis (where all schools have received major financial and technical support for IT development, through the EIAT project) with our findings in Sligo, where much less funding and support is available.

We combine the findings of this primary research with data drawn from a variety of secondary sources so as to draw conclusions regarding the gender-technology relation within the changing society of Ireland in the early twenty-first century and to make recommendations regarding the involvement of women in technology training and the use of ICTs.

1.5 The Value of the Research

In Ennis, a focused effort was made to encourage the uptake of ICTs in the local community. The provision of electronic services throughout the community of Ennis impacted on the school system, town government, businesses, the town library etc. The project pro-actively tackled some of the barriers to the uptake of technology, by providing financial support and special training programs aimed at some of the marginalised sections of society. We focus on the effectiveness of these efforts in relation to the women of Ennis and examine the impact of ICTs on Irish society as a whole. The challenge of evaluating the EIAT project warrants the attention of academics, policy-makers, community groups and government bodies. The EIAT project tested a range of important hypotheses about individual development, family process and community dynamics. We believe that these findings have implications for our understanding of human behaviour within the context

of technological developments and the social aspects of computerisation. We also believe that they suggest important directions for further research as well as for broad policy directions. The opportunities of digital information and communications technologies are strongly connected to issues of access; that is, technological access (physical availability of suitable equipment, including computers of adequate speed, equipped with appropriate software for a given activity) and social access (a mix of professional knowledge, economic resources and technical skills to use the technologies in ways that enhance professional practices and social life). Social access should not be viewed as an add-on to technological structure. It is important that policymakers understand the ways in which social factors influence the adoption, uses and usability of advanced information technologies. Future research should contribute to our understanding of the ways in which both technological and social access to today's ICTs is affecting women, both those within the formal work environment and those outside the workplace. In order to gain this understanding, significant research must be undertaken which investigates the underlying social judgements that women make regarding the use of ICTs at home, in public facilities and at work. In this stage of digital communications and information technologies use in Ireland, it is critical that planning and research go hand in hand. Therefore the social aspects of advanced technologies must be understood so that existing gender inequalities and divisions do not continue to act as barriers to women's engagement with the Information Age.

1.6 Thesis Outline

The remainder of the thesis is structured as follows:

- Chapter two reviews research which examines the relationship between technology and society, focusing particularly on ICTs and CMC;

- Chapter three investigates the position of women in the technology and society relationship and reviews feminist and gender studies in this regard. It also examines the workings of social networks and the part which these networks play in women's engagement with ICTs;

- Chapter four outlines the methodology of the thesis and details the interconnections within the researcher's informal social networks so as to evaluate the ways that these networks influence the progress of the research programme;

- Chapter five presents the findings of the primary research in the area of women and technology and examines some secondary research related to the EIAT project;

- Chapter six presents the findings of the primary research in the area of education and technology;

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- Chapter seven draws conclusions and makes recommendations.

Chapter 2

Technology and Society

This chapter examines the relationship between technology and society. It considers some popular and academic understandings of the relationship between society and technology, both generally and in relation to ICTs. It locates these considerations within the framework of the Information Age and concludes with an examination of recent work in the area of cyberspace and CMC.

2.1   Background

'We are a culture inextricably bound up with our electronic technology' (Gibson and Oviedo, 2000: 2).

'Technologies are inherently ambiguous; they can be interpreted in different and possibly conflicting ways, are not always understood, and continue to be adapted and redesigned' (Gattiker, 2001: 5).

We are living in an era of rapid technological advance. However, since the early 1990s, the sector which has grown most rapidly has been the IT sector. IT developments are affecting all aspects of society, from the way we are educated, to the way we work, to how we socialise with each other. The popular response to such far-reaching societal changes is multi-faceted. On the one hand, fears of such technological development are commonly expressed.[1] On the other hand, ICTs are viewed as a great equaliser, one where social, economic and geographic differences are negated or at least made invisible.

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[1] Waters (1999) protests against the pressure to become more 'email-available';

'we live in an era of technological fetish, technological obsession, technological fascism in which we are pummelled with the notion that it is necessary to be instantaneously available to everyone at all times and that to wish otherwise is evidence of backwardness'.

In similar vein, Kelleher (2002) describes the fears of electronic voting, introduced for the first time in Ireland in 2002: 'Internet voting ... like Internet commerce ... is open to manipulation and fraud, but a dubious election is far more difficult to put right than a dubious online purchase'.

As a means of understanding the complexity of the technology-society relation, we will firstly attempt a definition of technology and then examine some popular and academic responses to technology in general and ICTs in particular.

2.2 Definitions of Technology

In order to set the framework of this discussion, it is firstly necessary to ask the question: 'what is technology?' When asked this question, most people are likely to think of scientific and engineering innovations such as machines, electronic consumer goods and so on. Broadly speaking, we define technology as the use of scientific knowledge to control physical objects and forces. This includes the application of practical or mechanical sciences to industry or commerce and the use of scientific discoveries for the production of goods and services that change the human environment. It also includes the development of new materials, machinery and processes that improve production and solve technical problems.

However, following MacKenzie and Wajcman (1985), our definition of technology also includes other less obvious meanings of the term, encompassing physical objects (e.g. computers and fridges), human activities (e.g. making computers and cars) and human knowledge, (the ways that people use technology and how they view it within their lives).

It is important to understand the relationship of a society with its technology. People create technology in order to alter their lifestyle or their surroundings and technology shapes the ways that society operates. This plurality of function and effect is well-captured in this definition which sees technology as:

> ' 'within' human life (medical technology, processed/GM foods), 'beside' human life (telephones), 'outside' human life (satellites), inhabited by humans (air-conditioning), inhabiting humans (pacemakers), as an appendage or prosthetic (eye-glasses), making us appendages (in assembly lines)' (Aronowitz et al., 1996: 10).

Or put more simply, technology is:

> 'an embodiment of human ideas' (Levinson, 1997: 60).

McOmber (1999) provides a taxonomy of the three main academic strands which define technology in relation to society. The three broad categories which he identifies are: technology-as-instrumentality, technology-as-industrialisation and technology-as-novelty. The first (technology-as-instrumentality) 'has considerable play in popular rhetoric' and

defines technology as a tool, something of use within society (1999: 118). Approaches to technology within this vein e.g. Mesthene (1969) reduce the complexity of the relationship between technology and social change to a simple, one-way process where technology is a cause but not a consequence of social change.

The second view (technology-as-industrialisation) sees technology as 'a product of a specific time and place ... as much an event as a set of practices or objects (1999: 148). This approach has a strong first world bias and assumes that the process of industrialisation will follow the same stages and effect the same societal changes in all cultures. Citing Pippin (1995) and Heidegger (1977) as examples, McOmber believes that more than any other concept of technology, this approach has 'set the terms for academic debate about technology'.

The third view (technology-as-novelty) views technology as whatever is 'the newest or latest instrumental products of human imagination'. This development is seen as 'a narrative of continuous discontinuity' where new technologies constantly replace old ones and where this in turn is seen to effect massive changes in society. Technologies 'become synecdoches for entire cultures or subcultures' whereby an epoque becomes labelled according to the 'highest' technologies available in that time e.g. the 'Bronze Age' or the 'Television Age' (1999: 148). This last definition occurs most frequently in relation to the changes in IT where the Internet is proclaimed revolutionary.

McOmber's final decision is that there is no single definition of technology which can cover all possible meanings of that term; 'technology is a repository of overlapping, inconsistent meanings ... some are laden with cultural values; others are relatively neutral'. To this end, he recommends that technology is best viewed as a diverse set of practices and values; 'an outcome of human choices, regardless of whether choices are intentionally made'. He advocates an approach which takes technology-as-instrumentality, technology-as-industrialisation and technology-as-novelty into account but which also adopts a 'definition of technology-as-cultural-practice which stresses the way in which all technologies arise in the interest of solving problems for some person or group' (1999: 149-150).

Green (2001) goes further in her description of the process by which technologies are developed, seeing this development as:

> 'a result of specific choices made by influential power brokers representing a limited range of social elites. These can be summed up as the A, B and C of social power: A = armed forces, B = bureaucracy, C = corporate power' (Green, 2001: 9).

Our understanding of technology follows McOmber (1999) (above) and also takes from Woolgar (1996) who believes that the ideal understanding of technology is one which views

technology as a 'text'. This approach allows one to consider both the social dimensions of technology and the problems of the user:

> 'when construed as a text, technology is to be understood as a manufactured entity, designed and produced within a particular social and organizational context' (Woolgar, 1996: 92).

2.3 Technology and Society in Popular Discourse

In the western world, a number of assumptions about technology and ICTs exist in popular discourse. While cultural variations exist and class, age, race and gender are all influencing factors, a number of recurring motifs can be identified. These include (see Figure 2.1):

- Technology as cultural symbol;

- Technology as controlling mechanism/invasion of privacy;

- Technology versus nature;

- Technology as social progress;

- Technology as social driver;

- Technology as solution;

- Technology as malignant influence.

2.3.1 Technology as Cultural Symbol

Within popular culture, all technologies are imbued with symbolic significance. The greatest symbols of modernity, power and wealth in the twentieth century were examples of technology (the car, the radio, the television, computers). On a global scale, the Internet has become imbued with all of these attributes:

> 'The Internet remains a wonderful mystery to most. It is both a cornucopia and a maze; it has everything you wanted and didn't want to know about a chosen subject; it is a treasure and a trial' (Breen, 1995: 1).

Such symbolic significance renders technology a potent element of cultural identity. Our research shows that whether seen as a positive or a negative influence in society, for many people, both adults and children, technology and technological enablement have a powerful resonance in modern society.
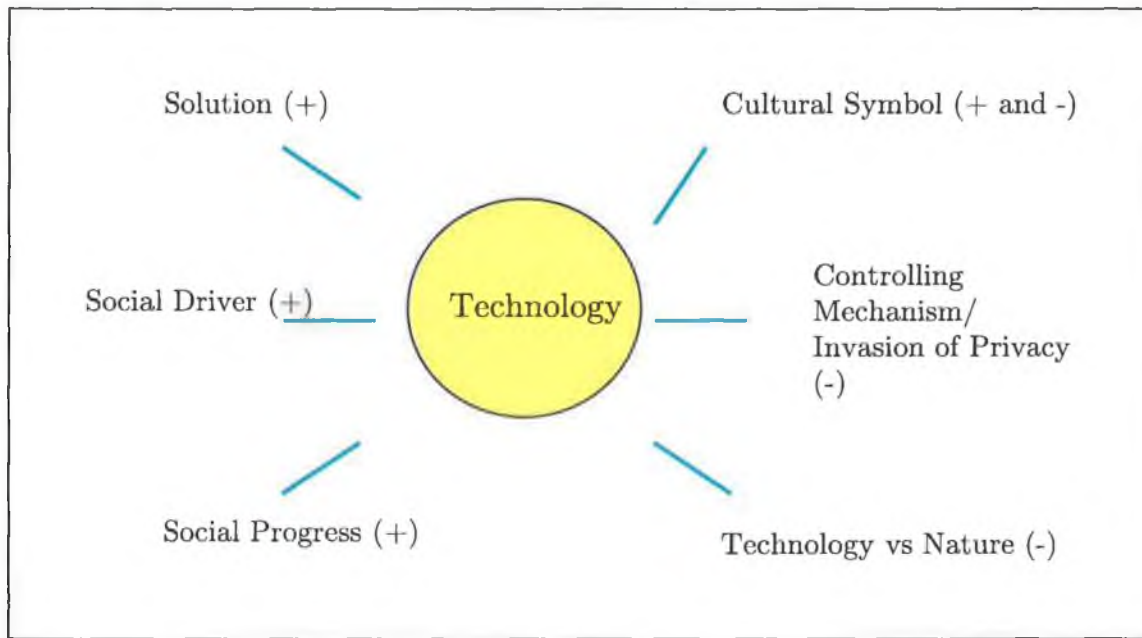
Figure 2.1: Popular Assumptions about Technology.

2.3.2   Technology as Controlling Mechanism/Invasion of Privacy

The 'watching' capacity of many modern technologies is a common feature of discussions of their significance in society. The widespread use of closed circuit television (CCTV) in the western world means that we are now subject to enormous levels of surveillance in our daily lives. With the growth in the numbers using the Internet in the first world has come the increase in worries about being watched.[2] On a practical level, fears of credit card fraud are a powerful deterrent to online shopping while worries regarding online pornography and paedophile activity prompt many schools and parents to limit children's access to the Internet. In chapters five and six, we see that these worries are of real concern to those interviewed in Ennis and elsewhere.

2.3.3   Technology versus Nature

The polarisation of technology and the natural world is a deep-seated belief in the modern world. This dialectical relationship has been and remains central to the Judaic-Christian religious tradition. The emergence of the Green movement in politics is testament to the

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[2]Some businesses now employ Internet monitoring software to trace all websites downloaded by staff (The Irish Times, 2000) while a recent article refers to worries regarding digital surveillance in the terms of warfare: 'we are all warriors in the information war ... we became so unintentionally the day we allowed information about ourselves and our children to be stored in electronic format on the ubiquitous 'database' - an unmitigated Doomsday Book, an organised, flexible, inter-connected depository for the entire contents of the world' (Power, 2000a).

worries of many regarding the exploitation of the natural world in favour of technolog-
ical 'progress'. These worries extend from practical fears regarding pollution caused by
industry and intensive agriculture to more esoteric fears regarding the loss of respect for
the natural world resulting in the loss of spiritual awareness.[3] The polarised relationship
of technology and nature is discussed further in chapter three.

2.3.4 Technology as Social Progress

The belief that science has been and remains responsible for social progress and improve-
ments in the quality of life has now expanded to include technology and technological
developments in ICTs. Both science and technology are often praised as beneficent im-
provers of our health, our wealth and our well-being. Developments in ICTs are also
frequently referred to as positive examples of social progress. McLuhan (1964)'s notion
of the 'global village' whereby worldwide society is an interconnected web of social inter-
action (irrespective of established societal divisions such as age, race, class or gender) has
been popularly adopted as a useful metaphorical description of the Internet. Moreover,
such a 'global village' is often seen as a means of overcoming existing divisions in the 'real
world'. In chapters five and six, we see that many of those interviewed describe the EIAT
project as a positive influence on the town because they believe that it has succeeded in
overcoming the perceived disadvantage of the geographical remoteness of Ennis.

2.3.5 Technology as Social Driver

Quite often, it is assumed that technology affects society while the possibility of any
reciprocal relationship is ignored. To accept technology as an inescapable element of
modern society or to reject its influence in total: these are often seen as the only choices.
If the relationship between technology and society is considered in such narrow terms,
ordinary people can feel excluded from engaging with technological developments. A
different approach might see the relationship between technology and society in terms of
a 'cycle of influence' i.e. new ICTs are created within society and become integrated into
society, giving rise to further technological innovation.

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[3]The release in November 2001 of the first of three film adaptations of *The Lord of the Rings* (Tolkien,
1954) trilogy has prompted popular discussions of the dialectical relationship of technology and nature
and demonstrates the extent to which the popular imagination is held by this polarised relationship. In
this film, the hobbits' pastoral, agrarian lifestyle is under threat of destruction from the evil power of
the One Ring (described by Tolkien as a symbol of 'the machine'). Evil resides in this manufactured
artifact which enslaves whole races. Sauron, the evil Lord of the title, could be considered to be an evil
personification of an industrialist who aims to enslave all to his will and to poison and pollute all of the
natural world.

2.3.6 Technology as Solution

Many popular opinion leaders such as Dyson (1997) and Negroponte (1995) expound on the technological aspects of the digital revolution while ignoring the societal implications. This approach leads to the commonly-held belief that appropriate technologies will appear when needed. This view, the 'technological-fix' approach, places all responsibility for developing technology outside the influence of the user. The passivity of the user is further increased by the targeting of the user as consumer.

2.3.7 Technology as Malignant Influence

Technology is commonly invested with malignant properties and influence. It is thought to pollute or infect the innocence of the young or effect harmful changes in society.[4]

Dean (1999) describes these fears as:

> 'tech-anxiety ... a remnant of containment culture. Instead of infection by communist ideas, the fear has now become more dispersed, a fear of any alien ideas as well as fear of the technology through which the ideas are transmitted. And, as in the Cold War, this paranoia contributes to a demand for regulating, for containing sexuality and otherness in the name of security' (Dean, 1999: 1070).

These fears are intensified in relation to ICTs. A recent survey of public opinion states:

> 'techno-fear featured strongly in the survey, with more than half the respondents agreeing that we are in danger of entering a robot state where everything is automated and 81% disagreeing with the principle of embedding chips into humans' (Lyons, 2000: 10).

Another example of such 'techno-fears' relates to Internet viruses which are seen as highly unpredictable and dangerous as they are created and disseminated in a wilfully immoral way with no regard to the damage they may inflict. The proliferation of online pornography is also seen as an inherent danger in the online environment as is the possibility of sexual harassment or violation of those engaging in chat room discussion groups. This unpredictability also feeds the notion of the Internet as the new frontier, the untamed

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[4]This viewpoint is dramatically expressed by (Waters, 2002b: 6):'In seeking increasingly efficient ways of absolving ourselves from pain, drudgery and inconvenience, we lose sight of the fact that life, in its essence, consists in the overcoming of difficulties. By hiving off essential functions to technology, we abolish life and vitiate our own right to be alive.'

border, full of unnamed dangers and in need of radical new regulations and state control, whether in the form of government regulation or filtering software. Such dangers come to represent the complex, ever-changing online environment and detract from the many positive characteristics of the Internet.

2.4 Technology and Society in Academic Discourse

In order to fully appreciate the many resonances of any medium, it is necessary to examine the:

> 'change of scale or pace or pattern that it introduces into human affairs' (McLuhan, 1964: 24).

In other words, the meeting of technology and society creates change and it is this change which we must examine.

Bolter (1984) bases his discussion of technology on this polarisation. He terms 'defining technologies' those technologies which may not be the most commonly used (or even those considered to be the most powerful) but which are an essential element in people's relationship with nature:

> 'A defining technology develops links, metaphorical or otherwise, with a culture's science, philosophy, or literature; it is always available to serve as a metaphor, example, model or symbol. ...Technology does not call forth major cultural changes by itself, but it does bring ideas into a new focus by explaining or exemplifying them in new ways to larger audiences' (1984: 11).

Academic discourse on technology and society follows two main strands. The first main strand views technology as external to societal structures, so that information is seen as a product i.e. an economic commodity. Researchers working within this framework assume technology to be outside the influence of society, to be completely culturally autonomous (Mesthene, 1969). The second main strand views technology as operating within societal structures, so that information is seen as a measure of social change. Those who examine technology within a societal framework see technology as a cultural construct in terms of both development and use (Bush, 1981; Vickery, 1990; Feenberg, 1991, 1995). Rule (1999) examines this social change, what he terms a 'drastic rearrangement' of the social 'balance of tension' effected by the 'new computerized media'. He rejects what he refers to as the 'silver bullet' model whereby technology can dramatically change existing social systems by short-circuiting established hierarchies. Rather, he suggests a 'land rush' model. New resources created by technology become the subject of a 'scramble for advantage' among competing players attempting to grab and exploit them (Rule, 1999: 662,663).

2.5 Determinism and Non-Determinism

McLuhan's (1964) examination of the media and its influence on society has had a profound influence on approaches to technology and society. However, the model employed by McLuhan in the 1960s failed to take account of the interaction between ideology and everyday life.[5] The biased approach of this influential thinker may be detected in the polarised approaches of both pro- and anti-technology researchers in their examination of technology.

Firstly, there is the dystopian belief that all technology is inherently evil and alien to human culture. This view sees the end-user as passive, manipulated by centralised content providers. Burstein and Kline (1995) and Slouka (1995) argue that at best technology is an assault on civilisation, damaging to the culture it 'dominates' and at worst completely out of control. Kroker and Weinstein (1994) refers to 'cyber-authoritarianism', a variation of the Orwellian idea of Big Brother watching and controlling us and the state unduly interfering in our lives. They describe those who have taken technology into their lives and who promote its use as a 'virtual class . . . populated by would-be astronauts who never got the chance to go to the moon' (1994: 214). Another 'techno-pessimist', Sussman (1997), argues that technological advances occur in specific ways which suit those who are paying for these developments.

At the opposite end of the deterministic spectrum is the utopian belief that technology will save, liberate or transform human culture. This utopian view is often referred to as the 'Net enthusiast argument'. It may be characterised by the writings of Rheingold (Rheingold, 1993, 1994) who envisages the Net as a means of recreating and reviving such public spaces as the Greek Agora, the New England town hall and the Parisian cafe culture. Within such a public sphere, private individuals can come together as a public community and rationally deliberate on an equal footing on issues of common concern. According to Rheingold, this 'free deliberative interaction' creates a politically motivated community who are instrumental in guiding the state's use of power. Thus the existence of an electronic public space is believed to increase democratic participation within society.

The deterministic approach has two main drawbacks. Both the utopian and dystopian views make the assumption that technological developments bring inevitable, predetermined societal changes. They also make assumptions about the user of technology, generally seeing this user as passive and easily-manipulated. This restricts the usefulness of this work in bringing a better understanding of the reciprocal relationship between technology and those who use it. Douglas (2000) colourfully demonstrates the limitations of the deterministic approach.

'Technological determinism - the 'nature' argument - is, after all, an infinitely

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[5]Williams (1974) was the first to highlight the deterministic bias of McLuhan's formalist analyses.

more daunting and impressive tool than social constructivism - the 'nurture' school - particularly when you're in the throes of a heated debate over the future and capacity of new technologies. 'Here it is,' the determinist can announce, 'mis-use it, try to customize it to fit your own interests - and it'll recoil on you like a loaded spring' (Douglas, 2000: 326).[6]

In contrast to these deterministic views, Feenberg (1995) advocates 'technological indeterminism', whereby technology is seen to interweave with culture. In this interweaving, the direction of technological advancement, the uses to which technology is put and the broad consequences for society of technological changes are negotiated as 'a scene of social struggle'(Feenberg, 1995: 33-34). By refusing deterministic views of technology, Feenberg argues that we can avoid polarised views of technology. One means of achieving non-deterministic understandings of technology is to stress the inter-relatedness of technology and culture. By locating technology and those who conduct research and development within the culture in which they operate, we can better interrogate how technology is perceived within a culture, how it shapes and is in turn shaped by that culture. Williams (1974) sees technology as a means to affect, alter and control our social process:

'we need . . . to steer our culture not towards one in which 'anything goes' but towards one in which technologies such as the Internet are used to reflect on our complex world, to gain a better understanding of it and to intervene in it the best we can' (Williams, 1974: 234).

Marien (1985) also believes determinism to be an inappropriate and inefficient approach to what he terms the 'communication revolution': 'we must choose between Computopia or a Big Brother society'. He believes that the main drawback of the over-simplification of deterministic views is that it adversely affects our ability to 'ask the right questions' (1985: 649-650).

The work of Aronowitz et al. (1996) follows this model of the location of technology within society by describing the:

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[6]Within the academic community, the move away from technological determinism was in part initiated in the 1980s by the Social Shaping of Technology (SST) tradition. Whereas technological determinism took technological advances and societal adjustments as a given progression, the SST approach sought to interrogate technological change by debunking the 'technological-fix' theory. Instead the processes of technological innovation and the conditions of its use were analysed. In addition to this SST work, studies in the Sociology of Scientific Knowledge (SSK) and the Social Construction of Technology (SCOT) reject the linear model of innovation and replace it with an understanding which sees all stages of innovation as equally crucial. This change of approach foregrounds the notion that technology is a manufactured entity and as such, allows the user to play an active role in the construction and progression of technology within society.

'nexus where culture, technology and science intersect . . . in both practical and personal spaces, including entertainment, sex, pedagogy, art, and the built environment'.

Aronowitz et al. (1996) believe that the confluence of culture, science and technology brings subtle and fundamental changes to social and cultural practices: 'technology shapes culture; science . . . grounds technology; (techno)culture produces science' (1996: 1,8).

Following Levinson (1997: 4), we adopt a 'soft determinism' approach to the social consequences of information technology i.e. technology 'making things possible . . . rather than inevitably and unalterably creating that result'.

2.6 ICTs and Society in Academic Discourse

Research on the impact of ICTs on society has been on-going since the 1950s. However, with fluid boundaries and fast-changing innovations, this research has often lagged behind the practical uses of these technologies within society. The research has primarily followed two main strands. In the first, researchers examine the varying ways that ICTs are shaped and used in society so as to project possible future uses and changes and their possible impacts on society. In the second, the concept of the 'Information Society' is examined so as to reveal the social, cultural and political issues which these developments highlight. This research is mostly concerned with changing social relations and interactions in technologically-mediated society. As such, it is an important framework for our research.

2.6.1 Considering the Societal Impact of ICTs

'Fundamental notions about the world are called into question when dominant communication technologies shift. Such shifts change how people manage information, call into question rarely examined assumptions, and alter the mirrors in which people conceive of self.'(Gibson and Oviedo, 2000: statement on book cover)

The first main strand of research which we examine focuses on the societal impact of ICTs. Academic research which has traditionally focused on the impact of technology on society has broadened its focus to include IT and ICTs. An examination of this type of research shows a focus upon two main areas. The first main strand of research examines the use and impact of ICTs in different social and organisational settings and considers the future of ICTs within society. For example, Levinson (1997) offers an overview of the lead-up to the

current information technology explosion by taking an historical perspective. He traces the developments in information technology from early examples such as hieroglyphics, printed authorship and photography to the new publishing opportunities afforded the online author. Examining the (often un-intended) social implications of some of these inventions, he shows how the invention of the daguerrotype (and photograph) led to a change in humanity's understanding of time (now that memories could be supplemented) and how the invention of the telegraph changed humanity's perception of space by making the world seem smaller. He compares these developments with current research and developments in artificial intelligence and examines the impact of such changes on the world of communication which he sees as holding great benefit to humankind.

The second main strand contrasts the economic impacts of ICTs with the social, cultural and political issues of these technologies. Dutton (1996) identifies four separate strands of research in this area; production (how social, cultural and political processes shape innovation), utilisation (how ICTs are used in organisations), consumption (how the general public consume and adapt ICTs) and governance (the role of public policy).

However, recent work by Valovic has highlighted what he terms the 'void in the research being done on the social implications of the new digital technologies' (Valovic, 2000: ix). He believes this to be the result of mistaken attempts by researchers to examine and understand the fast changing technologies in this area, when in fact the focus should be upon trying to examine and understand the people using these technologies. He states that, as a result, work in this area tends to deal with superficial issues rather than 'the deeper cultural transformations being wrought by this technology' (2000: 12).

The work of Castells (1996, 1997, 1998) is a useful illustration of the way that many researchers conflate general worries about changes in society with specific fears of technology and technological change. Stating that 'new communication networks have a cultural dimension all of their own', he uses such phrases as 'abduction of identity' and 'irrelevant humans', showing that he believes the consequences of this cultural dimension to be negative in effect. In contrast, Slevin (2000) believes that new technologies such as the Internet may be of service to society in 'coping with our modern experience, rather than becoming yet another source of anxiety and fear' (2000: 233).

It is also important to understand the ways in which ICTs shape and are shaped by society in order to better predict the societal changes which may ensue. Dutton (1996) examines past effects of these technologies in order to predict some long-term social and economic implications of ICTs. He establishes the three main factors influencing the future of what he terms 'the information superhighway'. These include; facing up to the digital divide; refining the relationship between legislation and regulation; and defining appropriate government roles so as to strike the right balance between freeing market forces and intervening through public policies.

2.6.2 Considering the Information Society

'Knowledge is an artefact, constructed by the individual as part of their paying attention to data, cues and stimuli in their environment, and using the raw material gathered via their senses in knowledge-construction' (Green, 2001: 78-79).

Information as a commodity is the basis of modern society whereby the storage, retrieval, production and communication of information are primarily carried out by electronic means. Access to and control of these electronic means are central to the world's economy.[7]

Masuda (1978) (quoted in (Green, 2001: 80)) also provides useful insights into the nature of knowledge i.e. when compared with industrial goods, information has four unique characteristics. Knowledge is:

- *inconsumable* (not consumed through use and so may be reused over and over);

- *untransferable* (once it has been received, decoded and understood, it can be passed on without the sender losing its benefits);

- *indivisible* (for information to make sense, it must be transferred in its entirety);

- *accumulative* (adding new information can also create new knowledge).

Masuda (1978) extends this understanding of information to take account of information in the technological age, when four additional characteristics may be identified. These further characteristics are:

- *concentration* (information may be conveyed more efficiently with technology than without it);

- *dispersion* (information can be disseminated throughout society without any disadvantage);

- *circulation* (many people can work with information simultaneously, which increases the speed of processing and use);

- *feedback* (cross-referencing with the aid of large databases can be achieved quickly and easily).

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[7]An indication of just how central digital communications have become to the world's economy is the news that worldwide PC sales are now used as a measure of the state of the global economy: 'productivity and confidence measures correlate closely with PC shipments' (The Irish Times, 2002: 12).

Such changes in the nature and means of distribution of information have led to many labelling the current age, the Information Society. This label describes the central role of information in the world's economy although there is much debate as to the changing nature of such a society, as the following selection of quotations demonstrates:

'the Information Society is a term used to describe a society and an economy that makes the best possible use of new information and communication technologies (ICTs). In an Information Society, people will get the full benefits of new technology in all aspects of their lives: at work, at home and at play' (Information Society Ireland, 2000: 2);

'any Information Society is a complex web consisting not only of a technological infrastructure, but also an economic structure, a pattern of social relations, organizational patterns, and perhaps other facets of social organization' (Bates, 1984);

'although most (scholars) concede that Western industrialized nations and Japan have experienced dramatic social, economic, and technological changes, there is little consensus on the nature and direction of the change ... without an adequate conception of the nature of an Information Society, attempts to project social problems in information societies is *(sic)* difficult' (Salvaggio and Steinfeld, 1989: 1);

'by the mid-1990s we have come to understand that our social and economic conditions have qualitatively shifted in ways that we variously describe as the postmodern condition, the information economy ... this nonlinear, highly complex, self-reflexive, and self-organizing environment' (Braman, 2000: 320).

The second main strand of research which we examine focuses on the Information Society. As there are many interpretations of what constitutes an Information Society, Salvaggio and Steinfeld (1989) provide a useful overview of research which attempts to define the essence of the Information Society, identifying five distinct perspectives within this body of work. These are:

1. research which examines the Information Society in terms of the nature of its economic structure;

2. research which examines the consumption of information goods and services rather than their production;

3. research which emphasises the influential role of information technology within the Information Society 'almost to the exclusion of other social, economic, and political attributes';

4. research which forecasts the possible social benefits which may result from the large scale introduction of information technologies;

5. research which takes a multi-dimensional approach to understanding the Information Society, examining economic, social and cultural aspects.

Braman (2000) also overviews the numerous shifts in the understandings of the Information Society which have occurred since the 1960s, taking as his starting point, the dominant understanding, (which he believes to have been instrumental in shaping public perception as well as policy-making) which sees the economy as a discrete, functioning entity being overtaken in importance by the information industries sector, leading to:

'commodification of types of information not previously commodified, including that which is most personal (such as personal data, or the genes in our bodies) and that which is most public (such as governmental information and cultural products)' (Braman, 2000: 312).

Some researchers have declared this shift in relative importance to be a natural stage in social evolution (Bell and Greenhorn, 1982; Bell and Kennedy, 2000) while others have concentrated on examining the workings of the 'new economy', declaring the standard economic tools to be insufficient in treating this phenomenon (Mosco and Wasko, 1992; Mosco, 1996; Schiller, 1982, 1999; Parker and Case, 1993; Parker, 1994).

Other research works from the premise that the nature of the economy has qualitatively shifted. Grabher (1993) focuses exclusively on the Net as the centre of the new economy while Braman (2000) labels these researchers as:

'(N)etwork economists [who] basically believe that the economy is now the content of the new medium of the global information infrastructure (the Net). From the perspective of network economics, cooperation and coordination are as important as competition for economic success' (2000: 313).

Our approach to considering the Information Society follows Williams (1998) who advises the adoption of a multi-disciplinary mode of research when dealing with the Information Society, one which includes:

'interrelated studies of the economy, public attitudes, the diffusion process, and educational planning ... This includes the necessity for combined qualitative and quantitative methods'(1998: 23).

2.6.2.1 Information and Education

The changing nature and means of accessing information has impacted on the nature and means of delivering education which in turn affects the nature and means of accessing information and so on:

> 'lifelong learning ... is our ability to think, and to select and use information that ultimately determines the success of a learning policy and this remains the case in the Information Society. But it is also true to say that ICTs can greatly assist us in providing learning opportunities and in removing obstacles to access' (CRITE, 2000: 4).

Educational institutions must take account of these changes, both in terms of the type of education provided and the delivery systems employed. Barriers to access must be removed and flexible delivery methods must be devised so as to provide education throughout people's lives which is suited to their individual needs and skills, throughout their lives. This in turn will lead to people's greater ability to make meaningful contributions to the Information Society:

> '(E)ducation is not a stand-alone industry, but is central to the operations of culture and society, as well as being a major conduit for the dissemination of technological skills and competencies. Digital culture is integral to the future development of the education sector in information societies. Not only is education one of the largest sectors of the information economy, it operates as the powerhouse for driving the skills and training through which the rest of the information infrastructure develops' (Green, 2001: 90).

2.6.2.2 The 'Digital Divide'

If educational institutions fail to reflect the changing nature of society in the content and delivery of their courses, the risks of a two-tier Information Society becoming established are far greater. We have already referred to the unequal opportunities inherent in technological development. However, to date, existing social inequalities appear to be replicated in the use of new electronic technologies. This inequality of access in the Information Age is termed the 'digital divide'. With the increasing importance of information in the world economy, those individuals and groups who control information are advantaged over those who do not:

> 'as information becomes the pre-eminent commodity, so it becomes central to a plethora of control technologies designed to restrict access to it, to enhance its value, and to exercise power through it' (Green, 2001: 79).

Tapscott (1996, 1998) also discusses the issue of the 'digital divide':

> 'If left purely to market forces, the digital economy could foster a two-tiered society, creating a major gulf between information haves and have-nots - those who communicate with the world and those who can't. As information technology becomes more important for economic success and societal well-being, the possibility of 'information apartheid' becomes increasingly real. Such a 'digital divide' may mean that for many children N-Gen means Not-Generation' (1998: 11).

This quotation highlights the difficulties which unequal access to the opportunities provided by ICTs may bring. This unequal access manifests itself in two ways. The individual firstly requires technological access. This means the physical availability of suitable equipment, such as computers of adequate speed, with appropriate software for a given activity. Secondly, the individual requires social access. This can be described as a mixture of professional knowledge, economic resources and the technical skills to use the technologies in ways that enhance professional practices and social life.

In the past, the social requirements of access were considered inferior to the technological aspects of access. It is important, therefore, that policymakers understand the ways in which social factors influence the adoption, uses and usability of advanced information technologies. We do not yet have a good understanding of the ways in which restricted access to emerging ICTs are affecting people at home and in the community. In order to gain this understanding, significant research must be undertaken which investigates the underlying social judgements that people make in using ICTs at home, in public facilities and at work. This thesis aims to make just such a contribution.

What is certain is that participation in the Information Age is dependent upon both technological and social access being offered to all, especially the 'information poor':

> 'poverty, in an information society, is linked to gender, age, social class, cultural grouping, education, disposable income, ethnicity and indigeneity, and geographical location. These are all factors that help determine relative access to ICTs, and to skills and experience in using the information gathered for social, cultural and personal ends' (Green, 2001: 108).

2.7 Definitions of Cyberspace

We have seen the powerful connection between technology, ICTs and the Internet in popular and academic discourse. We will now examine recent academic work which considers cyberspace in general and computer-mediated communication in particular.

'Cyberspace is indeed strange. It exists in the general vicinity of what Popper calls the third world. The third world is the world of physical representations of ideas, of texts, of speech, of ideas that have their origins in the second world and yet exist at some level in the first. Cyberspace is odd . . . because it does not have an existence in the same way a paper text has an existence, it is closer to thought than it is to a book. And yet, it is a space, where there is a kind of tropic movement' (Connor, 2000: 291).

'Cyberspace is a repository for collective cultural memory - it is popular culture, it is narratives created by its inhabitants that remind us who we are, it is life as lived and reproduced in pixels and virtual texts. It is sacred and profane, it is workspace and leisure space, it is a battleground and a nirvana, it is real and it is virtual, it is ontological and phenomenological. [It is] an arena of power. [It is] a reconceived public sphere for social, political, economic and cultural interaction' (Fernback, 1997: 37).

'Cyberspace is neither a pure pop nor culture phenomenon nor a simple technological artifact. Instead, it is a powerful, collective, mnemonic technology offering a computer-generated, interactive, virtual environment of cyberspace. With its virtual environments and simulated worlds, cyberspace is a metaphysical laboratory, thereby providing people with a tool for examining our very sense of reality and the world we live in' (Gattiker, 2001: 12).

The above quotations demonstrate one of the difficulties associated with defining cyberspace. Cyberspace as a 'virtual world' is open to a myriad of interpretations. It is a physical connection, an abstract suggestion. It allows the transmission of data. It enables the creation of friendships. It is real and hyper-real:

'every writer entering the hyperreal of cyberspace faces this dilemma: terms keep slipping out of the moorings of their past histories and into the flux of a future we are all trying to anticipate' (Gibson and Oviedo, 2000: 100).

Featherstone and Burrows (1995: 5) believe that cyberspace is best considered a generic term which 'refers to a cluster of different technologies, some familiar, some only recently available, some being developed and some still fictional, all of which have in common the ability to simulate environments within which humans can interact.'

2.8   Cyberspace in Academic Discourse

Gibson (1984) coined the term 'cyberspace' to describe a fictional, computer-generated world where data is accessed and manipulated via sockets implanted in the brain. This 'non-space of the mind' is the total interconnectedness of human beings through computers and telecommunication without regard to physical geography. Now that the Internet has come into existence, Gibson's 'consensual hallucination' appears both far-sighted and far-fetched. It is true that the Internet enables communication in a virtual environment. It is also true that this communication transcends physical geography. However, access to this environment via physical ports implanted within the body is currently neither possible nor probable.[8] Neither is it true that this environment is 'experienced daily by billions'. Access to the Internet is still very much a first world phenomenon, often dependent upon factors such as gender, age, class and race.

At its most rudimentary, the notion of cyberspace arises from the ability to communicate without the requirement of physical proximity. Thus we can imagine being in cyberspace when we communicate by telephone, a possibility which once seemed outrageous but is now considered commonplace.

A useful summary of the technical properties of cyberspace is as follows:

> 'the (overlapping but distinct) domains of digital communications and information technologies - the Internet, the world wide web, email; plus all the subframes within these (bulletin boards or BBS, chat rooms, multi-user domains (MUDs)/dungeons, etc.) - alongside a host of related technological systems, including virtual reality, digital imaging systems, new biomedical technologies, artificial life and interactive digital imaging systems' (Bell and Kennedy, 2000: 1).

Following from these technical properties, Bell and Kennedy (2000) define the required research focus when interrogating cyberspace as a cultural phenomenon. They state that as well as:

> 'exploring these technocultural constructions ... thinking about the hardware (machines), software (programs) and wetware (humans), we need to consider the place of imagination and representation, cultural use and value, and focus our attention most squarely on human interactions with (and within) these emerging cybercultural formations' (2000: 1).

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[8]The 1999 film *existenz* portrays a world in which 'porting' via an implant in the spinal column is part of normal life.

To the question 'where is cyberspace?', Bell and Kennedy (2000) suggest:

> 'cyberspace exists in the network of computers, modems, communications links, nodes and pathways that connect users into something ... like the World Wide Web, the Internet, the information superhighway' (2000: 2).

In answer to the question, 'where are we when we are in cyberspace?', the authors suggest:

> 'physically, we are seated in front of a monitor, our fingers at work on the keyboard ... but we're simultaneously making ourselves over as data, as bits and bytes, as code, relocating ourselves in the space behind the screen, between screens, everywhere and nowhere' (2000: 3).

Possibly most difficult of all to answer is the question, 'who are we when we are in cyberspace?' It is possible that there are as many 'answers' as there are inhabitants of cyberspace. Bell and Kennedy (2000) suggest that identity in cyberspace is multi-faceted, restricted only by our lack of imagination and playfulness:

> 'when we are in cyberspace we can be who we want to be; we (re)present ourselves as we wish to ... we can be multiple, a different person (or even not a person!) ... playing with our identities, taking ourselves apart and rebuilding ourselves in endless configurations' (2000: 3).

One approach to understanding the human interaction with the machine has been to re-define the rigid divisions between human-life and machine-life (Featherstone et al. (1995); Lupton (1996); Balsamo (1996)). If we consider that technology and computers are becoming an essential element in the modern world, it may be necessary to re-examine where 'human' ends and 'machine' begins. Pepperell (2002: 180) writes:

> 'complex machines are an emergent life form ... as computers develop to be more like humans, so humans develop to be more like computers.'

Post-humanists such as Pepperell believe that by blurring the boundaries dividing human and machine, we can overcome our deep-rooted fear of technology and learn to love it, to incorporate it into our lives, into ourselves.

Bell and Kennedy (2000) pose a series of questions in this regard:

> 'Are we now so inseparable from our computers that we have effectively become them? Are they us? Are they extensions of our identities - prostheses? Do we blend with them, each incorporating the other, to become hybrid cybernetic organisms - cyborgs?' (2000: 4).

For Bell and Kennedy (2000), the answer is 'yes' to all of the above. The authors believe that the human-machine opposition is now superseded by:

> 'a new union of meat (our bodies) and metal (technology) . . . the next great leap forward . . . the only logical outcome of the cybercultural trajectory' (2000: 5).

This re-considering of the human/machine, nature/technology binaries has seen the figure of the cyborg take on new, important significance. The cyborg is the human/machine being, the ultimate in body/technology interactions. The cyborg may be created through surgical interventions or may come into existence in the interplay between human and screen, mind and machine. Either way, when human and machine meet, both human and machine are changed and created anew:

> 'the cyborg is the interface of the organic with the technological; the techni-cizing of the human and the humanizing of technology, i.e. the body as both the hardware of machines and software for machines' (Fitzpatrick, 1999: 97).

For those who cannot accept such a transformation of the human-machine interaction, there is another aspect of cyberculture which must be considered. As cybertechnologies are now an integral element of how the modern world operates, influencing international stock markets and global economies, it is possible that all humankind may be integrated into these technologies whether or not they choose to be. If our lives are influenced so profoundly by technologies, there may be some validity in the notion of the human and the machine having reciprocal and interlinked connections. It may also be possible that our openness to the concept of such a human-machine relationship determines our uptake of technologies within our lives:

> '(A)re we only cyborgs to the extent that we experience ourselves as cyborgs?'
> (Bell and Kennedy, 2000: 6).

This plurality of discourse can be seen as an attempt to understand the rapid pace of ICT development. The conjoining of the human with the machine to create the 'cyborg' is a response to the perceived dehumanising influence of the online environment. We believe that the belief that the 'mind' is assumed into the 'metal' results from a long-established understanding of the machine as all-powerful, alien and malevolent. We reject this approach, preferring to consider the human and the machine in a duality of influence and interaction. The notion of the cyborg is discussed further in chapter three.

2.8.1 Metaphors of Cyberspace

With the growing sophistication of this communication environment where information is coded not just in aural but also in other sensory modes, we can imagine a cyberspace which holds out great possibilities for complex interactions. These interactions have given rise to a number of new understandings of how communication operates in anonymity. Recent research has examined some of these understandings or metaphors (some of these understandings have taken the form of metaphors which are often as interesting in what they assume and exclude as in what they elucidate).

Extending McLuhan's seminal notion of the 'global village', many descriptions of cyberspace engage this spatial metaphor. Thus, cyberspace is:

> 'tantamount to physical space [having] dimensionality, continuity, curvature, density and limits' (Fernback, 1997: 36).

Moreover, this space is governed by social mores:

> 'virtual space is socially constructed and re-constructed' (Fernback, 1997: 37).

One common metaphor of cyberspace employs an aggressive rhetoric of exploration and settlement to describe the origins, development and spread of cyberspace:

> '(C)yberspace is a newly discovered frontier that many theorists are cultivating, and the terms for its exploration and colonization multiply at a pace greater than any other colonialist venture' (Downing and Sosnoski, 2000: 100).

In a similar vein:

> '(C)yberspace symbolizes a new American frontier full of unexplored opportunities, that stimulate high levels of excitement as well as fears of chaotic semi-organized activity and even personal harm. New frontiers attract adventurers, speculators and even con artists. Taming a frontier is a kind of work that favors people who are bold and action-orientated rather than timid or reflective' (Kling, 1996: 8).

This understanding of cyberspace as an unregulated frontier, inhabited by 'out-laws' is also evident in this quotation from an American police officer, labelled a 'cybercop', who works to trace those who commit online crimes such as stalking, harassment and fraud:

'everyone using the 'Information Superhighway' should know that they are really in the electronic frontier. They are not talking to their caring next-door neighbour. There are good guys and predators. Very few laws or law enforcement' (Gill, 1995: 166).

Barnes (2000) links this frontier rhetoric with 'the myth of manifest destiny', an understanding of society which is evident in cultures bent on expansion and empire building. Whether in terms of the homesteading movement of the 1800s or the virtual networking of the digital age, this approach fosters the notion of the 'pioneer':

'people who engage in CMC view themselves as pioneers who are homesteading a new electronic territory' (Barnes, 2000: 195).

Cyberspace as a frontier is discussed further in chapter three.

As well as being described as a 'final frontier' to be crossed and conquered, cyberspace has been variously described as a door into a new, unexplained world, a new electronic space waiting to be colonised, an abstract illusion, and a fictional metaphor.

2.8.2 Computer-Mediated Communication

Computer-mediated communication is another interesting strand of research that examines the various ways that communication takes place in this new space.

'CMC is the space within which the relations occur and the tool that individuals use to enter that space' (Jones, 1997: 16).

'In cyberspace, we tend to be bolder, riskier, sometimes more rude, sometimes more kind ... we might be alone at our computers as we type, but we are participating in some form of public life, the form of public life that comes about after the mistrust of our neighbors and our intense desires for privacy force us to re-examine our atomized lives' (Fernback, 1997: 38).

For Valovic, computer-mediated communication is best described as 'anarchic pluralism' which is experiential in nature; 'it yields different results for different users' (2000: 20,12). It is this property of this unique phenomenon that makes it so difficult for researchers to fully understand the issues at play and leads to an urge to simplify these complexities.[9]

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[9] Valovic also believes that this urge to simplify is a 'by-product of the postmodern state of grace called information euphoria', the 'karmic playback' or 'inevitable hangover' which he describes as 'information ennui'(2000: 15). Following euphoria and ennui, Valovic describes the third most common approach toward new electronic technologies as 'information wisdom' which he believes is characterised by a 'healthy ambivalence' towards the social consequences of these technological developments. This more tempered approach moves from exaggerations and generalisations to more practical examinations of technology within society.

Avital (1989) focuses on the positive possibilities afforded by CMC stating; 'the Net is a tool for stripping away strictures, a tool for liberating exploration of sense and self'(1989: 27).

Finally, Barnes (2000) refers to the difficulty facing researchers who examine cyberspace and social transactions within it:

> 'CMC is a new form of communication. Consequently, new methods and models need to be created' (2000: 170).

2.9 Summary

In this chapter, we have reviewed popular and academic discourse concerning technology, ICTs and society. We have considered the Information Society and the changing nature of knowledge and education in the modern age. We have also examined cyberspace and CMC. Following Fernback (1997), we see cyberspace as an 'arena of power' offering many possibilities for different users. This work forms part of the epistemological basis of the approach taken in this research programme.

Chapter 3

Women, Technology and Society

This chapter examines the relationship between women, technology and society. Working within a feminist research framework, it begins with an investigation of gender roles and boundaries and relates these to some popular and academic understandings of the gender/technology relation, both generally and in relation to ICTs. It also examines some research on social networks and considers the importance of these networks in women's engagement with ICTs.

3.1 Background

We have already established that the western world is profoundly influenced by technology. An examination of the confluence of society and technology should include an examination of the effects which technological developments may bring to society. It should also examine whether existing gender behaviours and boundaries are blurred or re-written within this new medium. In particular, the emergence of cyberspace and CMC prompts us to re-examine gender relations within a technological framework. In doing so, our approach follows that adopted by Bryson (1999) who states that 'today feminist understanding should be able to move beyond any kind of rigid classification and can draw on insights wherever they are to be found' (1999: 220).

3.2 A Feminist Approach

'Feminist theory has never been a united body of thought (its many strands having evolved from a wide range of 'malestream' theoretical perspectives and also from the diverse experiences of different groups of women)' (Bryson, 1999: 8).

'Feminism in all its varieties has always insisted on the importance of women's ideas, feelings and experiences. It has valued women in our own right and not according to male-defined ideas about worth' (Steiner-Scott, 1985: 7).

'Feminist inquiry ... poses fundamental, assumption-shattering questions: What are the meanings and mechanisms of gender differentiation? How are gender differences *differently* constructed over time and across cultures, social classes and racial and ethnic groups? What are the specific reverberations of gender differences for the acquisition and exercise of social and economic power and control? What is 'gender identity' and why and how do we acquire it? What is the relation between gender and sexuality? How do different sex classes, i.e. women and men, differently experience that relationship? How does an understanding of the mechanisms of gender power relations enable us to change those relations?' (Smyth, 1993: i-ii)

Feminism is a diverse and multi-stranded means of interrogating many social and cultural assumptions, such as perceived differences between women and men. Feminist scholarship questions the philosophical and epistemological paradigms which shape and influence research methods and practice:

'unlike the alienated abstract knowledge of science, feminist methodology seeks to bring together subjective and objective ways of knowing the world' (Rose, 1983: 87).

'as feminist researchers, we often deal with dilemmas that have no absolute solutions. We therefore believe that we cannot talk about what feminist research *is*, only about what it *includes* ... Feminist research methodologies stress gender as a basic theoretical concept, a deconstruction of the power relationship between researcher and researched, a political commitment to the emancipation of women, and models of research and practice which privilege participation, representation, interpretation and reflexivity' (Byrne and Lentin, 2000: 5).

In light of the diversity of feminist research methodologies, Shields and Dervin (1993) describe four organising principles which are common to work carried within a feminist conceptual framework. These include:

i) an understanding that women's experiences of their social and personal worlds are essential elements of feminist research and should be considered primary 'scientific sources';

ii) a definition of gender and gender relations as socially constructed and historically specific;

iii) an interest in both the role of the researcher and the research process itself so that the research method has both reflexivity and inter-subjectivity;

iv) and an underlying political agenda which seeks to effect positive changes in the lives of women worldwide.

This research programme is located within this feminist conceptual framework and exhibits similar characteristics to those described above by Byrne and Lentin (2000) and Shields and Dervin (1993). We believe that our approach is suited to the study of the multiplicity of identity and experience within women's lives. Just as many groups of women have many different needs, so many aspects of feminist research have many different techniques and approaches. Therefore, our epistemological framework focuses on women's shared experiences and highlights the importance of understanding women's stories. Throughout the progress of this programme, we reflect on and evaluate our feminist epistemological approach so as to understand how we know what we know, examining the ways in which certain biases and assumptions:

'condition the methodological approach and the issues and techniques that arise in the context of these assumptions' (Bradley and Sutton, 1993: 406).

This is most commonly carried out through 'an ongoing criticism of non-feminist scholarship and is guided by feminist theory' (Byrne and Lentin, 2000: 9) with the political aim of effecting social change:

'while at the same time representing human diversity, including the researcher as a person, developing social relationships with the people studied and defining a special relationship with the reader' (2000: 9).

We also follow the notion of Smith (1987) that feminist research methodologies must:

'never lose sight of women as actively constructing as well as interpreting the social processes and realities that constitute their everyday lives'(1987: 21).

The remainder of this chapter describes the details of this conceptual framework and makes connections between the theoretical basis of the work and the investigations into technology and society described in chapter two. We also describe the workings of social networks and the importance of these to women's engagement with ICTs. We begin by examining the notion of gender and the relationship between technology and gender.

3.3 Gender and Technology

One of the principal means by which women are excluded from technology is the 'masculinisation' of technology which denotes technical competence as essential to masculinity and its absence as essential to femininity (Wajcman, 1991). These cultural stereotypes have led to the gendering of technology:

> '(T)he 'technology club' is a largely male-dominated one, and men are happy for it to remain so ... Feminists need to anticipate social and technological developments, to try to influence how they are going to be used and implemented, and to initiate and insist on public discussions on the implication' (Butterworth, 1993: 37).

If like Butler (1990), we consider gender to be ever-changing, a feminist analysis of gender relations must examine more than socially-determined categories of gender but must also investigate the ways that gender categories may be altered by the influence of technology and ICTs:

> '(A)s we are identified by others and constitute our own identities in the course of a lifetime's interactions, part of the process is invariably gendering. Ineluctably, technology enters into our gendered identities ... Technology, then can tell us something we need to know about gender identity. Gender identity can tell us something we need to know about technology' (Cockburn, 1992: 41).

When we consider the confluence of gender and technology, we consider the ways that social patterns and structures change or mutate when they are mixed with technological dimensions.

3.3.1 Definitions of Gender

> 'The term gender is used to describe those characteristics of women and men that are socially constructed, in contrast to those that are biologically determined ... A gender analysis identifies, analyses and helps to act upon inequalities that arise from the different roles of women and men or the unequal power relationships between them ... Since these inequalities most often disadvantage women, a gender analysis highlights women's problems' (WHO, 1998);

'Gender is a term increasingly used to convey a differentiation, by cultural processes involving appearance and behaviour, action, thought and language, of two ideal social categories, the masculine and the feminine, and their normative mapping onto male and female bodies respectively. By extension, gender is used to symbolize other differences (of size or importance for instance) and other phenomena (such as colours) are enlisted as symbols of gender ... Together masculine and feminine are conceived as making a whole, human being - the couple or dyad' (Cockburn, 1992: 39);

Gender is

'never fixed, always fluid' (Butler, 1990: 23);

'Gender is best defined as a relationship rather than possessions' (Haraway, 1991: 28).

The above selection of quotations demonstrate that there are a multitude of understandings of the term 'gender'. Some work in this area follows the World Health Organisation definition which sees gender studies as a means of examining women's problems with a view to effecting change in the unequal power structures within society which disadvantage women and undervalue their contribution to society. Our understanding of gender principally follows the approach of Butler (1990) in that it focuses on the dynamic properties of gender structures and behaviours and examines the possibilities for change within these structures. As Romaine (1999) states:

'Gender is above all dynamic and changes in response to cultural and historical forces ... Even though our culture treats the gender identities of male and female as if they were essentially real and stable components of personal identity, we are never passive victims of culture or history' (1999: xiii).

In other words, gender boundaries can be blurred and gender terrains can be reinvestigated. We believe that one means of effecting such changes is through the use of technology, in general, and ICTs in particular. We will discuss this further in later chapters. In the next section, we focus on the means by which gender roles operate to emphasise difference and the effect which this has upon communication patterns and social interactions.

3.3.2 Gender Differences

The system of gender is a system of constructed difference. A feminist perspective of relations between women and men examines the influence which gender brings to these relations. Following Rakow (1988), this system of constructed difference may be viewed as follows: the male gender has traditionally been identified with characteristics which define the masculine as rational, objective, competitive and interested in progress. These are strongly connected to the public domain which is often considered a male preserve. In contrast to these, the feminine gender, occurring in the private sphere, has traditionally been identified with characteristics which define the feminine as subjective, intimate, emotional and caring. Within this sphere of constructed difference, relations between feminine and masculine genders reinforce the differences in social position, access to power and meaning systems used by women and men to give sense to social reality. They also emphasise the fundamental divisions between the public and the private domain, where the former is mainly comprised of men while the latter is mainly populated by women, with the resulting 'invisibility' of the lives and worlds of women within the home. In the next section, we examine the effects of gender differences in a number of key spheres of human interaction. We begin with gender differences in communication.

3.3.3 Gender Differences in Communication

> 'Language is the primary means through which we understand the world and our place within it ... It is the world of words that creates the world of things and ideas. Language can alter reality rather than simply describe it ... The world is not simply the way it is but what we make of it through language' (Romaine, 1999: 15,20).

Many authors have emphasized that men and women differ in their use of language. Hauser et al. (1987) describe two distinct styles of verbal communication. The enabling or facilitative style functions so as to encourage a conversation to progress while the restrictive style functions so as to disrupt the interaction. Maccoby (1990) found that women are generally socialised into using facilitative styles of conversation while men most commonly rely on restrictive styles. The result in communication is that women tend to seek dialogue whereas men often interrupt the communication process at an early stage. Another perceived gender difference in language use is the accepted myth of the talkative, 'gossipy' woman although Spender (1985), Herring (1992, 1993a,b, 1996a,b,c) and Herring et al. (1995) have shown that both in face-to-face communication and in the online environment, men talk far more than women. Romaine (1999: 160), echoing Spender (1985), demonstrates the pervasiveness of this 'gossipy' woman myth through history and within many different cultures and suggests that:

'perhaps it just seems that women talk more because men expect women to be silent. When silence is your yardstick, any woman who talks at all seems to be talking too much'.

Romaine (1999) also sees women's silences as a possible rejection of the space/non-space traditionally allocated to women within language:

'women have to search for the words that give meaning to their existence, which in the male world and ways of talking has been unspoken and nameless'(1999: 23).

Such gender differences in language use, first observed in face-to-face behaviour, are also present in the ways in which women and men use the telephone. Noble (1987) found that women use the telephone more frequently than men while men use the phone for more specific purposes than women (these purposes do not include day-to-day chatting or emotional sharing). Walker (1994) and Lacohee and Andersen (2000) found that many people find it easier to share thoughts and feelings at a distance with the result that women use the telephone more often than men to sustain a larger circle of distant friendships. Finally, Moyal (1992) found that women make far greater use of the telephone for maintaining family and friend networks than men, stating that ' 'kin-keeping' floods the lines' (1992: 55).

Finally, women and men use email differently. The results of our pilot study (1999) show that women use email primarily for communication with family and friends while men use email primarily for communicating with colleagues. This gender difference was also found in the random questionnaire conducted in 2001. In addition, many of the women interviewed in 2002 stated that their most common use of email was in order to keep in touch with friends and family. These differences are also evident in a study completed by Kraut et al. (2001) whose exploration of the use of email for the maintenance of social networks also found that pre-existing gender differences were present in email usage. Therefore, compared to men, women were more likely to enjoy maintaining email contact with friends and family and more likely to maintain their system of social networks via email. Women's emails contained more personal content than men's and women tended to email in intense bursts. Women were also more likely than men to use email to keep in touch with acquaintances living geographically distant. Finally, Pew (2000) also found that women most commonly use the Internet to cultivate relationships with family and friends.

The consideration of gender differences in communication within the electronic environment has given rise to a large body of work which may loosely be categorised as feminism and CMC. We discuss this work later in this chapter.

3.3.4 Social Networks

One of the central themes of this research programme is the effect of social networks on women's engagement with ICTs. Words such as 'web', 'networks', 'mesh', and 'connectedness' are often used to describe the dynamics of these patterns of interconnection which women establish, the dynamics of these patterns of interconnection which women establish between themselves, and some of the ways that these interconnections affect women's use of ICTs and their take-up of technology training. We begin this section by examining some of the ways that social networks are established and operate.

3.3.4.1 Introduction

An early theory of mass communication, developed by Katz and Lazarsfeld (1955), suggested that for most people, interpersonal factors rather than the mass media were most influential in forming opinions. More recent development places this early work in the context of ICTs, considering the importance of opinion leaders in influencing people's willingness to use ICTs. For example, Green (2001) considers this early work in relation to the centrality of social networks in opinion-forming in the context of ICTs:

> 'in Internet technoculture terms, a person who is highly involved with life online, and willing to ask advice and support from others, may in turn provide information and support to 'newbies' online' (2001: 37).

We also consider the importance of key, informed figures within women's informal networks which influence their engagement with ICTs. We begin this investigation by examining the context in which social networks operate i.e. the community. Scott (1991) refers to a community as 'a web of relations through which people interact with one another'. He further defines the community as a social configuration which is made up of a number of sub-groups such as 'the family, the church, classes and associations' (1991: 23). This community may or may not contain 'cliques', particular configurations of interpersonal relations which comprise informal groupings with certain group norms and feelings of connection and intimacy. Warner (1941) also refer to 'cliques' stating that:

> 'people are integrated into communities through informal and personal relations of family and clique membership, not simply through the formal relations of the economy and political system. Any person may be a member of several different cliques, and such overlapping in clique membership spreads out into a network of interrelations which integrate almost the entire population of a community in a single vast system of clique relations' (1941: 36).[1]

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[1]This is described by (Scott, 1991: 7) as one of the earliest uses of network terminology to describe the structuring of whole societies into sub-groups.

It is these 'cliques' or networks of interrelations which are of interest in our investigations of the gender-technology relation. We focus on the informal social relations networks which women form within and throughout their social spheres in order to understand their place within the community. We find metaphorical notions such as the 'web', 'networks', 'mesh', and 'connectedness', to be useful descriptions of these informal, social relations.

3.3.4.2 The Importance of Networks

People's patterns of interaction consist of personal links which they establish with others. These links may usefully be considered as: 'the sphere of network analysis' (Mitchell, 1969: 10). Mitchell sees such interpersonal networks as being built firstly upon communication:

> 'which involves the transfer of information between individuals, the establishment of social norms and the creation of a degree of consensus';

and secondly upon action:

> 'which involves the transfer of material goods and services between people, thereby creating a reciprocal flow and exchange of information, resources and services'.

Mitchell rather grandly conceptualises the 'total network' of a society as:

> 'the general ever-ramifying, ever-reticulating set of linkages that stretches within and beyond the confines of any community or organisation' (1969: 36,9,12).

This notion of the importance of linkages is held up by Gaynor (2000) whose analysis of the impact of networking on entrepreneurs found that having an evolving network is of great importance to entrepreneurs for a number of different reasons. This concurs with other work in the entrepreneurial field. For example, studies by Larson (1992), Oviatt and McDougall (1994) and Chen and Chen (1998) all find that a sustained competitive advantage is strongly linked to an entrepreneur's ability to develop and manage its array of network relationships. These findings in the area of entrepreneur studies are a useful demonstration of the complexity of networks and their effects upon people's formal and informal interactions.

3.3.4.3 The Key Components of Networks

There are four key stages with increasing levels of complexity in network development. The first stage begins with two people being aware of each other so that a link is created. The second stage sees a deepening of interest so that one person is in contact with another when an interaction may occur. The third stage occurs if there is an exchange or transaction. The fourth stage occurs if a number of interactions take place so that a relationship may be established i.e. a connection between people who believe they have obligations to each other which are not of economic import. Such relationships are extremely complex due to the creation of expectations between the people involved with a structure of distinct, socially determined meanings invested in the actions of individuals in relationships. All the relationships in which a person is involved may be termed their network. Burt (1997) states that one's ability to create links, initiate interactions and develop relationships is considered to be linked to one's 'social capital'. Such social capital provides enhanced access to accurate information through knowing more people, having a favourable reputation, having a high status and receiving personal referrals. Baron et al. (2000) state that having gained access to such information, it is one's social skills or ability to interact effectively with others which plays a key role in any subsequent success. They term this ability one's 'cultural capital'. Erickson (1988) clarifies the symbiotic relationship between one's social and cultural capital. He refers to social capital as being the resources available to someone through the people they know so that the more people one knows, the more resources available to one. He refers to cultural capital as being what people know. His research demonstrates that diversity in cultural capital is more essential to success than a great amount of knowledge in one specific area. The diversity of one's cultural capital allows meaningful interactions with a variety of people which in turn increases one's sphere of influence and social success.[2]

3.3.4.4 The Different Types of Relationships

Anderson et al. (1994) terms one's unique set of connected relations with other people one's 'network identity'. Networks typically contain a multitude of relationships, almost all of which can be located within two distinct spheres, the 'formal' or 'impersonal' sphere and the 'informal' or 'social' sphere. Relationships of an 'impersonal' nature most frequently operate within the business or work sphere and are often carefully cultivated for the benefits which they may bring to both parties. Relationships of a 'social' nature

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[2]The concept of social capital is becoming more popularly understood. This is demonstrated in part by its appearance in a recent article (Waters, 2002a) in which social capital is described as 'the new buzz-term among social policy-makers ... [which] describes the pattern and intensity of connections between people, together with the values arising from them. Their basic premise is that more interaction helps people build communities, make mutual commitments and thereby create a social fabric enabling more satisfying and effective living together'.

frequently become established between two people who meet socially and find that they have an affinity which brings them both numerous intangible benefits such as confidence or enjoyment. Gaynor (2000) describes such relationships as 'emotional, multi-faceted and charged with trust, moral obligation, loyalty, commitment, respect and expectations' (2000: 40). The work of Lee (1969) (who studied the means by which women acquire information about obtaining abortions) also demonstrates the different interpretations made of both formal and informal relationships. Most often, women seeking abortions tried to obtain information from female friends and acquaintances of their own age who might have had some experience with abortion in the past. The women interviewed stated that they felt that these women were either most likely to have that information or to be able to put them in contact with others who could help. Contacts tended not to be relatives or those in authority (employers, teachers etc.). Therefore, the women studied had clear ideas about the knowledge and attitudes of those within their social networks.

3.3.4.5 Gender Differences in Managing Social Relations

Some studies have found that women, on average, invest more in personal relationships than men with the result that women have more extensive social networks than men (Wellman, 1992; Walker, 1994). Claes (1992) found that whereas men may have as many if not more same-sex friendships than women, these friendships tend to be less intimate than female friendships. Other studies of these social networks consistently find that women and men have different ways of relating to others and managing their relationships. Twenge (1997) and Walker (1994) found that women tend to engage in intimate conversation with their good friends, whereas men tend to spend time in common activities with theirs. Moore (1990) and Neuhouser (1995) found that men's networks primarily tend to be formal due to the greater numbers of men who are engaged in formal employment. This contrasts with women's networks which tend to be informal with a greater reliance on kinship relationships and ties within women's daily social spheres. This reliance on informal networks may partly be due to the small (in relation to men) numbers of women participating in formal work organisations in some cultures. For example, Werbner (1991) found that Pakistani women in England who are not formally employed had more time to socialise and as a result, were better than men at developing friendship networks. Tannen (1972) found that women are more likely to communicate in order to avoid isolation and gain community, whereas men are more likely to communicate in order to gain and keep social position. This reliance on informal exchange networks may also be necessary among women who are not involved in the formal work sector as it enables them to share resources and information which may help them and their families. The general tendency of women to connect to others may partly be explained by the common expectation that women will be the maintainers, both of family ties and of their family's connections to friends (Di Leonardo, 1987; Wellman, 1992). These researchers also found that women

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were more likely than men to define themselves through their social relations and to act as the communication hub between the household and the various circles of relations and friends.

3.3.5 Gender Differences in ICT Usage

There is a marked difference in the attitudes of women and men to ICTs. A recent survey found that 15% more women than men were concerned that machines had already taken too many jobs (70%) while 12% more men than women believed technological advances to be generally a positive thing (72%) (Lyons, 2000: 10). This concurs with our data which found that while 29% of men under fifty described themselves as being 'very interested' in technology, only 17% of women under fifty had such a positive view of technology. These differences were not evident in the over fifty group as both women and men in this group had fairly negative views of technology. There is also a marked difference in the levels and types of usage that girls and women (compared with boys and men) make of technologies, in general, and ICTs in particular. There are a number of reasons for these differences. These may be examined under the following headings: access, costs and uses.

3.3.5.1 Access

We have established that traditionally, technology has been viewed as a social and cultural construct of men with the result that the dominant value system underlying the technologically creative process has been considered fundamentally masculine. Historically, access to technology has been difficult for women so we must consider the question of access in light of today's developments. Compared to men (and boys), do women (and girls) have equal access to computers, both in terms of technology and training?

In America, gender parity in Internet usage has come about in the last two years (Pew, 2000). However, while the numbers of European women online has grown by 29% between 2001 and 2002, now standing at 25.1 million (NUA Internet Surveys, 2001), Europe is still nowhere near gender parity in online transactions. In addition, an examination of the use of technology in the workplace shows that women are over-represented in the lesser-skilled areas such as word-processing and data entry while men are over-represented in the highly-skilled areas of design and programming. This has occasionally been blamed on 'female technophobia' as if an inability to deal with technology is an inherent element of womanhood. If we reject this biological determinism, we must examine the reasons for the under-representation of women in technology usage and ask why those tasks which women perform are not significant enough to render them visible within the computing culture.

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Disparity of access between girls and boys

Education is an important element in the shaping of identity and the formation of social attitudes of girls and boys. This leads to the continued acceptance of gender inequalities and male privilege as the norm within society (Ryan, 1997). It also leads to the continued disadvantage of girls in relation to ICT training.

Educational research shows no significant difference in computer use in children of pre-school age. This parity seems to exist until children reach pre-pubescence, ten and eleven years of age, when girls, regardless of ability, receive negative messages about maths, science and technology. Romero (1995) reports that these negative messages, combined with the loss of self-esteem which many girls of ten and eleven experience is sufficient to persuade them to exclude themselves from choosing these subjects and following the standard path of what is often called a 'girl's education' i.e. an education which lacks any instruction in maths, the sciences or technology. Kramer and Lehman (1990) state that the combining of computer education with maths and science classes alienates girls. In addition, within schools, computer stations are regarded as 'male turf' by both girls and boys and boys are the first to grab and then maintain control over computers available on a first-come, first-serve basis. Romero (1995) also reports that teachers treat boys and girls differently, reprimanding girls for calling our answers, calling on boys more often and praising boys more often. Carlander (1997) reports on a study carried out by the *Association Femmes et mathematiques* in fifty French secondary schools which found that the notion of having a 'head for maths' as a pre-requisite for the study of science continues to be a commonly held belief among students. The study found that 62% of girls believed themselves to have abilities in this area, compared with 72% of boys. Carlander (1997) also reports that the filming of science classes in Germany, the UK and Portugal showed that teachers reply more to questions from boys than from girls. In addition, she reports that researchers from the University of Rennes and Dijon (in France) found that science teachers devoted 20% more time to boys, were less likely to put questions to girls and congratulated girls on their discipline and tidy work, while praising their male classmates for their reasoning abilities. Carlander (1997) quotes a researcher at the University of Linnköping, Sweden who states that:

> 'Girls are under-evaluated and less is expected of them - an attitude which they appropriate by excluding themselves from the competition. Maths and technology? Those are not subjects for them because girls are not seen as the builders of the nation'(1997: 15).

The fact that video games are the first introduction that most children have to computers is also an important factor in the disparity of access. Numerous studies have identified the prevalence of early gender stereotyping with girls receiving dolls so as to foster sensitivity

and gentleness while boys receive computer games with all the aggressive metaphors that underpin these game narratives. These video games allow boys to develop their abilities in an unstructured, technologically significant environment which puts girls at an early technological disadvantage. Perry and Greber (1990) state that many girls believe that as computer games are an integral element of the world of boys, so all interaction with computers is alien to girls.

Disparity of access between women and men

Many of the early users of the Internet were connected via an affiliation with either a university or a corporation. These institutions remain in the main dominated by men. This has resulted in a definite disparity of access on gender lines contributing in part to the under-representation of women in science and technology subjects. This under-representation may also be partly explained by the negative stereotypes surrounding these disciplines. Science and technology subjects are often considered to be cold disciplines, with logic and rigour as the primary requirements, qualities commonly associated with men. This leads many women to reject careers in these areas. Claessens (1998) reports on the gender imbalance in the representation of women in technology and science careers in Europe, showing that women fill only 20% of positions in science and technology in Europe at present, although they fill between 40% and 50% of jobs on the employment market as a whole. In addition, 52% of European higher education graduates are women but science and technology subjects are taken by only 25% of female students. In France, just 24% of medical doctors are women while only 20% of mathematicians are women. In Sweden, 44% of doctorates in the bio-medical field are awarded to women but only 25% of these women take a post-doctorate and only 7% teach at universities. In the Scandinavian countries, where the parliament comprises approximately 30% women (far higher than in other countries in the EU), university chairs remain very much a masculine stronghold (96% men in Denmark and Sweden and 94% in Norway). Indeed, the representation of women in science and technology subjects is sufficiently low that in 1998, the European Commission in association with the European Parliament, organised a two-day *Women and Science* conference with the aim of increasing the involvement of women in science and technology areas such as health, biotechnology, the environment and education throughout the EU.[3] Participants at the seminar identified some of the greatest obstacles facing women researchers. These include:

- women scientists, in common with women in other professions, have difficulties reconciling career and family life;

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[3]This conference followed two earlier European meetings held to assess the situation of women and science: the seminar *Women in Science (1993)*, an initiative of the European Commission and the workshop *Women in Science and Technology (1993)*, organised by the European Parliament's Scientific and Technological Options Assessment (STOA) unit.

- in the laboratory, women scientists often find themselves assigned to male project leaders and decision makers who often limit them to completing non-creative tasks;

- as a result, women scientists tend to publish less, which has a negative impact on their promotion prospects;

- women scientists most commonly prefer joint research and so publish their results as one of a team so their success remains more anonymous;

- women scientists travel less and attend fewer seminars than their male counterparts;

- women scientists more rarely rise to positions of seniority;

- women scientists receive fewer prizes (they have received just eleven of the 441 Nobel Prizes for Science);

- women scientists are more rarely members of international organisations or prestigious academies of science.

Positive measures to counter disparity of access

Ebben and Kramarae (1993) have suggested a number of ways in which the gender imbalance might be redressed. Such measures would include making the Internet easily accessible to all; making networking an attractive communication tool for women by creating tangible and viable information and resources; encouraging young girls and women to become involved in the development and use of the technology of cyberspace; and creating a friendly online environment where women can speak their minds, without having to hide their gender. According to the researchers, the implementation of these measures would facilitate women's increased contribution to the daily shaping of the world of cyberspace.

Cottrell (1992) also suggests some means by which females may be encouraged to make more use of public computer facilities. She believes that computer facilities must be a physically safe environment; third level colleges should ensure adequate numbers of female staff members in the computer science departments; pornographic images should be banned as background screen images in computer laboratories and offices; public computer laboratories should be equally accessible to all; and individualised learning resources such as self-paced online or video training tools should be provided for those students who feel uncomfortable in large classes.

One positive means of redressing the disparity of educational access is the establishment of mentoring programmes such as that organised by the Colorado Minority Engineering Association. Set in the University of Colorado, Denver, a 'summer enrichment' programme was inaugurated to encourage girls and members of 'at-risk' minority groups to get a

thirdlevel education. The programme reports that nearly all those who took part in the programme went on to third level education and the majority elected to study maths and science. Later in this chapter, we discuss some mentoring programmes taking place in Ireland.

Other means of encouraging women to see careers in science and technology as viable options include the increased visibility of technologically-empowered women via the Internet. For example, Aliza Sherman's cybergrrl site (www.cybergrrl.com) offers information on software and links to other female-oriented sites. Cybergrrls (so-called to distinguish themselves from the 'girls' of online pornography) are active on the Net, establishing websites to market their products and services. Many cybergrrls use their sites to invite women online and get them involved in web-based activities. Sherman cites what she terms the 'five myths that keep women offline' as follows:

> 'the Internet is too hard, it is too expensive, it is too dangerous, it holds nothing for me professionally and it holds nothing for me personally'. She gives practical reasons why these beliefs are mistaken such as 'if you can type, you can go online', and 'the Internet is like a city; stay out of certain areas and don't do certain things' (Frost, 1996: 5).[4]

(1996) describes technologically-empowered women as 'creative, innovative and adventurous' (Sinclair, 1996: 86). However, such descriptions tend to create divisions between those women with online knowledge and those who feel excluded. As Warnick (1999) puts it:

> 'Cybergrrls are portrayed in their own self descriptions ...as opportunistic, savvy, dynamic, resourceful and forward looking. Absent and tacitly devalued are those women who are not technology literate or who are viewed as passive, unskilled, hesitant or controlled by forces of which they themselves do not take control' (1999: 74).

3.3.5.2 Costs

Secondly, we must examine the costs of computing. In chapter two, we discussed the 'digital divide', examining how economic disadvantage can limit the access to technology of those who cannot afford the costs of such access. These costs may be divided into the following areas: the cost in time which the learning of new skills requires; the cost in time which participation in the culture of computers requires; and the financial cost

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[4]Rose (1995) highlights the increase in such 'dangerous territory', reporting that the trade in brides and prostitutes on the Web is on the increase, facilitated by brightly coloured visuals and requiring only a credit card number for the business of selling women to be conducted.

of connection (both the initial set-up costs and the continued costs of computer usage). Our research found that while such costs will not deter professional women from engaging with technology, they will almost certainly prove prohibitive for women who are outside the full-time work environment. Therefore, if cost acts as a strong prohibitive factor in women's engagement with ICTs, it is possible that it also adversely affects the engagement of other groups with the Information Society. This fact must be recognised and remedied so as to make the benefits of the Information Age equally accessible to all.

3.3.5.3 Uses

Tapscott (1998) sees the growth of the Internet as an important means of redressing the gender imbalance between girls' and boys' use of computers:

> 'The Internet has made computers much more interesting for girls. Girls' group play is dominated by the pattern of building villages. A computer that can't communicate with other computers lacks the necessary tools for building community, and therefore isn't really seen as a toy or means of having fun' (1998: 62).

Considering adults, women and men also use online facilities differently. Frissen (1992) believes this to be a symbolic expression: 'about themselves and their sexual identity'. She also sees women's reluctance to use computers and other electronic devices as

> 'an active practice - meaningful in female subculture' (1992: 93,37).

She states that the exclusion of women from the design and production of technology deprives them of the power which technology can bestow. In addition, the absence of significant numbers of women from the design and production of technology means that technology is often developed in ways which are not meaningful to women. One example of this phenomenon is the 'toys for boys' syndrome. She links the developments in virtual reality and similar technologies to the fact that many of the men who developed these systems wanted to make computer games that were more realistic and exciting.

3.3.5.4 Other Barriers

Other barriers to women's equal engagement with computer culture include the possibility of online sexual harassment and the availability of online pornography.

Sexual Harassment

The Internet is frequently referred to as an area of social interaction, a place to meet others and exchange ideas. As in the built environment, within the Internet, there are

a number of different environments in which this chatting can take place. Firstly, there are public newsgroups available on UseNet. Secondly, there are semi-private mailing lists which are usually moderated or organised by a systems operator (Sysop) and thirdly, there are chat-rooms which operate in real time. These include Internet Relay Chat (IRC) rooms and Multi-User Dungeons/Domains (MUDs).

The contribution of women to UseNet newsgroups and semi-private mailing lists is limited. For example, Cottrell (1992) found that in unmoderated newsgroups i.e. newsgroups without a designated system manager, approximately 80% of messages are posted by men. Examples of such newsgroups include alt.feminism and soc.women. In moderated groups such as soc.feminism, contributions from women number approximately 50% of the overall messages. In another study of newsgroups, Herring (1993b) found that women contribute half as much as men and men's messages are twice the length of women's. In addition, women consistently receive fewer average responses to messages posted while topics of discussion initiated by women are less often discussed by online groups. She also found that women are more frequently subjected to sexual harassment and more intimidated by flaming (personal insults online).

Such studies show that posting messages in these environments can be hazardous to women. For example, women who post frequently suffer sexual harassment such as requests for nude pictures of themselves or sexual propositions via return e-mail. In a similar fashion to the way that real or perceived dangers in the built environment are feared by both women who have been attacked in the past and those who fear attacks in the future, online sexual harassment discourages both women who have already been harassed and women in general from online participation. Therefore actual figures of the number of women who have been harassed (for example, one-fifth of the five hundred respondents to the 'Systers' mailing list of female computer scientists reported having been sexually harassed in the past) must be considered in conjunction with the exclusion which the *threat* of harassment causes.

Activism against online sexual harassment is essential if this exclusion of women from the online environment is to be tackled. Kramarae et al. (1993) have suggested that anti-sexual harassment policies should be incorporated into academic and corporate computing policies. Such a policy might include: an established grievance procedure for sexual harassment complaints; periodic reports on the numbers and types of complaints and the actions taken; and a clear definition to be decided upon as to what constitutes offensive messages.

Edlington (1995) suggests that women can prevent harassment by being careful about what messages they post and where, ensuring that messages are carefully written so that they are not open to misinterpretation.[5] The author also makes suggestions for some

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[5]This approach is similar to anti-rape advice which makes women responsible for avoiding dangerous

additional measures which may reverse the trend of large numbers of women leaving the Internet and others refusing to join for fear of being harassed. She believes that:

- the extent of online sexual harassment should receive more publicity;

- women who receive explicit messages from men should take a tougher stance against these men;

- systems operators (sysops) on bulletin boards must take active steps to deal with the problem;

- women need to be informed of the potential dangers of the Internet and means of tackling problems which arise in this unregulated environment;

- as UK law states that sending anything sexually explicit or threatening is illegal, this legislation should be used to secure the prosecution of harassers which in turn might deter any would-be harassers.

These measures are a vital means of addressing the problem of online sexual harassment. The author concludes that:

'the future of the Internet depends on attracting more users - especially females. Sexism and harassment need to be tackled by everyone if the Net is to grow. And if the Net becomes a battleground of the sexes, we will all lose out' (1995: 21).

In summary, while many women go online without being harassed, studies have found that for many women the possibility of online sexual harassment makes cyberspace an environment hostile to them.

Pornography

In a study undertaken by researchers in Carnegie Mellon University in Pittsburgh, Pennsylvania, some key facts regarding online pornography are listed. These are:

- 'there's an awful lot of porn online' (over an 18-month period, the team surveyed almost 100,000 images, stories and film clips);

- 'it is immensely popular' (trading in sexually explicit imagery is 'one of the largest (if not the largest) recreational applications of users of computer networks);

- 'it is a big moneymaker' (five of the largest bulletin board systems (BBS) displaying sexually graphic images for a fee have annual revenues in excess of $1 million) ;

situations or sending out signals which attract unwelcome attention.

- 'it is ubiquitous' (the research team identified consumers in more than 2,000 cities in all 50 states in the US and 40 countries, territories and provinces around the world);

- 'it is a guy thing' (the BBS operators state that 98.9% of consumers of online pornography are men - with a suggestion that some of the remaining 1.1% are women paid to post messages in chat rooms and bulletin boards to make men feel more comfortable);

- 'it is not just naked women' (the adult BBS market is largely driven by demand for deviant material which is otherwise difficult to obtain - paedophilia, bondage, sadomasochism etc.) Elmer-Dewitt (1995: 34)

The development of ICTs was considered to bring new personal freedom and empowerment for women.[6] Just as the possibility of being sexually harassed while online can act as a barrier to women's use of online facilities, so the development of computer pornography is opening the way for 'ever more sophisticated possibilities for the abuse and exploitation of women' (Butterworth, 1993: 33). This possibility of abuse can deter women from fully engaging with ICTs.[7]

3.3.6 Summary

This brief examination of gender as a 'system of constructed difference' and the behaviours, boundaries and differences which constitute this system is an important means of considering the implications of such differences in the context of ICTs. If we consider that normative gender roles delineate the feminine gender as emotional, personal and caring and delineate feminine communication patterns as generally facilitative, open, concerned with personal relationships and dependent on informal social networks, we can examine the ways that these social constructions may affect women's use of technology. In carrying out this analysis, we consider how gender relations are constructed and how this impacts on different groups of women such as those outside the formal workforce, those working full-time in the home, those who are over-55, or professional women. This research programme examines the intersection of categories such as gender, age and educational attainment within the determining impact of gender structures. This examination is undertaken so as to identify the possibilities for change which exist within such structures. In this approach, we follow Waylen (1998) who states that:

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[6]The use, production and distribution of pornography by some sado-masochistic, radical lesbians is an example of women harnessing such freedom. However, such usage remains limited.

[7]In a revealing insight into just how much more easily accessible pornography is in computer format, Butterworth (1993) gives the example of a computer consultant who stated that every large office that he had ever visited had pornographic images stored somewhere on the computer system.

'the actions of different groups of women cannot be understood outside of the structures which constrain them, just as those structures cannot be understood without some consideration of the impact of the choices made by actors both inside and outside of them in creating and changing those structures' (1998: 2).

Finally, we believe that our approach is a suitable means of examining the multiplicity of experience within women's lives.

3.4 Women, Technology and Society in Popular Discourse

Within popular culture, women's magazines are often a useful indicator of attitudes to gender roles and their place within female culture. Therefore, a consideration of the amount and type of coverage of technology is appropriate to this investigation of the gender/technology relation. The profile of technological developments in women's magazines is steadily increasing, with all the market leaders featuring articles dealing with websites and the Internet in the recent past. However, most of this coverage presents the Internet and the WWW simply as exciting new shopping aids. Consider the October 1997 issue of *Cosmopolitan* which carried a 4-page feature entitled 'What's new, Cyberpuss?' The language used in this feature is coy and tongue-in-cheek. For example, practical advice to enable one to get connected to the Internet is mixed with 'four essentials for surfing' which include nail varnish and the telephone number of the local pizza house so that one can comfortably shop all night! Visually, shots of glamorous young females draping themselves over computer screens and varnishing their nails in front of computers which have cuddly toys stuck to the monitors serve to 'feminise' these boys' toys and make them non-threatening. This visual message is backed up by references to real-life young women such as the actor Jennifer Aniston who 'admits' to using the Net in order to check references to herself. The article portrays engagement with ICTs as a necessary evil in order to avail of new shopping and light entertainment channels.

Articles of this type are typical of the coverage afforded new communications technologies within media marketed to women. The message to women is that technology does not have to be boring or difficult if it is used for fun and glamour i.e. shopping. However, young women are targeted solely as consumers. There is no mention of the opportunity for networking which such technologies afford, e.g. the opportunity for connecting with other women which the participation in chat-rooms facilitates.

This portrayal of 'suitable' uses of technology for women is also evident in other media. A radio advertisement broadcast on R.T.E. Radio in the autumn/winter of 1999 featured

the voices of two young females, one a prospective purchaser of a computer, the other the supposed vendor. When the purchaser states that she wishes to buy a computer, she is asked if she would like one that 'goes 'bleep' or 'blip''. The purchaser considers for a moment and chooses one that 'goes blip' whereupon she is informed that this will cost £2000. This ridiculous exchange is then commented upon by an authoritative, older male voice which says that as one wouldn't 'dream' of buying a computer in this way, neither should one buy one's insurance without researching all the options. Such advertisements reinforce the stereotype of the gullible female consumer who has absolutely no knowledge or interest in technology.

In addition, there is a general 'female invisibility' problem in publications which deal with technology. McQuillan and Bradley (1999) give two examples of this problem. The first example they give dates from 1998, when only one month after *Microsoft*'s human resource manager highlighted the skills shortage problem in the Irish computer industry saying that more female recruits needed to be attracted to the industry, *Microsoft* published a supplement in the *Sunday Times* which did not feature even one woman. The second example refers to *Computer Weekly*, one of the most widely read U.K. computer industry publications which rarely features women. In its September 3rd 1998 edition, the only three women featured are all in the advertising section, one of whom is partially undressed, her hair in curlers with a tattoo on her breast, an image which is at odds with the serious tone of the accompanying text.

If technology is represented in popular culture as alien to women, popular culture continues to represent technology as the rightful domain of men. For example, Stewart Millar (1998) studied six years of *Wired* magazine's output. She details six myths endorsed by *Wired* which lead to the construction of what she terms 'hypermacho man' (the imagined reader of *Wired*, technologically up-to-date and stereotypically male). These myths are:

1. a deterministic view of technology;

2. the designation of cyberspace as a separate, unadulterated space;

3. continuous reference to the unprecedented pace of technological developments;

4. a view of the Internet as the superlative means of locating information in a free-market economy;

5. a determined first world bias;

6. an endorsement of the need to consume in order to stay abreast of technological developments.

The overall effects of these myths is to designate digital technology as inescapable and socially beneficial and critics of technological developments as mistaken and uninformed.

3.5   Women, Technology and Society in Academic Discourse

In the 1970s, a 'new wave' of feminism began to view women's exclusion from technology as an aspect of their social disadvantage. Women's lack of technical knowledge was also identified as limiting women's fulfillment of their potential. Wajcman (1991) attributes this lack of technical knowledge to the cultural stereotype of technology as an element of masculine culture. Wajcman traces the historical and cultural constructions of gender which have led to women's technologies being deliberately diminished and forgotten. She suggests that the cultural stereotype of technology as an activity suitable for men must be abandoned: 'we need to try and sever this link between what technology is and what men do' (Wajcman, 1991: 201).

Much academic work in the field of technology and gender works from this premise which is posed as a series of questions by Cockburn (1992):

> 'What do we mean by social when we speak of technology? What do we mean
> by technology when we speak of gender? What is the connection between
> technology and power? What kind of power are we talking about?' (1992:
> 32).

These questions (which are central to a feminist understanding of technology) are a useful starting point in our examination of the academic discourse which surrounds women, technology and society. Cockburn finds that the sociological theories of technology fail to consider the importance of technology and gender as central components of technology and technical change. If we consider this shortcoming in connection with the main thrust of work examining women, technology and gender, we can supplement Cockburn's enquiry with three key questions. These are:

i) what kinds of values and meanings about gender are expressed through technology?

ii) what roles do these technologies play in the construction of gender relations?

iii) what effects do the ways that women and men use technology have upon the socio-cultural value system which underlies these technologies?

3.5.1   Determinism and Non-determinism

The dystopian/utopian polemic already identified in the general research in this area is also evident in work dealing specifically with women, technology and society. The two

main approaches either reject technology (and modernity) as being by men and for men (technophobia) or embrace technology as a means of empowerment (technomania). These responses reinforce many of the assumptions and established ideas surrounding techno-science and modernity, whereby women are seen as outsiders, excluded from technology and power and deprived of the possibility of changing gender relations. They are fundamentally marginalised, unable to change either the nature of technology or of culture. Within this view, the disparity of access to technology and the under-representation of women in the world of technology is assumed to be unchangeable giving rise to a value system underlying technological practices which is fundamentally masculine and not a meaningful element of women's culture (Bleier, 1986; Harding, 1986; Biehl, 1991; Cockburn, 1992). While this designation of involvement with technology as an activity appropriate only to men has acted as a barrier to women's involvement in technology, some researchers have interpreted this non-involvement as an active resistance on the part of women who reject technology as non-feminine and therefore of no interest or relevance to their value systems (Turkle, 1984, 1988; Turkle and Papert, 1990; Cockburn, 1992).

The opposing view sees recent developments in technology as a useful means of challenging established gender roles and traditional public/private divisions:

> 'Virtuality brings a fluidity to identities which once had to be fixed . . . complex systems and virtual worlds are not only important because they open spaces for existing women within an already existing culture, but also because of the extent to which they undermine both the world-view and the material reality of two thousand years of patriarchal control' (Plant, 1996: 170).

In other words, Plant sees developments in ICTs and the online environment as an ongoing means of effecting change in gendered identities and the operation of power in society.

One form of technomania is termed 'power-feminism' and its proponents (Wolf, 1993; Spender, 1995) see computers as a great liberator for women and investigate how computers can be used in ways that are meaningful to women. For example, Wolf (1993) calls for a de-gendering of the machine so that the masculine culture of technology in its varied forms, whether within the household, architecture, urban spaces, cars or transport, is rejected and a new gender dynamic is created. In this, she uses von Hippel's notion of 'users as innovators' i.e. many technologies which were imagined to have a limited number of uses are often re-shaped by users who find new uses for these tools. These new uses are in turn commercialised by the original manufacturers.[8] Therefore, this approach

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[8] A common example of the 'users as innovators' theory is the telephone which was originally imagined to be of use only in the commercial world but was quickly appropriated by women as an essential tool of communication. Martin's (1991) examination of the archives of the Bell Telephone Company shows how the formation of the Canadian telephone system was influenced by women's use of the telephone.

states, although women are still under-represented in the design of technology, they often re-shape technology in ways which are more meaningful to them. For example, Grint and Gill (1995) argue for a move away from essentialist understandings of 'masculine' or 'feminine' technologies to a more complex understanding of the nature of technologies whereby the 'textual character' of technologies is determined 'not in the technology itself . . . but in the interpretations that are made of it' (1995: 8).

Wajcman (1991) further divides the feminist response to technology. She believes that radical feminists see technology as masculine, liberal feminists see it as neutral and socialist feminists see it as exploitative. Wajcman argues against such rigid boxing of ideas and focuses on technology as an inherent element of society, a 'cultural product' which is shaped by history, knowledge, social practices and other forms of representation. Adam (1993) believes that technology must be considered in relation to gender, an uncommon stance among researchers with a background in computing rather than the humanities, as many computer scientists concentrate on the technical aspects of technological developments and ignore the ways that these developments affect society. Finally, Butterworth (1993) critiques the 'technological-fix' approach referred to in chapter two:

'Technology is represented as being an 'evolutionary' process, which arises out of neutral ground or 'the survival of the technologically most useful'. In this view, technology 'just happens' and the good stuff stays, the bad stuff, no-one buys. Radical feminists know that nothing in this world happens which is divorced from its social and political context: that just as the personal is political, so is the technological' (1993: 37).

3.5.2 Technology versus Nature

Much ICT research has analysed the ways that nature and technology have always been placed on opposite sides of the spectrum. Work in this area also studies how this affects gender stereotyping and relations. This approach is sometimes termed 'eco-feminism'. Cadigan (1991) working in the medium of fiction, investigates how oppositions between nature, science and technology operate in contemporary American society. Van Zoonen (1995) states that as women have traditionally been seen as closer to nature, the dominance over nature which is afforded by technology may be assumed to be a dominance of technology over women as well. She states that much of the power of patriarchy has stemmed from this control over nature and in turn women. In their exclusion from technology, power and the public sphere, the influence which women may exert within their socio-cultural system is severely restricted. Condren (1989) examining the history of the Judaic religious tradition also makes a clear link between the loss of respect for nature and the emergence of patriarchal societal structures:

'[Under polytheism] humans felt themselves to be part of the cosmos. [However] in the Jewish and Christian traditions, every effort would have to be made to overcome one's passionate nature. 'Nature' was passionate and unpredictable and could undermine the relationship between God and man ... These theological changes ... were to have profound consequences for the position of women, eventually succeeding in entirely abolishing any routes for female autonomous religious power. Although technically neither male nor female, God became in essence a male deity supporting the concerns of men in the emerging patriarchal order' (1989: 17).

Haraway's ironic manifesto for cyborgs 'creatures simultaneously animal and machine' (1991: 150) optimistically envisions a future in which our relationship with technology is revolutionised by 'liberatory' cyborgism. This work has influenced many of the explorations of women, nature and technology which have been written in the last decade. This body of work is often referred to as 'cyberfeminisim'. Following Haraway, cyberfeminists have used the cyborg metaphor as a means of re-thinking gendered identities in the Information Age. They believe that cyberfeminism liberates women from the controls inherent in the structures of the physical world and allows women to re-invent/re-invest the female body with new meanings and powers. Much of the work in this area can be divided into three strands of research: the first deals with the relationship between women and cyberspace, the second deals with feminism and CMC and the third deals with the use of ICTs within the home.

3.5.3 Gender and Science

Another specialist area of academic discourse which is of interest is that which considers the gender/science relation. Indeed, the history of women's participation in and contribution to the sciences demonstrates a strictly enforced imbalance between the sexes. For example, in 1903, Marie Curie was only nominated for the Nobel Prize when her husband personally urged the members of the selection committee to consider her work more closely.[9]

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[9]In the period 1500-1700, the only women who could become involved in the sciences were 'gentlewomen' whose fathers, husbands or brothers were already involved. For example, the 'Sisters of the Royal Society' were the sisters or wives of 'Royal Society' founding members Robert Boyle and John Evelyn. The social standing of these women and their family connections protected and facilitated their scientific ventures. In the same period, women such as Elizabeth Grey, Alethea Talbot and Queen Henrietta Maria provided medical care for their own household and community, kept manuscript recipe books of remedies for future reference, occasionally even publishing these medical and culinary tips. They also prepared, compounded and applied home cures, work which was often disparagingly referred to by male scientists as 'kitchen physic'.

It is possible that such a long history of exclusion has led many women to self-exclude themselves from the sciences. It is also possible that the emphasis on 'truth' in science has created the notion of an impersonal and objective discipline which does not allow for the importance which many women attach to the effect which a scientist's background may have on the ways in which s/he sees and interprets results.

Riger (1992) traces the development of modern scientific methods and the feminist response to such methods. Some feminists consider the social context of 'facts' to be essential to a true understanding of facts; others reject universal, ahistorical laws of human behaviour; others try to locate women's experience and perspective within the traditions of scientific research and development; and others reject the notion of science as a search for knowledge, free of moral, political and social values, believing that:

> 'knowledge is not neutral; rather, it serves an ideological purpose, justifying power' (1992: 730).

Oakley (1998) is one of those who believes that science and gender can usefully be joined within a feminist discourse if the long tradition of animosity between feminism and science can be subverted. She points to the work of those whom she terms 'second- wave feminists' (Harding (1986), Hartsock (1987), Rose (1994)) as demonstrating the need for a feminist standpoint so as to remove science from its rhetorical construction as the specialised province of 'men in white coats'. In other words:

> 'the need for a science that respects the foundations of women's knowledge of the world in their work and the love of caring for, and about, others' (1998: 134).

3.5.4   Women and Cyberspace

This new space called 'cyberspace' is often characterised as the great equaliser, a new culturally blind space where all social, sexual and gender differences are negated. However, an examination of descriptions of cyberspace shows that many existing cultural divides and biases are employed in descriptions and analyses of this new space, denoting it as male-centred. Consider the competitive colonising and pioneering rhetoric which is often used to describe cyberspace:

> 'Cyberspace is a newly discovered frontier that many theorists are cultivating and the terms for its exploration and colonization multiply at a pace greater than any other colonialist venture' (Gibson and Oviedo, 2000: 100).[10]

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[10]For example, a recent article describing the process of creating a personal webpage is entitled 'In the path of the Net pioneers' and displays an image of Thomas Edison (McClellan, 2000).

This aggressive rhetoric could be described as male-centred and therefore unsuitable to describing women's experience of cyberspace. Warnick (1999) compares this marginalisation of women's contribution to the creation and development of computer frontiers to the neglect of the contribution made by women in forging the American frontier. This world of 'founding fathers' and 'pioneering adventurers' portrays women as 'late arrivals on a new frontier who are unprepared for a hostile male-dominated environment'. Looking at the history of the Internet (originally designed for the US Defence Department and then taken over by academic communities - often computer science departments), Johnstone (1995) describes the Internet as having a 'locker room atmosphere' (1995: 23). Researchers have also pointed out that this exclusionary atmosphere is increased by the language used on the Internet and by the technological constraints surrounding its usage. Shade and We (1993), examining the low visibility of women in computer culture in general and the Internet environment in particular, question whether this low visibility might be due to the predominant language use in computing which makes use of violent terms such as 'abort' and 'kill' which reinforce the metaphor of cyberspace as an uncontrolled frontier, an environment unsuitable for women. The authors search for ways that women can counter this exclusion and believe that networking, in particular, may be an empowering computer use for women.

Another means of making cyberspace more female-oriented is to imagine it differently. After all, comparisons between the Web and 'new frontiers' or 'locker rooms', for instance, are simply imaginings within a male-oriented paradigm. Perhaps a female-centred paradigm would encourage metaphors of cyberspace which better describe female experiences and values. Some researchers have succeeded in drawing such female-centred images of cyberspace. For example, Van Zoonen (1992) likens the Web to a library (traditionally, a female-dominated workplace). She rejects the notion of a 'cyber-library' which replicates physical libraries where most of the works are by men saying that instead women should create material suited to women's interests and needs. Similarly, Kaplan and Farrell (1994) see the Web as an inter-connected network or web which is in constant flux, reflecting the input of users; 'you create the net in the act of accessing it' (1994: 67).

In addition to imagining the Web differently, we have already seen that women use the Web differently. Brunner (1991) examines women's interactions with virtual space and concludes that women are moulding ICTs to suit their needs. She believes that while men see technologies as tools which give power and wisdom, women see them as instruments for connecting them to other people i.e. communication. She sees electronic networking conferences on topics of interest to women, Bulletin Board systems used by women only and participation in chat rooms dealing with women's issues as interesting ways that virtual space can become meaningful for women.

3.5.4.1 Cyberspace - A Women-Only Space?

There are many deterrents to women's online participation. In particular, the existence of online pornography and the possibility of sexual harassment act as powerful barriers to women's full involvement in the online environment. (We discuss these in greater detail earlier in this chapter.) Such deterrents have given rise to the argument that the establishment of women-only spaces within the virtual environment is the best means of increasing the numbers of women online.[11]

Proponents of all-women forums stress the reduction in online harassment which these bring. Those who argue against such women-only spaces believe that such spaces reinforce negative gender divisions. They also believe that separating women and men online risks losing a vital aspect of women's online presence i.e. the opportunity to educate/inform men of the need for changes in gender relations.

Whether all-women forums should or should not be established, there is no question that it has become much easier in the virtual environment to stake out such territories. Finnegan et al. (1987) believe that this is because no one group owns or manages all of the Internet. They also believe that by claiming their own territories in virtual space, women can then begin to call for a re-shaping of policies in the built environment. In other words, technology can provide a suitable medium for women to organise and campaign to confront political problems.

Bruckman (1996) believes that the relevant question is not whether women are comfortable on the Net but what types of communities are possible. She suggests some practical means for women in search of a 'good virtual community'. These include 'lurking' (reading the contributions of mailing lists but not subscribing to them); reading electronic guides such as 'Net-guide' and 'Wired' which are more current, selective and useful than published guides; and using web search engines to find appropriate sites. She also encourages women to start their own websites. This allows them to move from being recipients of information to content-creators.

In summary, the electronic frontier is strongly male-dominated and remains an environment where many women feel quite uncomfortable if not actually unsafe. Most researchers believe that ensuring gender equity within the online (as well as the physical) environment

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[11] This follows a long-established tradition of women calling for women-only spaces where women's issues could more easily and positively be aired. In the writings of Virginia Woolf and Marilyn French and more recently, the science fiction authors Marge Piercy and Ursula le Guin, idealised spaces for women have regularly featured. Many researchers believe that women-only mailing lists and women-only areas are the best means of creating 'a cyberspace of our own' (Ebben and Kramarae, 1993: 52). They compare the development of computing networks to the development of the telephone in terms of their usefulness to women as a vital feminist resource. They also believe that online electronic conferences and mailing lists which focus on issues of relevance to women create an online community of women.

should be the priority of the Information Age. To achieve this aim, new metaphors describing the online environment may be invented or disseminated; the Internet should be easily accessible to all; networking should be established as an attractive communication tool for women; young girls and women should be encouraged to become involved in the development and use of new communication technologies; a friendly online environment should be created where women can speak their minds without having to hide their gender; and women must be both allowed and facilitated to contribute to the shaping of the world of cyberspace.

3.5.5 Feminism and CMC

Bromley (1995: 2) defines computer-mediated communication (CMC) as 'anonymous, fast and enabling communication with large groups simultaneously'. As interpersonal communication has traditionally been considered the preserve of women, much of the feminist interest in the confluence of technology and society has focused on the use of technology for communication, CMC. Many researchers (Henwood, 1993; Webster, 1995) have argued that in developing a discourse on technology and gender, we would do well to conceptualise them both as continually shifting. Within this approach, the new communication environments are believed to hold possibilities for reforming gender identities.

For example, Lawley (1993) believes that gender boundaries are being changed by communication technologies and specifically examines the possibilities of CMC to reform gender identities. With these shifting boundaries, deterministic views of the effect of technology on society and women must be re-examined. She refers to the work of McLuhan who she says sees the end-users of technology as passive. Lawley questions this view in the light of the new CMC environment where eventually the control of most systems is conceded to an elite of system managers. Lawley examines the role of the system manager in the CMC environment and the possibility for more women to become system managers and in this way, to have more control over the development of communication technologies. Finally, she refers to the creative possibilities afforded computer users who create and shape mediated or virtual environments.

Similarly, Light (1995) believes that CMC offers potential empowerment for women in cyberspace and that it is therefore vital to encourage many more women to become involved in CMC so that they may realise the relevance of electronic networking to their lives. However, Warnick (1999) takes a more jaundiced view of recent moves to involve more women in online activities. She believes that many of the appeals to women to come online are motivated by various vested interests (such as cosmetics firms, booksellers, entertainment franchisers and advertisers). These organisations recognise the buying power of women which stems from the sexual division of domestic labour which assigns to women

the (unpaid, usually unrecognised) work of purchasing and preparing goods and services for domestic consumption. However, she believes that these very appeals value:

'activity, aggression, currency, technology, and wealth and ... devalue their opposites - passivity, hesitancy, convention and poverty' (1999: 45).

In displaying such bias, Warnick believes that such appeals to women actually function to reinforce both their exclusion from, and marginalisation within, the online environment.

However, there is evidence to suggest that the online environment can prove a meaningful channel for women's communication. Bromley (1995) reports the highly effective use which American feminist activists have made of computer networking, establishing mailing lists which facilitate feminist discussions, engaging in political lobbying efforts and organising online academic conferences. However, Herring (1993a) states that academic CMC continues pre-existing patterns of social hierarchies which reinforce male dominance in academia and in society. She believes that the rules of the game still favour the powerful, a fact that is continuing unchanged by technology. Herring finds that where new technologies have been made to serve feminist ends, the existence of the group pre-dated its online presence and the new CMC medium is simply being used to enhance their work.

The feminist linguist newsgroup 'fling' (fling@listserv.oit.unc.edu) has been the site of much interesting discussion in this area. Consider this exchange between two female academics, Amy Sheldon and Susan Herring.

Amy: I have recently been analysing the behaviour of young adults in computer-mediated chat rooms and finding ... that they tend to enact more stereotypical gender roles the more they engage in fantasy play. They often seem to end up playing out familiar cultural 'scripts' such as sexual distress and coy resistance, chivalry to defend a damsel in distress, sentimentality at weddings etc. which involve traditional, binary gender roles.

Susan: Chat rooms are between strangers, not intimates and ... this context can account for the stereotyping. After all, what common ground do strangers have if not cultural stereotypes? Also, perhaps there's an element of performance involved in chat room behaviour, even irony or 'cuteness' or outrageousness.

It should be noted that Sheldon qualifies these comments with the proviso that as she does not 'inhabit' chat rooms, she cannot be absolutely sure that she fully understands the 'quality' that prevails in chat rooms. This is reminiscent of the disclaimer regularly made regarding many elements of popular culture such as television soap operas, romance novels etc.; 'I don't watch/read them myself but I have heard other people say ... ' which betrays the speaker's assumptions regarding the merit of such entertainment. In the same way, by commenting upon chat room interactions but absenting herself from participation in such forums, Sheldon betrays her bias against CMC. This weakens the strength of her argument.

3.6 Information and Communications Technologies (ICTs) in the Private Sphere

'The adoption and use of new communication technologies are interpreted as a series of social actions undertaken by its members, under precise conditions, for specific motives . . . A process of co-construction between family members and the cumulating of communication technologies in the household seems to take place. Its main feature . . . appears to be a process of spiral, ongoing mutual definition' (Caron and Caronia, 2001: 38).

The potential for introducing technology into the home is enormous and continues to grow as the demand for PCs, high definition television (HDTV), videotext and teletext services, pay-per-view TV and ISDN lines increases. Therefore, the boundaries defining technologies as work tools or leisure items are becoming less rigidly defined. This in turn leads to some blurring of the division between the public and private spheres. This introduction of ICTs into the private home has the potential to redefine the ways that family members incorporate technologies into their daily routines which can also change communication and interaction patterns between members of households and between the household and the public domain. This makes IT developments of particular interest to feminist researchers.

Research in the area of ICTs within the private sphere must firstly consider the material context of these technologies, i.e. the ways in which they are used, the times at which they are used and the spaces in which they are located, all within the context of changes over time.

Secondly, research must consider the context within which this integration of ICTs occurs:

'a cultural context which is at once specific and ubiquitous: the home. The home contextualizes the 'behaviour' of technological devices as objects that inhabit houses, occupy a space within domestic space, are part of the dynamic of daily life and family relations. The form their enculturation takes here is 'domestication'. Information and communication devices in the home belong to the wider class of domestic technologies. They cannot fail to be brought within the habits and values of the family-households that use them; nor can they fail to have an impact on the people already living where they (so to speak) are brought to life' (Silverstone and Hirsch, 1992: viii).

Or, in other words:

> 'Like all material objects entering a cultural and a social context, when new technologies are adopted in a household, they are submitted to a process of *domestication* through which they acquire (or lose) particular meanings, functions, and values according to the *economies of meaning* of each household' (Caron and Caronia, 2001: 39).

Thirdly, research in this area must also take into account the 'family' and the complex web of understandings and relationships through which family members interact with each other and the wider community:

> 'Family dynamics are expressed and managed through shared goals, family myths, rules and routines, conflicts and tensions, and its frameworks for explanation and understanding. These properties affect the ways in which families variously construe the relationships between individual members of the family and between the family and the social world' (Livingstone, 1992: 113).

Fourthly, in examining the functions of these new household technologies and the changes which they may bring to domestic life and family dynamics, feminist researchers also examine the reciprocal role played by gender boundaries and behaviours in family discourses and the domestication of ICTs. This research considers the implications (if any) of these changes for the position and social roles of women, men, girls and boys in the family and for the traditional gendered separation of the public and private spheres. They analyse the patterns of use of ICTs to see if this use follows traditional gender divides.

For example, Livingstone (1992) analyses the use of ICTs in the private sphere by investigating gender patterns in the home and how these influence the ways these technologies are used. She examines how wives and husbands have different understandings of and make different uses of domestic technologies such as the telephone, the radio and the TV. She conducts this investigation within four categories. These are:

i) necessity, whereby technology is seen to fulfil a need;

ii) control, whereby women and men have different understandings of how technology imparts control (women see technology use as a means of controlling one's environment while men enjoy the challenge of establishing control over the technological device);

iii) functionality, whereby men refer to the technical details of an object while women refer to whether or not the device is easy to use;

iv) and sociality, whereby technology may facilitate social interaction, allowing connections with family and friends or may substitute for that interaction, providing instead a social interaction between person and object.

Wheelock (1992) presents data gathered in 1990 in the US which examines the household use of computers. She examines the gender and age differences and the different ways that computers are used within households. Her research identifies the computer as the focus of conflicting ambitions and desires, all connected to the complex relations of gender and age identity created both inside and outside the home. Wheelock found interesting gender and generational differences in domestic usage of computers. In general, most parents saw the purchase of a home computer as an aid to their children's educational and career progress. However, eight sets of parents admitted buying the computer for their sons while only one set of parents purchased a home PC for their daughter's use. In terms of daily usage, sons and fathers used the computer more than mothers and daughters. Sons' social networks and interactions often centred on computer knowledge and usage. Many boys were members of computer clubs and exchanged computer games and software with their friends. This computer-centred socialising was absent from the relations of the girls within the families studied with many girls having opted out of using the family computer. (Eighteen boys described themselves as 'positively interested' in computers with only six girls using that description.) Some research has considered whether the increased availability of ICTs in the home makes technology more accessible for women. However, Wheelock found that many of the mothers considered the computer as a 'glorified toy' and felt that it did not relate to their lifestyles. In this way, they engaged in the active resistance decribed by Turkle (1984, 1988); Turkle and Papert (1990) and Cockburn (1992). However, the work of Haddon (1992) shows that the discourse of IT often finds that those who are not involved describe feeling 'left behind' while those who are involved describe feeling a sense of empowerment due to their participation in social events and successful engagement with ICTs. This sense of empowerment is borne out by the findings in this research programme. Haddon and Skinner (1991) also found that learning IT skills and using IT technology became part of a:

> 'process of identity formation which occurs both with other family members and in terms of the family's collective identity in relation to the outside world' (1991: 85).

The majority of women interviewed in this research programme also spoke of how ICT training led to changes in their self-esteem which in turn led to changes in their relations with family members.

The work of Haddon (1992) has similarities with that of Wheelock in its description of the differences between boys and girls' cultures with boys engaging in discussing computers and computer games ('boys' talk') while talk of computers and computer games is not part of the currency of girls' culture. There are also similarities with the work of Wheelock in the attitudes of parents, described by Haddon as the 'gatekeepers' of home ICT use, with parents displaying quite different understandings of computers in relation to their daughters and their sons.

Caron and Caronia (2001) studied nine families and their use of ICTs in the home. They found that the use of ICTs in the domestic sphere changed over time and through the geographical migration to different locations within the home, so that family members:

> 'assimilate them into their specific repertoire of norms [and] habits [so that] values seem to evolve towards new forms opened up by the technologies themselves and the unexpected dynamics that they create' (2001: 57-58).

3.6.1 Summary

Research in the area of ICTs in the home has focused particularly on how these new communications technologies may re-define the private sphere and family discourses and practices.[12] It would appear that ICTs within the home are a potent addition to the complex gender and generational patterns already in existence within the domestic sphere. As a games machine, an aid to education or as a useful work-tool, the home computer has many functions. As a domestic technology, it must be domesticated. It must be incorporated into the routines and interests of the members of the household who can use the computer to reach beyond the boundaries of the home. Feminist analysis of ICTs in the home contributes to our understanding of how technology within the home affects the dynamics of gender and generational interactions within the family and the boundaries between family and community.

3.7 Women and Technology: The Irish Perspective

In Ireland, the *Information Society Commission* carries out continuing research into the changes which technological developments are bringing to social interactions and practices in Ireland. In Information Society Ireland (1999), Irish women are described as: 'more familiar with current technologies, more willing to learn about it (sic), and can see the benefits and implications more clearly than their male colleagues'. Statistically, 45% of working women are familiar with IT, as opposed to 40% of working men; 69% of women outside the workforce are 'comfortable with technology' (55% men); 80% of working women were willing to learn about technology (64% men); 32% of women outside the workforce were prepared to take advantage of the changes which technology might bring (25% men); 80% of working women felt that technology would bring overall benefits to their lives (62% men); and 81% of working women believed that more people will work

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[12]One recent means of such re-definition is in the area of teleworking, where the employee works from the home environment. This shift in the boundaries of the public and private spheres may bring changes in the nature of domestic relations and a redefinition of work/leisure boundaries.

from home in the future (76% men). These results are at odds with the data which we gathered in Ennis and elsewhere. In the same report, the chair of the ISC, Vivienne Jupp, states that she believes that the responsibility for the IT revolution lies with women.

However, the disparities of access identified worldwide are also evident in the Irish context. Smyth and Hannan (1997) found that Irish girls attending coeducational schools under-perform in maths relative to girls in single-sex schools. They question whether this 'disadvantages girls in their take-up of and performance in other 'male' subjects such as physics' and argue that 'educational policy needs to address the type of education that girls receive, rather than focussing on the level of performance alone' (1997: 22).

Similarly, disparities are evident at third level. McQuillan and Bradley (1999) surveyed 216 female, second and third level students in Co. Limerick, to 'explore their attitudes to and experiences of computing' (1999: 1). The authors specifically state as one of their intended purposes the desire to 'highlight positive factors that influence women's career choice and academic success'(1999: 1). However, the study shows that for girls in second level education:

> 'despite many positive factors weighted in favour of girls choosing computing, for the majority of girls, academic computing is a big turn-off. They see it as machine-focused, boring and unsociable, the antithesis of their interest in communication and 'people-centred' professions' (1999: i).

The study also shows that while women in third level education:

> 'had positive attitudes towards computers ...enjoy their course and are academically successful ...an emphasis on abstract and technical curricular content and the media portrayal of computing as a masculine, technically focused domain conflicts with their gender identity and preferred learning styles and values, and creates barriers to academic success' (1999: i).

The authors conclude that:

> 'the problem of women's under-representation does not lie in women's lack of ability or interest, or their false perception of computing, but rather in the academic and cultural environment which is inherently, as well as stereotypically masculine ...we argue for the adoption of a broad conceptual framework to effect change ...whether we attract and retain women in computing depends on our willingness to incorporate more feminine styles and values into our institutional ecology, and our acceptance that the 'problem' (and solution) does not lie with women, but with academic institutions and structures, and the way that computing is taught'(1999: i).

Clancy (1995) also found evidence of gender differences in the level and nature of participation in third level education in Ireland with levels of female participation in computer science courses having dropped from approximately 40% in the late 1970s and 1980s to between 10 and 20% in the 1990s.[13]

Other evidence of gender imbalances in third level participation is contained in the so-called 'pipeline shrinkage' whereby the higher the academic position in computer science, the lower the number of women represented. These continued gender imbalances point to the need for future research to firstly examine whether these rising levels of female participation in third level education are being accompanied by changes in the nature of participation as well. Secondly, future research must examine the 'pipeline shrinkage' so as to devise some strategies to counter this problem. It appears that gendered socialisation does work against women engaging with technology. In the following section, we examine some of the ways this alienation from technology may become manifest and consider some means of redressing these imbalances.

Positive measures to counter disparity of access in Ireland

McQuillan and Bradley (1999) suggest some means of redressing the problem of the under-representation of girls and women in computing in Ireland. These include:

- the immediate provision of a forum to discuss issues relating to the problem of women's under-representation in computing;

- a consideration of the gender/technology relation at school level with the immediate development of a website aimed specifically at girls' interests (possibly modelled on the Backyard Project - www.backyard.org - developed in Silicon Valley);

- the facilitation and encouragement of greater numbers of female teachers to develop their skills and expertise in computing to provide female role models with 'expert' status;

- the provision of realistic examples of what a course in computing entails with colleges including details or photographs of final-year students to illustrate the different career paths available to graduates;

- the improvement of courses at third level to counter the lack of a social dimension to computer courses. This social dimension could take the form of a module on computing culture or sociology which could debate the role of computing in society and embrace wider issues such as sexism, class issues and equality;

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[13] *The Irish Times*, March 23rd 1999, states that the percentages of women in third level computing courses comprises 34% of first years in computing degree courses and 39% of Certificate and Diploma courses, figures which still fall short of the figures from the 70s and 80s.

- the provision of greater funding for the *Women in Technology and Science (WITS)* group to facilitate the conduct of seminars, initiatives and publications to build on existing women's networks and create stronger links between women in schools, colleges and industry;

- an attempt by the computer industry to foster greater links with schools and institutions so as to attempt to dispel the stereotype of the computer scientist as a socially mal-adjusted male. This could be achieved by inviting high profile women in the computer industry to give career talks to girls.

To date, only two of these measures have been put in place, in Ireland. The establishment of a number of mentoring programmes similar to that suggested by McQuillan and Bradley (1999) may be a possible reason for the recent improvements in the gender balance in undergraduate technology and computing third level courses in Ireland. One programme established by the National Software Directorate (now incorporated in Enterprise Ireland) aims to combat impending and current skills shortages in the computing industry and involved women with postgraduate qualifications who were employed directly in software development or engineering to give career talks to final year students. The second programme, organised by Irish third level colleges in conjunction with *Women in Technology and Science (WITS)* involved women already working in the IT and computing sectors making career presentations to second level female students to convince them that computing is a good career choice.[14]

A second reason for the recent improvements in figures in Ireland may be related to the increases in funding which have occurred to redress this problem. In 1998, the *Women in Technology and Science (WITS)* group received £30,000 funding from the Department of Education and Science to aid in their promotion of the participation of women in all areas of science, technology and engineering.

3.8 Summary

In this chapter, we have reviewed popular and academic discourse concerning women, technology, and society. We have considered the relationship between gender and technology and some of the gender differences in human interaction. We have considered the workings of social networks and some of the gender differences associated with these networks. We have also examined the area of feminism and CMC and the use of ICTs in the private sphere. Finally, we have considered women and technology in the Irish context.

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[14]Byrne (1999) describes some of the questions asked of the role models working within the Enterprise Ireland programme. These questions ranged from how the role models became established in computing to an average day's work, to what she wears to work, to how she keeps up-to-date with new technological developments.

Chapter 4

Methodology

4.1 Introduction

This chapter outlines the research methodology implemented in this research programme. Data was obtained through a variety of sources. Primary data was obtained by conducting unstructured interviews, focus groups, classroom observations and discussion groups. In addition to this primary data, secondary sources of data were used to crosscheck assumptions and assist in the methodological triangulation of the research. These sources included technical reports, government publications, academic dissertations, texts and journals, newspaper articles (provincial, national and international), popular magazines, conference proceedings, novels, films and various websites. This combination approach, (mixing primary and secondary sources of data)is described by Maykut and Morehouse (1996) as an 'interpretative-descriptive approach' which is described as most suited to research which aims to interpret a culture from the 'insider's perspective' (Maykut and Morehouse, 1996: 122).

4.2 Motivation

The two central questions that were formulated at the outset of the research programme were:

1. As Ireland becomes an Information Society, what effects are becoming manifest in Irish society?

2. How are these effects impacting upon the gender/technology relation in Ireland?

These questions reflect the central theoretical framework of this research programme i.e. the reciprocal relationship between society and technology and the effect on gender divisions. They are a useful means of providing a focus and context for the work of the research programme and are formulated within a self-conscious feminist perspective:

'whereas most writers assume that they are 'objective' and, therefore, can arrive at 'truth', feminist scholars, among others, increasingly recognize the need to challenge this approach' (Condren, 1989: xxiii).

The progress of the research took place through a process of questioning, learning and discovery. Rather than assume that technology affects society and changes how people interact, this research programme considers the society/technology relationship to be a fluid one, with technology affecting how a society operates and in turn society moulding technology to its needs and interests. This society/technology discourse is multi-faceted and complex, being a reflection of the many layers of a people's view of themselves and their place within society. Furthermore, this theoretical framework considers gender relations to be an intrinsic element of this discourse. With gender stereotypes traditionally denoting technology as inherently masculine, the consideration of the gender/technology relation is an essential element in understanding the society/technology discourse. Working within a feminist perspective, this research examines the gender/technology relation in the context of the emerging Information Society in Ireland.

The EIAT project in Ennis, Co. Clare was chosen as the locus of the primary fieldwork of this research programme. As a flagship of the growth in the information and communications technologies industry which has occurred in Ireland in the last few years, the 'technologising' of the community in Ennis has occurred more quickly and in a more organised fashion there than in other areas of Ireland. It was felt that an investigation of the progress of the project, from its beginnings in 1997 (when the logistics of 'wiring' the town were the foremost difficulty), through the involvement of the townspeople through the various targeted programmes and trials, to the close of the project in 2002, would yield a useful insight into the effects which the introduction of ICTs has upon gender boundaries and behaviours. We also interviewed women in two other towns in the west of Ireland in order to compare the various experiences of different groups of women, both within the context of the EIAT project and within the context of the developments in ICTs in Irish society generally.

In chapter three, we have considered the ways in which inequality of access is strongly related to the delivery of technology training within the school system. We have also considered the ways in which the popular acceptance of technology usage as best suited to the male gender places girls and women at a disadvantage in relation to ICT usage. In addition to these findings, as the research programme progressed, we found that many of the women interviewed mentioned the important role which their children's engagement with technology in the classroom played in encouraging and persuading them (the women interviewed) to overcome their fears of technology and undertake technology training. Many of the women mentioned that their children's positive approach to ICTs was a revelatory experience and helped to change their negative opinions of ICTs. Comments

such as these motivated us to consider the education/technology relation more closely. We felt that our understanding of these women's stories would be enhanced by the inclusion of classroom-based fieldwork in the research programme. We also wished to examine whether the findings discussed in chapter three were relevant to the educational practices in Ireland today. To this end, we conducted a series of classroom observation and discussions, examining the attitudes of children, teachers and school management to the use of ICTs in the classroom and the possible benefits and drawbacks of the increasing 'technologising' of the education environment. Once again, this fieldwork was conducted both within the context of the EIAT project and outside the confines of this project.

4.3 Objectives of the Research

We aimed to achieve two main goals in this research programme.

1. Firstly, we wished to examine the workings of the EIAT project in order to determine the effects of such developments upon the community of Ennis. In particular, we wished to explore the issues surrounding the engagement of the women of the town with the project.

2. Secondly, we wished to examine whether such projects have measurable, long-term effects on the gender/technology relation in the communities in which they are conducted. To this end, we conducted fieldwork with groups of women who are engaging with ICTs and in schools where ICTs are being made available to children.

(These research goals should be taken in conjunction with the five aims of the research programme as described in chapter one.)

4.4 Method of Research

The research programme incorporates both quantitative and qualitative methods. It incorporates some small-scale data collection in the form of a short survey of townspeople's opinions, administered in 2001, pre-figured by a pilot study in 1999. It also incorporates a series of unstructured interviews, focus group sessions, observation sessions and discussion groups. The secondary research centres on the interpretation of secondary materials, such as government reports, interim reports on the EIAT project, magazine and newspaper articles. Empirical data was gathered over time and in a variety of ways in order to track changing attitudes.

During the first phase of research (the pre-test period (1999-2000)), a questionnaire examining people's attitudes towards ICTs and the Information Age was piloted. Discussions

were held with the CEO and assistant CEO of the EIAT project and a series of personal interviews with members of the community of Ennis who were using the technology in their everyday lives and/or businesses were conducted. These interviewees were; a primary school teacher and pupil; a local newsagent; a tele-worker; and a disabled person using assistive technology.

The second phase of field research took place in Ennis in the summer of 2001 when a questionnaire was administered to members of the public on two days in two different locations in Ennis town. This questionnaire examined how the Information Age in general and the EIAT project in particular were viewed by the people of Ennis.

The third phase of research involved conducting focus group discussions and unstructured interviews with women who had undertaken technology training. The initial focus groups and interviews were conducted in Ennis with comparative sessions taking place in Galway and Sligo. These three focus group sessions took place with three distinct groups of women of differing ages, educational levels and professional training. This allowed comparisons along generational, educational and class lines.

This work was supported by fieldwork examining technology in education. Observations of primary school children using ICTs in the classroom were combined with interviews examining the attitudes of pupils and teachers with regard to ICTs (within the home, within the classroom and in the community). This work was undertaken in two primary schools in Ennis and Sligo (a town of similar size on the west coast of Ireland). This facilitated a comparison between the use of and attitudes to ICTs in classrooms in light of the EIAT project and in a general sense. We used this technology in education research to support the main thrust of the research i.e. the gender/technology relation. It enabled us to place the comments of the women interviewed in the context of developments within the education sector and to investigate some of the changes which these developments are bringing about, both in familial relations and in the wider world.

The primary research was supported by secondary research so as to interrogate assumptions and ensure that a thorough methodological triangulation was put in place. Many written sources were accessed. These included both an interim report commissioned by the EIAT task force in 2000 and a 2001 survey on the EIAT project entitled 'Behaviour and Attitudes'. Numerous reports examining aspects of the Information Age in Ireland were also consulted. In addition, various academic texts, journal articles and newspaper reports were consulted. Maykut and Morehouse (1996) describe this method of combining secondary sources with the primary data generated through questionnaires, interviews and observations as :

> 'some selection and interpretation of the data ... weaving descriptions, speakers' words, fieldnote quotations, and their interpretations into a rich and believable descriptive narrative' (Maykut and Morehouse, 1996: 122).

4.4.1 Choice of Research Method: Some Useful Reading

Caron and Caronia (2001) consider the research methods most appropriate to an examination of the use of ICTs in the home i.e. a mixture of both quantitative and qualitative approaches:

> '(M)ethods . . . which rely heavily on a quantitative approach, provide findings which are useful. However they need to be complemented by methods that are, generally, more subtle in contextualising use [of ICTs] and take into account the nuances of day-to-day interactive situations involving individuals and their appropriation of technologies'.

They describe the qualitative approach best suited to this research domain as:

> 'moving away from the deterministic paradigm, [taking] instead a contextualist and interactionist perspective on how people make sense of, give meaning to, and accomplish functions through the technical objects produced and offered by the market' (2001: 39).

A further understanding of the use of qualitative methods may come from the following description:

> '(Q)ualitative methods is an umbrella term covering an array of interpretive techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world . . . In order to understand people's lives and meanings, we must first be able to both appreciate and describe their culture . . . the origins of many of these cultures are not coupled conceptually to matters such as geography, ethnicity or social class but are grounded in organizational experiences' (van Maanen, 1983: 10).

This description of the qualitative process is a useful match for the needs and focus of this research programme, the aim of which is to examine, interpret and attempt to understand the experiences of women engaged with ICTs. In keeping with the work's feminist framework, we felt that there was no ultimate truth to be uncovered, but rather multiple truths, stories and understandings. We found that the interpretive techniques described by van Maanen (1983) were a useful means of eliciting and interpreting the stories and feelings of those involved in the programme. Being part of the culture of Ireland during this period when ICTs are being adopted and incorporated into Irish social and cultural practices also aided with the interpretation from the insider's perspective. We believe that the advice of Adler and Adler (1987) fits our research in this regard:

'In the context of social groups, two sets of realities [exist]: one presented to outsiders and the other reserved for insiders' (1987: 21).

The study by Trauth (2000) of the information technology sector in Irish society in the 1990s was also of particular relevance to this study. Her advice regarding a suitable methodology for examining a society's relationship with technology was influential in choices regarding the methodology of this study. She states that:

'the subtle influences of an environment's culture, history and society . . . are [best] learned about . . . not only by talking about them, but by observing and experiencing them as well' (2000: 18,19).

She further advises that this involvement in the field of study can best be achieved through reflexive methods:

'A key dimension of this . . . interpretive study is the self-reflexive stance that I have taken. I use my own experience and my learning process as a backdrop against which to highlight the socio-cultural factors that became relevant in this study. I reveal my own discovery process and show how I came to understand the importance of these particular cultural factors. Many times I reveal how I came to recognize the importance of a certain factor or the contradictions that I saw' (2000: 19).

We follow Trauth's work in this regard and interject the self into the research process. We examine the story of our own experience with ICTs so as to examine the gender/technology relation. We use this to focus and refine our approach to the conduct of the fieldwork. We adopt a flexible approach to this work, learning from the people of Ennis with whom we came into contact and who allowed us to learn from their experiences. This approach coincides with that of Flick (1998) who states that:

'research and its findings are . . . influenced by the interests and the social and cultural backgrounds of those involved. These factors influence the formulation of research questions and hypotheses as well as the interpretation of data and relations' (1998: 4).

The importance of the interpretive process is also foregrounded in Blumer (1986) who declares that most qualitative research works from three main premises. These premises are paraphrased in the following list:

1. humans use objects according to the meanings which they have for them;

2. these meanings originate in the social interaction of humans;

3. these meanings are understood through an interpretive process.

With regard to selection of subjects for interview, Morse (1994) defines several general criteria for a 'good informant' in research. These include:

- the necessary knowledge and experience of the issue or object;

- the capability to reflect and articulate;

- the time to be interviewed or observed;

- the readiness to participate in the research programme.

These criteria have proved very useful in our selection of research participants. In Ennis, we interviewed people who were involved in the EIAT project, either as individuals through the Resident Programme, as business people through the Business Programme, as participants in training programmes or as students within the Education Programme. This was essential in order to satisfy the first criterion of Morse as listed above i.e. to ensure that participants have the necessary knowledge and experience of the issue or subject. In order to identify whether the participants satisfied the remaining criteria, we contacted each interviewee individually by telephone, explaining the context, focus and approach of the programme. We explained that there were no right or wrong answers, that all participants would remain anonymous at all times and asked each interviewee if they were interested in becoming involved in the programme and whether they would be interested in discussing their opinions and experiences of the EIAT project. In Galway and Sligo, the snowball method of sampling was employed as possible participants were identified through personal contacts who could aid the researcher in contacting participants who satisfied the necessary criteria.

Our choice of research method was further aided by reference to work accessed in varying locations. The website of the *Virtual Society* research project proved a useful resource regarding methodological choices. At the opening address to a 'Virtual Methodology?' workshop in 2000, Steve Woolgar, the director of the project, rejected any notion that there should be a definitive methodology for studying virtual communities:

'This is entirely in tune with what we know from many years of social studies of science. It is only rarely possible to discern a consensual version of the methodology that informs scientific practice ... Methodology, according to research in social studies of science, is actually about muddling through ... When we talk about methodology we are implicitly performing who we

are, [asking] what's the point of what we're doing, which community we belong to, which rules we will allow our work to be adjudged by and so on. And so it is no coincidence, it seems to me, that talk about methodology brings out the moral. It is an extremely anxiety-ridden concept. Methodological tools, in particular our claims about which one is better than another, involve bids for security of membership to a community of research practice.'[1]

While Woolgar is referring to the study of virtual communities, his description of the manner in which choices regarding methodology are undertaken have resonance with our work with the physical community of Ennis. Similarly, Williams (1998) advises the adoption of a multi-disciplinary mode of research when dealing with the Information Society, one which includes:

'Interrelated studies of the economy, public attitudes, the diffusion process, and educational planning . . . This includes the necessity for combined qualitative and quantitative methods' (1998: 30).

Witherspoon (1988) also refers to methodological concerns in relation to the examination of the Information Society:

'The study of social and economic change in the information age is in no way restricted only to economic data, public attitudes, or technology transfer . . . The study of change in a society is a study of its people, whose efforts create and continue the economic, educational, political, and cultural institutions that unite them with a collective identity . . . [society's changes] can be viewed through the eyes of a few individuals who have served that society as agents or examples of change. Such views are particularly interesting in a society undergoing rapid change' (1988: 259-260).

Witherspoon's research was carried out in Texas, USA, during the decline of the oil industry and the rise in importance of 'high tech' industry. This research considers the 'observations and life experiences of ten distinguished citizens, in order to examine the people of Texas, their values, life-styles and elements of their culture' (1988: 260).

These readings provide a useful starting position for our research at the confluence of gender, technology and society in Ireland. They inform both the focus of the research and the interactions between the researcher and the interviewees. Our research is best summarised as follows: its primary focus is qualitative and approaches employed include

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[1]For the full proceeding notes of this and other Virtual Society? conferences, see http://virtualsociety.sbs.ox.ac.uk/oldnew.htm

direct observation, unstructured interviews and focus groups, approaches which we feel are particularly suited to exploring the detail of social and cultural dynamics. The research programme also incorporates some small-scale data collection in the form of a short survey of townspeople's opinions, administered in 2001. The secondary research centres on the interpretation of secondary materials, such as government reports, interim reports on the EIAT project, magazine and newspaper articles.

4.5 Focus of the Research

As previously stated, we exist in a technological age, where access to information and means of communication is easy and fast. Some people view these developments as positive, enabling the peoples of the world to keep in touch and informed. Many others believe that these technological advances are dangerous, damaging communities, society and the environment. These two opposing views are generally termed techno-positive and techno-negative. Both have merit, both have drawbacks. Yet, if we take these two standpoints as a beginning point in our examination of the emerging Information Society in Ireland, we can move beyond these polarised opinions to a better understanding of the changes which technological developments are effecting. These changes are now extending from the business sector into the wider community and are viewed in a positive light by government and business organisations which are actively engaged in promoting information technology to the populace at large. The flagship project is the EIAT project which provided equipment and training in order to proactively encourage the community in Ennis to make use of ICTs in their working and social lives.

In order to analyse how the introduction of ICTs is affecting Irish society, this research programme studied the impact of the EIAT project on Ennis, which, as a mid-sized Irish town (of approximately 20,000 people), provides a good example of Irish society in microcosm. The purpose of this research was to examine the ways in which the technological, social and cultural changes which are taking place in Ennis are affecting the people of Ennis and the community they share.

All of this research was undertaken as a discovery. We wished to uncover the hidden stories behind the relationship between people and new technologies such as ICTs. In particular, we wanted to make contact with women who had crossed the many barriers which deflect women from engaging with technology so as to hear the story of their involvement. As an established aim of the EIAT project was to encourage large numbers of women to engage in technology training, we wished to examine whether this aim had been successful and how the women who had taken part in training felt about their involvement with ICTs in general and the EIAT project in particular.

During the early stages of the research, we engaged in many informal discussions with

family, friends, colleagues and a small number of initial interviewees in Ennis. Many of those with whom we spoke mentioned the importance they placed on the effective use of technology in education. They felt that innovative and effective technology training in schools would be the key to the wide-scale up-take of ICTs in Irish society in the future. Many parents talked of how they felt the need to be trained in the use of technology so as to be fully involved in their children's education. Our initial interviews during the pre-test period in 1999/2000 uncovered many interesting aspects of the use of ICTs in education. The school principal interviewed discussed many of the logistical difficulties which accompanied the delivery of large numbers of computers to schools. She also discussed many of the pedagogical issues surrounding the use of technology in education. The primary school student spoke of the reality of using computers in class, mentioning, in particular, how useful the Internet was for finding things out for school projects etc. The business woman spoke of how proficient her sons were becoming in their use of technology and how intimidated and excluded she felt as a result. She spoke of her interest in undertaking technology training which would allow her to communicate with her sons in a meaningful way regarding technology. All of these initial discussions and interviews indicated that the role played by technology in education should figure in our research. We decided that some classroom observations coupled with interviews with teachers, students and school management would provide a useful insight into the education/technology relation. We also felt that this would serve to inform our investigations of the gender/technology relation. These classroom observations and interviews were conducted in 2000 and again in 2002. In this way, we gauged the changes that were occurring within the school as both pupils and teachers' opinion of computers moved from viewing them as a novelty to learning to use ICTs in meaningful and useful ways. They also took place both in Ennis and in two other towns in the west of Ireland to provide useful comparison.

Ultimately, we consider this second branch of fieldwork to be supplementary to the first. The education/technology relation is not the focus of this research but it provides some useful pointers along the way. The focus of our research is primarily an examination of the gender/technology relation with additional insights provided by our examination of the education/technology relation.

4.5.1 Personal Networks used in this Research

'Problems raised in personal accounts of research are themselves of sociological importance and ... such accounts can offer ... a lively insight into research of a kind that is often denied by conventional methods textbooks' (Roberts, 1981: note on bookcover).

If we consider that the process and problems of research can be as illuminating as the finished material, this research programme may be described as a 'self-reflexive' study i.e.
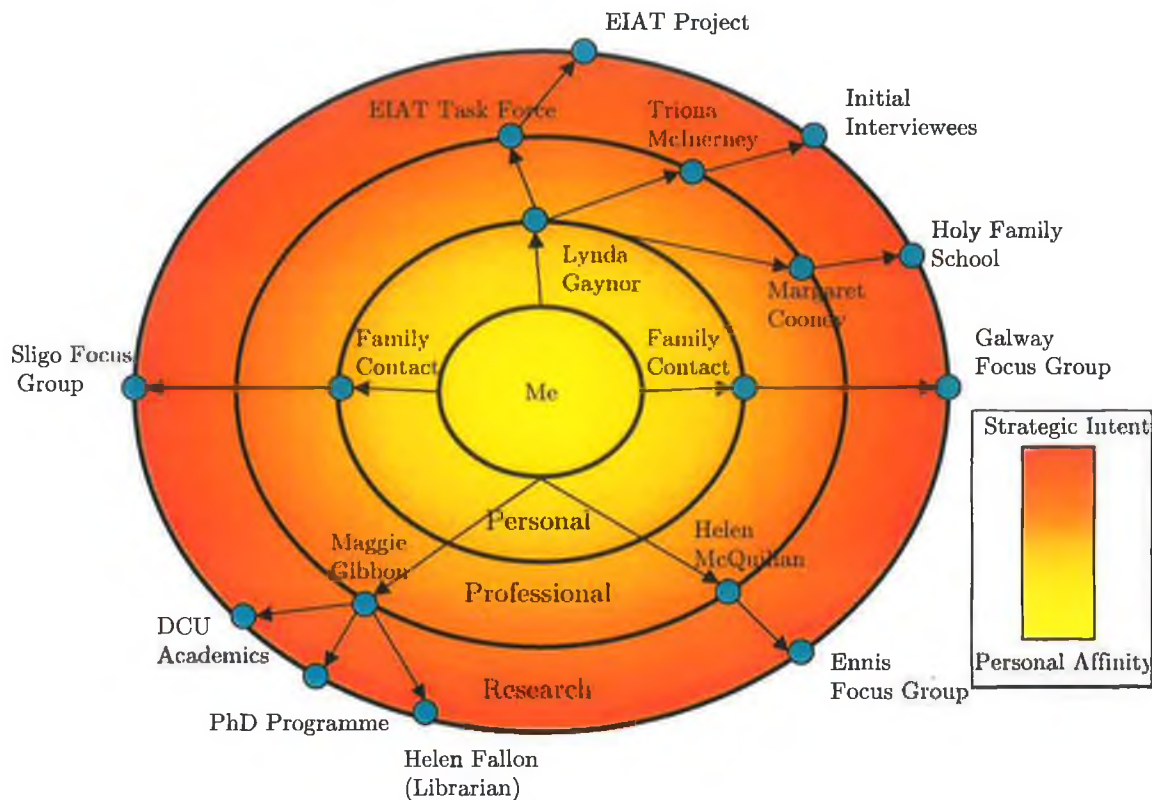
Figure 4.1: My Network Identity

the researcher's experiences, discoveries, successes, failures, all the process and practice of learning throughout the programme, are consciously and continuously identified and examined. The personal learning process, therefore, acts as a springboard for the general progress of the research programme, whether in the directions pursued at the level of primary research or those followed at the level of secondary work. My experiences throughout this research programme were also an essential element in understanding the importance of social networks in women's lives, in their communication methods and in their take-up of technology training. Indeed, it is interesting to observe the network identity which I have developed during the course of this research (see Figure 4.1).[2]

I believe that the single most important impetus for this research programme was the establishment and development of the researcher's contacts network, both personal and professional. As Coviello and Kristina (1999) observe, collegial and friendship-based relationships may emerge from formal contacts. I believe that this accurately describes the relationship which has developed between the supervisor of this research programme and myself. In the early 1990s, I attended Dublin City University (DCU) to follow a Master's Degree programme in the School of Communication. During this time, I attended a mod-

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[2]While the majority of the writing in this thesis employs the 'we' persona to reflect the sense that this work learns from and builds upon the work of many other scholars, this section which considers the 'network identity' of the researcher and their importance to the research programme employs the 'I' persona to reflect the personal nature of the information.

ule entitled 'Contemporary Feminist Theory and Practice' which was delivered by Dr. Maggie Gibbon and a good working relationship developed between us. This relationship was influential in a number of ways. Firstly, this course module was very rewarding, both as academic training and as personal development. I do not believe that it is an over-statement to say that the formal exploration of feminist thinking addressed my innate belief in the power of women and women's thinking and strongly influenced my percep-tion of the world, then and now. Secondly, the relationship with Maggie was important. Having already spent four years in full-time, third level education, Maggie was the first lecturer I met who was both personally amiable and professionally inspiring. She was the first lecturer whom I addressed by her first name and whose advice I sought on a number of matters beyond the direct scope of the study module. She was the personal face of the rather daunting institution of DCU and this in itself was an important factor both in the decision to embark upon an extended period of study and research at DCU and through-out the personal and professional ups and downs of the programme. Thirdly, the progress of this doctoral research programme ran concurrent with the progress of my family life. During the four years of this programme, I have had two children. This meant that the work progressed in blocks which accommodated pregnancies, births, feeding schedules and all of the details of rearing small children. Field work, in particular, had to be carefully planned and co-ordinated. In practice, this meant that rather than organising numerous short field-trips, I organised instead stays of upwards of a week once a year for the three years of 2000, 2001 and 2002. While this pattern emerged due to the necessity of com-bining family and research commitments, it proved a very useful means of measuring the development of the EIAT project at regular intervals throughout its progress. Throughout this period, Maggie, a mother herself and well-used to combining work and family com-mitments, took a positive view of the progression of the work in intensive bursts. I am not certain that all supervisors would have been comfortable with this working method and some might have questioned my commitment to the research programme. This level of flexibility and encouragement was essential to my continued motivation and involvement in the research. This relationship then, was set in train in the formal sphere and initially progressed due to strategic intent. Maggie was an accomplished and knowledgeable fem-inist and I found our discussions informative and educational. She became the sounding board of many of my research ideas and our discussions (both electronic and face-to-face) provided a sound theoretical grounding for my work.

Maggie's academic contacts also proved essential to the development of my theoretical understanding. Even before I had officially signed up for the research programme, Maggie introduced me to Helen Fallon. Helen was a librarian in DCU who had just completed a Master's degree in the area of women on the web. Our three-way discussions introduced me to the exciting area of study which examined the confluence of women, society and technology. Helen's extensive research skills also proved very useful in the early days of the research programme when identifying seminal works was of paramount importance.

There were numerous other female academics whom I met through Maggie who also provided guidance on topics such as qualitative and quantitative research methods and questionnaire design and administration, topics which I had initially viewed with some trepidation. Through Maggie, I also made contact with a number of female researchers working in the DCU-based STeM (Society, Technology and Media) research centre. These contacts were particularly helpful in providing direction and focus to the programme's field-work. With the progress of time, email facilitated regular exchanges of ideas and aid. For example, one of these researchers mailed a useful bibliography of women and technology resources which provided some useful leads. She also made suggestions regarding software which might prove useful in compiling my own bibliography. Thus, my relationship with Maggie proved an important link to other academics working in related fields. In addition, this relationship grew to have a strong personal dimension as Maggie's support became such an important motivational factor during the uneven progress of the work. I would describe this relationship as central to the progress of the research programme in general.

A second central relationship was essential in developing the detail of the programme. Lynda, a personal friend who worked as a consultant to the Ennis Information Age Town project and who knew I was examining gender and technology invited me to deliver a paper at the annual symposium of the EIAT Task Force. This allowed me to become familiar with the project and those developing it, in particular, the female assistant CEO of the project and another female member of the Task Force who worked as a primary school principal in the town of Ennis. The belief that the EIAT project was an important microcosm of many of the changes occurring in Irish society due to developments in ICTs coupled with this personal contact with the project encouraged me to avail myself of the opportunity to locate the bulk of the programme's primary research at Ennis. It is possible that given the high profile of the EIAT project and its close connection to my research interests, I would have conducted field work in Ennis even without Lynda's connection with the project. However, I would certainly have found it much more difficult, personally and professionally, to connect with people involved with the project without Lynda having organised this initial contact. This contact was particularly important in the initial stages of the fieldwork. The assistant CEO facilitated my contact with a number of townspeople who were involved with the project and the primary school principal also agreed to be interviewed on a number of occasions and allowed me to interview school pupils about their attitudes to technology. These initial interviews were an important stepping stone in my familiarisation with the project, the town and the emerging fieldwork requirements. They encouraged me to return to the town in 2001 and carry out a random survey and to return in 2002 to conduct focus group sessions, interviews and classroom observations.

There was also another aspect to my relationship with Lynda which influenced the progress of the research. In 2000, Lynda had completed a Masters' Degree in International Busi-

ness. Her final thesis dealt with the importance of networks to the success of entrepreneurs. Our personal friendship meant that Lynda and I often discussed the progress of my research. At one such discussion, I mentioned to Lynda what, at the time, I was calling my 'strong women' theory i.e. I had become convinced that the progress of the research was hugely influenced by my emerging relationships, formal and informal, with a small number of key women who, in turn, provided connections to other women and so on. Each of these key relationships comprised both personal affinity and strategic intent, although some, such as the relationship with Maggie, grew initially out of my formal need for academic direction and contacts while some, such as that with Lynda, began in personal affinity and progressed to provide theoretical direction and further contacts. I wondered whether the importance of these networks in my personal and professional life might not be mirrored in the personal and/or professional lives of other women, particularly in relation to their engagement with technology. In response, Lynda began to describe the theory of networks as they relate to the area of entrepreneurship and this led to my examining this body of theory and its relevance to my work.

Another contact which was also influential was that which I established with Helen McQuillan, the Head of Research at the EIAT project whose research in the area of women and technology in the context of the Irish Information Age was already known to me. Having similar research interests eased the difficulties of seeking Helen's help in order to contact those women who had taken part in an ECDL pilot training programme run in association with the EIAT project. Helen also facilitated access to the extensive files of media coverage of the project at the office of the EIAT project, which provided a useful secondary source of data to the research. It also helped in the discussions about the project which took place between the Head of Research, her research assistant and I during the trip to Ennis in May 2002, which acted both as a strong motivator to complete the work and as a helpful insight into the operation of the project.

Finally, many personal contacts helped the progress of the research programme, some by discussing the details of the programme and others simply by reading extracts of material and making suggestions. For example, one friend who works as a librarian in an Irish academic institution provided useful practical information in relation to academic referencing practice, in particular in relation to the Harvard referencing system and provided useful comments. Another friend who had begun a programme of doctoral research abroad (which was then cut short due to her becoming pregnant and returning to Ireland) recounted having lost a number of computer files during a power cut and gave suggestions on useful means of file management. Other family members were helpful in providing accommodation and babysitting during fieldwork trips.

In addition, many female contacts facilitated the conduct of fieldwork. One female relative living in Galway informed me about a group of women over-55 who were engaged in computer training whom she felt would be happy to take part in a study of this kind.

She personally contacted all members of the group and suggested a suitable local venue in which to carry out the focus group discussion. Another female relative living in Sligo facilitated the conduct of fieldwork in the primary school where she worked in order to observe the students' use of technology and to interview these students about their attitudes to technology. She also facilitated the conduct of a focus group discussion with a group of female primary teachers who had all undergone technology training in the last number of years. She did this both through her personal contacts with other primary school teachers and through her professional contacts as a technology trainer at the Teachers' Centre in Sligo. As family relatives, personal affinity was the primary mover in my relationships with these two women and yet strategic intent played a part as they facilitated the conduct of field work.

4.5.2 Summary

This network of contacts, personal and professional, was instrumental in guiding the development of the research programme and encouraging me to strive to overcome many of my apprehensions in order to pursue the best research programme possible. This ego-centric network mapping reveals the interplay of both formal and informal networks and demonstrates the extent to which personal encouragement and professional support can be influential factors in women's self-belief and self-esteem. The process of drawing up this network mapping was a useful learning task within the research programme. It provided an important means of examining the centrality of social networks in the relationship of the women interviewed with ICTs and allowed a better understanding of the many barriers which impede women's engagement with ICTs. It also enabled me to recognise the strong influence which personal contacts played in the interviewees' eventual means of overcoming their fears and undertaking technology training.

4.6 The Importance of Social Networks to the Women Interviewed

I suppose it was a bit of a snowball. Someone you knew was getting involved and they told you and then you got involved too. I suppose there were people that I talked to who might have been influenced by me too. (Female Interviewee, Ennis 2002)

The majority of interviewees in Ennis stressed that before the establishment of the EIAT project, they imagined technology to be outside the sphere of their 'normal' lives, reserved for their partners or children or those using technology in their working careers. However, the national and international media coverage which followed the town's winning of the *eircom* competition generated intense local interest and discussion, in many instances

among those who would not normally have discussed technology or computers. This fact and the knowledge that due to the defrayment of costs by the EIAT project organisers, large numbers of 'ordinary' women were enrolling for technology training, proved the catalyst for the interviewees' decision to undertake technology training:

'There was so much talk about the project. Everyone was saying that they were ordering computers - even my sister and her husband were getting one for the kids';

'It just seemed normal to get involved, not that big a deal';

'I would have felt like a coward if I hadn't. So many people that I knew were putting their names down'.

During interviews with the women in Ennis, it became apparent that these discussions in the main were within their informal networks of female friends and acquaintances. The women in Galway felt that the most important impetus to their decision to both organise and undertake technology training was their long-established group friendship:

'We have all known each other for years and we have done so many different things together - 'Brownie' week-ends and youth workshops and sports days - this just seemed like another thing to try';

'We're friends but we're what I suppose you might call 'active friends'. We've always done things together. Learning computers is the thing at the moment. There will probably be something else next year';

'I wouldn't have dreamed of enrolling in a course in the community school with a bunch of students or whatever. Doing the course this way (just the group with a teacher, organised by themselves) is the only way that I would have had the courage to get involved'.

The women in Sligo, all of whom were working teachers, had an advantage in that they had a designated, familiar space in which to undertake training, i.e. the Sligo Teachers' Centre. This centre was considered 'home turf', a location with which they were familiar and where all other trainees would be teachers like themselves. This factor was essential in helping the women of the focus group to overcome their fears and undertake technology training:

'The Teachers' Centre was somewhere I knew. I'd done other courses there and of course, I knew ... [the trainer] ... which helped a lot';

'Friends (other teachers) were getting involved and that got me interested';

'The first course that I did was all women together (no-one knowing anything) and we were all equally stupid which helped' (laughs).

Therefore, all of the women interviewed were drawn into technology training because they heard of a personal friend or acquaintance who was undertaking training, or because they

organised and customised training which suited their needs or because they were familiar with either the trainer or the training centre. In all cases, these personal connections or networks were the crucial factor in these women overcoming many barriers and taking steps to become involved in technology training. And most commonly, these networks were informally established and conducted whether with personal friends or professional colleagues.

In summary, we have considered social networks and their influence on human relationships. In particular, we have considered how one's 'network identity' affects one's interactions with others. We have also considered the importance of social networks to the women interviewed in Ennis and elsewhere.

4.7 Choice of Research Instrument

'[Fieldwork consists of] getting closer to the people involved in it, seeing it in a variety of situations they meet, noting their problems and observing how they handle them, being party to their conversations and watching their way of life as it flows along' (Blumer, 1986: 37).

Our choice of a mainly qualitative over a quantitative approach resulted from an analysis of the objectives of the research i.e. to gain access to a specific cultural group in order that their beliefs and feelings might provide some insight into the implementation of the EIAT project. Trauth (2000) makes reference to the effectiveness of combining a series of interviews with participant observation methods:

'In order to place the information obtained from these interviews into a larger context, I also collected information about Irish society by means of participant observation ... At the macro level, participant observation occurred in the course of every day living, working and communicating with Irish people about every day affairs ... In this way, I learned about Irish culture and to compare this experiential information with the information I was obtaining from my interviews' (2000: 381,382).

Our research methods have many similarities with those of Trauth. Living and working in Ireland as ICTs became established within Irish society, we could observe at first hand the changes that these developments were bringing to Irish culture. We could also observe the inequalities of participation in the benefits of this technology. Therefore, in similar fashion to that of Trauth, we also engaged in participant observation in the course of every day living and compared this information with that obtained during interviews. These interviews required the establishment of personal relationships between the researcher and the townspeople involved in the research:

'field research involves the researcher in a relationship with those who are studied; it is a social process in which the researcher plays a major part' (Burgess, 1982: 24).

This process involved the researcher spending periods of time in the town of Ennis each year between 1999 and 2002. The shortest of these periods was three days and the longest was two weeks. Each visit allowed the researcher to learn more about the town and its people, to become more familiar with the physical layout of the town by spending a number of afternoons strolling through the town's busy streets, visiting the playground, the library, the shopping centre etc. The researcher often met interviewees in local coffee shops, hotels and bars and much of the interviewing conducted for this study took place against the background of town-life in Ennis.[3]

4.8 Interviews: Some Useful Reading

Unstructured interviews were employed to evoke a more in-depth level of knowledge and understanding of respondents' attitudes towards ICTs and the EIAT project. It was felt that the use of formal methods such as structured interviews, while achieving uniformity, would be unsuccessful in probing the underlying attitudes of the townspeople. Moser and Kalton (1971) describe the use of the formal approach in the analysis of complex phenomena as 'too superficial and crude'. They identify the strength of the unstructured interview technique in allowing the interviewer the freedom to

'assess the adequacy of the responses and, where necessary, to probe for further details' (1971: 32,33).

This analysis follows Palmer (1928) who summarises the strengths of the unstructured interview as follows:

'provid[ing] the opportunity for the researcher to probe deeply, to uncover new clues, to open up new dimensions of a problem and to secure vivid, accurate, inclusive accounts from informants that are based on personal experience'.

Palmer explains that while to the observer, the interview may assume the appearance of a 'natural, interesting conversation', to the proficient interviewer,

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[3]Quite often, informal meetings with townspeople led to discussions about the Information Society in general and the EIAT project in particular. I vividly recall an afternoon spent in a hairdresser's salon in Ennis which resulted in a conversation lasting about two hours which touched on many of the research foci which were emerging in my work. The afternoon saw me leave the salon with a new hair-style and colour and a renewed vigour for my work!

'it is always a controlled conversation which he guides and bends to the service of his research interest' (1928: xx).

Palmer goes on to suggest that this may best be carried out by the establishment of a 'flexible but controlled' framework within which the interview can be conducted:

'researchers must keep the informant relating experiences and attitudes that are relevant to the research problem and encourage the informant to discuss these experiences naturally and freely' (1928: 35).

This need to encourage participants to discuss their experiences is also examined by Strauss (1964) who gives four different means of interrogating the respondent which may be useful in this regard. These include:

1. the use of the devil's advocate question whereby the opposing view is stated so as to discover the informant's position;

2. the statement of a hypothetical question so as to discover what the informant might do in particular circumstances;

3. the statement of the ideal position so as to discover how the informant views ideal persons, situations and conditions;

4. the statement of the researcher's own interpretations of situations which may stimulate the informant to 'confirm the researcher's findings or give counter-information which can lead to new lines of inquiry. (This last method is considered by Palmer to be most useful towards the end of a research programme.)

Merton and Kendall (1946) identify four criteria of importance in the design and conduct of research interviews. These are:

1. 'Non-direction' whereby the interviewer encourages the interviewee's frank and honest contribution without fear of criticism;

2. 'Specificity' whereby the most important issues are examined in depth;

3. 'Range' whereby a flexible interview structure is employed;

4. 'Depth and Personal Contact' whereby a strong personal relationship is established between the interviewer and the interviewee. To this end, the concrete task for the interviewer is to continuously diagnose the current level of depth and employ strategies for raising the degree of depth. These include: focus on feelings, restatement of implied or expressed feelings and reference to comparative situations.

We have actively employed these techniques in the conduct of primary research and believe that the data was gathered in a non-directed manner and the participants' opinions and ideas were discussed in sufficient specificity, range and depth for the purposes of the study.

4.9   The Primary Research

The primary research conducted for this thesis was carried out in the four consecutive years: 1999, 2000, 2001 and 2002. In this section, we detail the work carried out in each year and show how each element of this work developed from that which went before and influenced that which came after.

In 1999, our readings in the areas of technology, society and gender had highlighted a number of topics in need of examination. Firstly, considering the rapid pace of technological developments in Irish society at the end of the twentieth century, we wished to examine how Irish people viewed these technological developments and the impacts which they were having on Irish society. Secondly, much of the literature examining the relationship between technology and society pinpointed the importance of early schooling in establishing a positive attitude to computer usage in students. We therefore wished to investigate how technology was being introduced and used in the classroom. Thirdly, we wished to consider whether the restrictions which gender divisions place upon women in areas of life such as education and the workplace were being replicated in the area of ICTs. We wished to identify whether technological developments were affecting the existing gender/technology divide enabling large numbers of women to overcome the barriers to their use of ICTs in ways which they felt were meaningful and useful. To this end, it was essential to talk to women, to hear their stories and appreciate their feelings, regarding the part played by ICTs in their lives. These stories would be compared and contrasted and eventually weave a web of understanding and knowledge which would inform other work in similar fields.

Considering that in 1997, Ennis, Co. Clare had won a competition to become Ireland's most technologically advanced town, (in effect to become Ireland's first 'wired' community), it seemed appropriate to conduct the bulk of this fieldwork there, so as to track the rapid pace of changes brought about through the project. In order to provide a frame of reference, fieldwork would also be undertaken outside the context of the EIAT project. In this way, the fieldwork conducted would aid in identifying whether Ennis was a town apart, i.e. a town made special by the EIAT project with a community which was interacting with ICTs in a completely unique and un-matchable way or whether, in fact, the changes occurring in Ennis were being replicated at a slower pace and in a more *ad hoc* fashion across the country. It was also important that this fieldwork be an ongoing process so as to allow the data collected to truly reflect the changing nature of the interface between ICTs and society in Ireland. Therefore, we also conducted focus groups in Galway

and Sligo and spent time in a primary school in Sligo, observing the use of computers in the classroom and interviewing teachers, students and management about their attitudes regarding ICTs. The focus group conducted in Galway consisted of a group of women over-55 who were currently training for the ECDL certificate. The focus group conducted in Sligo consisted of a group of primary school teachers, all at different levels of computer training but all actively using computers in the classroom. This allowed comparison not only between groups of women in three different towns on the western seaboard but also between women with different age, educational and professional profiles. The two schools in Ennis and Sligo where observation was undertaken were similar in size and make-up (both were mixed schools pursuing an active policy of delivering relevant and interesting technology training to all students within the school).

We will now describe the methodology of the primary research as conducted in the four years from 1999 to 2002.

4.10 1999 - The Pilot Study

'A straight-forward question asks what it needs in an unambiguous way and extracts accurate and consistent information' (Fink, 1995: 23).

In 1999, we designed a pilot study examining people's use and opinion of computer technology (see Appendix B). In designing this self-administered questionnaire, we considered the issues summarised in (Marsh, 1982: 33) which included:

- the opposing merits of open-ended and closed questions and the possible inclusion of a 'no opinion' option (Schuman and Presser, 1979a);

- the varying usefulness of a number of models to measure attitude consistency (Judd and Milburn, 1980);

- the factors influencing the choice of response categories (e.g. yes/no, agree/disagree) (Bishop et al., 1978);

- and the way that the same question, posed by different researchers, can produce different responses (Turner and Krauss, 1978).

In addition, a number of measurement types were chosen. These included nominal, ordinal and numerical. Open-ended questions were also included where the researcher felt that the information being probed was of a complex nature. The topics covered reflected the emergent methodology which saw research foci arising throughout the progress of the research.

This questionnaire was piloted at the researcher's (then) place of work, Dundalk Institute of Technology (DKIT) and among close family and friends. In practice, in DKIT, this meant placing a copy of the questionnaire in the post-box of colleagues in the three schools in DKIT i.e. Business, Science and Computing. A brief note, describing the research programme and asking for our colleagues' co-operation in this pilot study, was included. In doing so, we were consciously following the guidelines for fieldwork given by Kane (1985) who believed that well-conducted fieldwork required the subject to be well-informed of:

'what the study is about, presented in such a way that the interviewee sees its general relevance, and if possible, its relevance to his or her own life and experiences' (1985: 69).

Participants were asked to complete the questionnaire and to use the space at the end of the questionnaire to make comments on the design of the questionnaire, the number of questions included, the way that questions were constructed, etc. They were also asked to write down any comments relevant to the subject matter of the questionnaire which they felt might not have been effectively drawn out by the questionnaire. In this way, the researcher received feedback not only on the subject matter but also on the most effective means of constructing questionnaires. (This feedback was very useful in 2001 when a second questionnaire was being designed to administer to the townspeople of Ennis.) Participants were asked to place the questionnaires in the researcher's post-box but in practice, most participants returned the questionnaire in person. This usually happened in a very informal way whereby a colleague would see the researcher in the corridor or the staff room, remember the questionnaire and return it there and then. In this way, the researcher realised that drop-boxes should have been placed in the post-rooms of the three schools to better facilitate participants' return of the questionnaire. It is possible that some colleagues took the trouble to complete the questionnaire but, due to the lack of a convenient drop-box, did not return the questionnaire.[4] Of 125 questionnaires circulated, 92 were returned and examined.

This simple fact alerted us to the importance which practical matters play when conducting primary research. While for the researcher, it may seem that the design of the questions and the rigour of the method are of primary importance, for the participants, their participation in the study must be quick and easy. Details such as the return of the questionnaire to the researcher need to be well organised and convenient. It was a useful precursor to the main questionnaire which was administered in Ennis in 2001.

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[4]In order to avoid this problem occurring again, we chose to administer the Ennis questionnaire in person, stopping people on the street, asking them to fill out the questionnaire on site and return it immediately.

In summary, we believe that carrying out the pilot study was a useful element of the methodological approach of this research programme. Firstly, it aided in the formulation of research foci. Initially, we believed that an examination of online pornography would form a substantial element of the programme. However, the pilot study helped to identify additional topics of interest such as personal relationships with technology, opinions of the Information Society etc. Secondly, the pilot study was a useful learning experience for the researcher, aiding in the development of essential fieldwork skills, including designing, administering and analysing questionnaires. Lastly, the emergence in the pilot study of what we considered to be gender-specific responses to ICTs contributed in part to our decision to focus mainly on the experiences of women in the qualitative fieldwork of the research programme.

4.11   1999 - The EIAT Task Force

In addition, in 1999, the researcher established contact with the Task Force of the EIAT project and held discussions with both the CEO and the assistant CEO of the project. As the two highest ranking officers on the task force of the project, these discussions were a valuable step in the research programme. They acted as a useful springboard for the later fieldwork in Ennis. They allowed the researcher to view the project from the viewpoint of those charged with implementing it. They pinpointed some of the difficulties which the people of Ennis were experiencing in the face of technological developments in the town. They alerted the researcher to the barriers to technology which the EIAT project was attempting to overcome. Finally, they provided personal contacts within the EIAT task force which were essential in later visits to the town.

4.12   2000 - The Pre-test Period

4.12.1   Background

Both the choice of research method and the frames of reference of the research were greatly influenced by the initial contacts and exploratory interviews conducted during the pre-test period. The receptivity of the pre-test interviewees, their interests, concerns and beliefs provided insights and information which were of great benefit in the planning, administration and analysis of the later fieldwork. It was also of benefit to be in contact (during the pre-test period) with both those who bore the responsibility for planning and implementing the project (the EIAT task force) and those who formed the main focus of the project (the townspeople of Ennis). In this way, the researcher became familiar with what might be termed the official and unofficial views of the project i.e. both the

established aims and objectives of the project and the actual ways that these aims and objectives were being achieved (or at least how the townspeople judged whether they were being achieved or not). As Burgess (1982) states:

> '(T)he [original] access that a researcher obtains influences not only the physical accessibility but also the development of the design, collection, analysis and dissemination phases of the investigation' (1982: 12).

The pre-test period was also essential in establishing initial support for the research. Personal relationships were initiated with individuals who were receptive to the frames of reference of the research and who were willing to support or sponsor it. Burgess (1982) terms these individuals 'sponsors' and 'gatekeepers' and identifies both the nature of the relationship between the researcher and the sponsor/gatekeeper and the important role which such individuals play in influencing the research project from the point of view of research design, data collection and dissemination.[5]

4.12.2 The Initial Interviews

In 2000, we conducted interviews in Ennis with five townspeople who were involved with the project. These interviews took place in Ennis town with a number of people who were using the technology in their everyday lives and businesses. These included a primary school principal and pupil, the owner of a local news agency, a tele-worker, and a disabled person using assistive technology. We contacted these interviewees through the assistant CEO of the EIAT project who provided a list of people involved with the project within the different sectors, namely the business sector, the education sector and the community sector.

In each case, the interview was conducted at the convenience of the interviewee. For the business woman, this meant chatting in a small office at the back of her shop. For the woman combining work at the EIAT project offices with working from her home, the offices of the EIAT project were the most convenient location. For the sight-impaired man using assistive technology, an interview in his home suited his needs best (and allowed him to show me the technology at work). Both the primary school principal and the student were interviewed in the principal's office.

All of these interviews were unstructured and informal. In each case, the researcher began by describing the research programme and the importance for this research of getting to

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[5]The use of gatekeepers in qualitative fieldwork is not without its difficulties. Burgess (1982) refers to 'elite bias' where the objectivity of the researcher may be coloured by her gratitude to the gatekeeper or where the choice of respondent may be too much within the control of the gatekeeper thereby skewing the inclusiveness of the research.

know people's real experience of technology and their feelings regarding any changes which they felt technological developments were bringing to their lives. This meant that for each person involved in the EIAT project, there was a story of hopes, expectations, frustrations, fears and achievements. We stated that the research programme was involved with the story of each interviewee and that they should relate that story as truthfully as they could. By this, we meant that the story should not be 'dressed up' to impress the researcher as understanding the difficulties and fears encountered were as essential to the story as understanding the successes. The interviews all lasted between forty minutes (the interview with the primary school student took place during a scheduled break) and ninety minutes (the interview with the tele-worker). Each interview was tape-recorded except for the one with the sight-impaired man. When asked for permission to begin tape-recording the interview, this interviewee stated that he would prefer not to be recorded because: *you never know who might be listening to it.* As a result, the researcher took notes during this interview.

While each interview centred on the interviewee's story, the researcher posed some questions to each interviewee to probe how they felt about specific key areas of interest. These included the EIAT project and its impact on the community of Ennis, the progress of technology in general in Ireland and in Ennis in particular and any fears which they might have regarding these technological developments. The introduction of these topics allowed the researcher to compare the answers which each interviewee gave and also provided a sense of inter-connectedness from interview to interview. During the interviews, some interviewees introduced topics which were of interest to them and the researcher then introduced these topics in other interviews. Thus, an emergent methodology was developed. This also facilitated the making of comparisons and connections. Finally, these interviews served a similar purpose to the pilot study conducted in 1999, in that they identified key areas of research and helped develop the researcher's questioning and interpretation skills.

4.13   2001 - Questionnaire

In August 2001, we conducted a random survey of the behaviours and attitudes of the townspeople of Ennis with the aim of examining their level of knowledge, interest and involvement in the EIAT project (see Appendix C). Over two days, in two locations in the town centre, we randomly sampled sixty-nine people (forty-five females and twenty-four males). The greater number of females may reflect the observed greater numbers of women on the streets of Ennis on the days in question. It may also reflect greater willingness on the part of women to take part in a random questionnaire or to converse with a female researcher. All respondents were given a brief summary of the context of the survey and allowed the choice of whether to complete the questionnaire in private or

in response to the researcher's questioning. Approximately two-thirds chose to complete the questionnaire in private while the rest preferred to have the researcher ask questions and record the answers.

4.14 2002 - Interviews, Focus Groups and Observations

The fieldwork which was conducted in 2002 took the form of focus group sessions, individual interviews and observations. In Ennis, both the women who were interviewed individually and those who took part in focus group sessions were chosen randomly from a list of participants in an EIAT-sponsored ECDL computer training course. The women in both the Galway and Sligo focus groups were recruited through a personal contacts of the researcher. The group sessions were conducted in convenient local venues such as hotel reception areas or conference rooms and lasted between one and a half and two hours. The individual interviews also took place in neutral, local locations and lasted approximately one and a half hours. In all, twenty-six women were interviewed in a period of two weeks in May, 2002.

The interviewees were all women living in either Ennis, Galway or Sligo. They all provided access to knowledge, people and resources which were essential to the research. Both the Ennis and Galway interviewees were women outside the full-time, paid work environment. The women interviewed in Ennis in 2002 were all, bar one, non-professionals, caring for children in the home either full or part-time, aged between 31 and 44. As previously stated, all of these women had taken part in the 1999 ECDL Pilot Programme.[6] The women interviewed in Galway were all now working part-time or were involved in voluntary work, having remained outside the formal work environment in order to rear their families. They were all aged over 55. The women interviewed in Sligo were all full-time, primary school teachers, aged between 23 and 44. All bar one (the 23-year-old), were married with children.

We also observed technology in use in both the Junior and Senior Schools of the Holy Family School, Ennis and St. Brendan's Primary School, Sligo and conducted interviews with the pupils, teachers and management of these schools. This research was an important aid in informing our understanding of the gender/technology relation.

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[6]The professional woman interviewed in Ennis had also taken part in this pilot programme and was randomly contacted. Her interview provided an interesting comparison with the experience of the other interviewees.

4.15 The Methodological Approach - Summary

As Ennis is a culture in rapid transition due to the emerging importance of ICTs, it emerged that a research methodology which was primarily qualitative in nature would yield useful insights into the social changes which are occurring as a result of the EIAT project and how the townspeople viewed these changes. This examination of people's attitudes and beliefs involved a programme of primary research conducted over a four year period. This data was gathered by a variety of methods including informal discussions, unstructured interviews, focus groups and participant observation. In addition, quantitative data was generated through the conduct of a self-administered questionnaire conducted on two specific days in the town centre, in 2001. It was felt that this triangulation of methods would be the most suitable means of fulfilling the research objectives. This primary research was supported by secondary analysis of various written materials. Finally, working within a feminist epistemological framework, we considered the importance of social networks to our research approach so as to better understand the importance of these networks to women's engagement with ICTs.

Chapter 5

Primary and Secondary Research

This chapter details the findings of the primary research conducted over the four years of this programme, 1999 to 2002. It describes the outcome of the pilot study conducted in 1999 and the discussions which were held with members of the EIAT task force, also in that year. It also recounts the outcome of the initial interviews which took place with five Ennis residents in 2000 and identifies the main research foci which emerged from these discussions. It gives the results of the random questionnaire conducted in 2001 with a break-down of attitudes along gender, age and educational lines. Finally, it recounts the stories of the women interviewed in 2002, detailing (as much in their own words as possible) their fears, attitudes and behaviours regarding ICTs in their own lives.

5.1 Background

As stated in chapter one, the key research issues of this programme centre on the social, economic and cultural impacts of ICTs and explore the ways that ICTs affect daily life and social structures and the means by which the up-take of the opportunities afforded by ICTs is affected by many factors such as gender, class, age, etc. Over four years, this research programme examined behaviours and attitudes in relation to ICTs in Ireland. To place this work in the context of global developments in ICTs, in particular in the area of Internet usage, we conducted secondary research to find useful statistical measurements of global Internet populations. Figures for worldwide Internet populations range from 445.9 million (based on figures compiled by *eMarketer*) to 553 million (based on figures compiled by *Computer Industry Almanac*) to 560 million (based on figures compiled by *Globalreach*). Projection figures also vary with *eMarketer* predicting a world Internet population of 709.1 million by 2004 and *Computer Industry Almanac* predicting 945 million by 2004. The percentages of people online in Ireland are stated to be 27% by *The Irish Telecommunications Market Quarterly Review* with 1 million Irish people having home access to the Internet, half a million using the Internet every month and 16% of those currently offline stating that they plan to get connected at home within one year. Figures published by *Amarach* show that 28% of all Irish adults now say that they use the Internet (784,000), a rise from 17% in 2000.

Notwithstanding the variations in these figures, they demonstrate that the increasing importance of the online environment worldwide is also evident in Ireland. However, when we examine these figures, we find that 41% of those who regularly go online are under 25. It is these differences which were examined in this research programme. The remainder of this chapter gives details of the fieldwork undertaken each year, from 1999 through to 2002 while chapter six details the technology and education fieldwork.

5.2   1999 - The Pilot Study

In 1999, we conducted a pilot study, examining the opinions of women and men in relation to developments in ICTs and the practical effects of these developments in people's lives. The study was distributed among 125 colleagues and friends, mainly in the researcher's then place of work, Dundalk Institute of Technology. 92 replies were received.

5.2.1   Findings
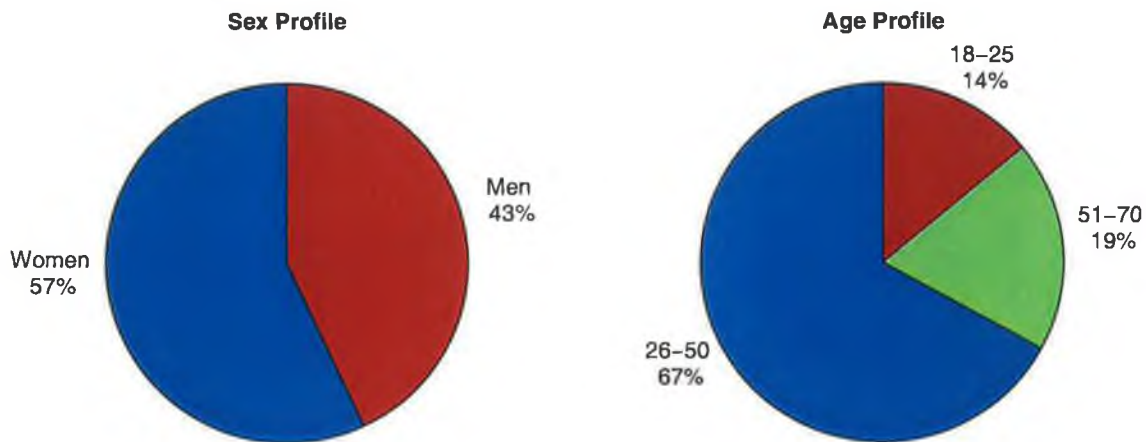
Figure 5.1: 1999 Pilot Study: Sex and Age Profile of Respondents.

The sex profile of the 45 respondents to the pilot study was 57% female, 43% male. The majority of the respondents were in the 26-50 age group (67%) with 19% in the 51-70 age category and 14% in the 18-25 age category (see Figure 5.1). 48% of females reported using the computer for more than 10 hours per week, with 33% using it from 0 to 5 hours per week and 19% using it for between 6 and 10 hours in the week. The number of computer usage hours which male respondents reported was similar: 49% of men stated that they used the computer for more than 10 hours every week. However, 38% of male respondents reported using the computer between 6 and 10 hours per week while just 13% used the computer between 0 and 5 hours per week. These results would suggest that for all male respondents, computer usage is an essential element of their weekly routine while
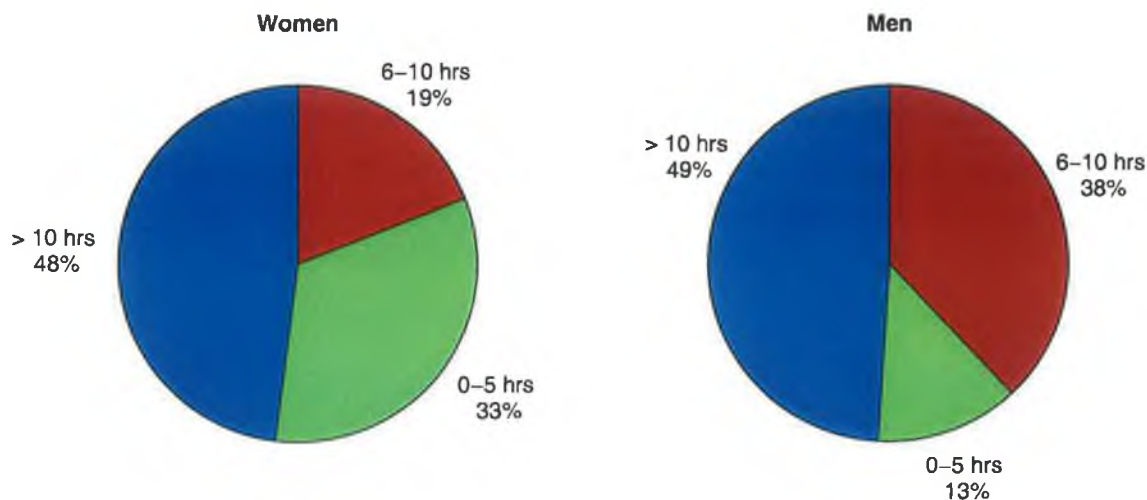
Figure 5.2: 1999 Pilot Study: Weekly Computer Use of Respondents by Gender.

for female respondents, there exists a significant number (33%) for whom computer usage is minimal (see Figure 5.2).

The task most commonly undertaken by both females (45%) and males (39%) came within the umbrella heading of 'office tasks' (word processing work materials, letters etc.). However, the next most common tasks differed between females and males. For females, 'communication' (31%) was the next most common task after 'office tasks' with 'information access' reported by only 17% of women as a task for which they regularly used computers. In contrast, the second most common computer task reported by males was 'information access' (28%) while 'communication' was reported by 25% of males as the third most common computer task (see Figure 5.3). The greatest number of female respondents reported that they most commonly emailed friends (46%) with emails to colleagues coming second (31%) and to family coming last (23%). However, the majority of male respondents reported that they most commonly emailed colleagues (57%) while emails to friends came second (29%) and emails to family came last (14%) (see Figure 5.4).

In answer to the question regarding the disadvantages of electronic communication (email) when compared to face-to-face (f2f) communication: 'What do you find most inconvenient about email communication?', female respondents were most put off by the 'lack of personal contact' associated with emails (58%) while male respondents reported 'lack of access' (to computers and email facilities) as the most important disadvantage of emails (31%) . Other differences included the 29% of female respondents who reported a 'lack of computer skills' as a disadvantage of email communication with only 8% of male respondents reporting such a lack as a disadvantage (see Figure 5.5). Regarding online shopping, no male respondents reported having bought online while 2% of women had done so. Finally, there was a marked difference in the response of women and men to the question regarding pornography. When asked: 'Do you find the free availability of In-
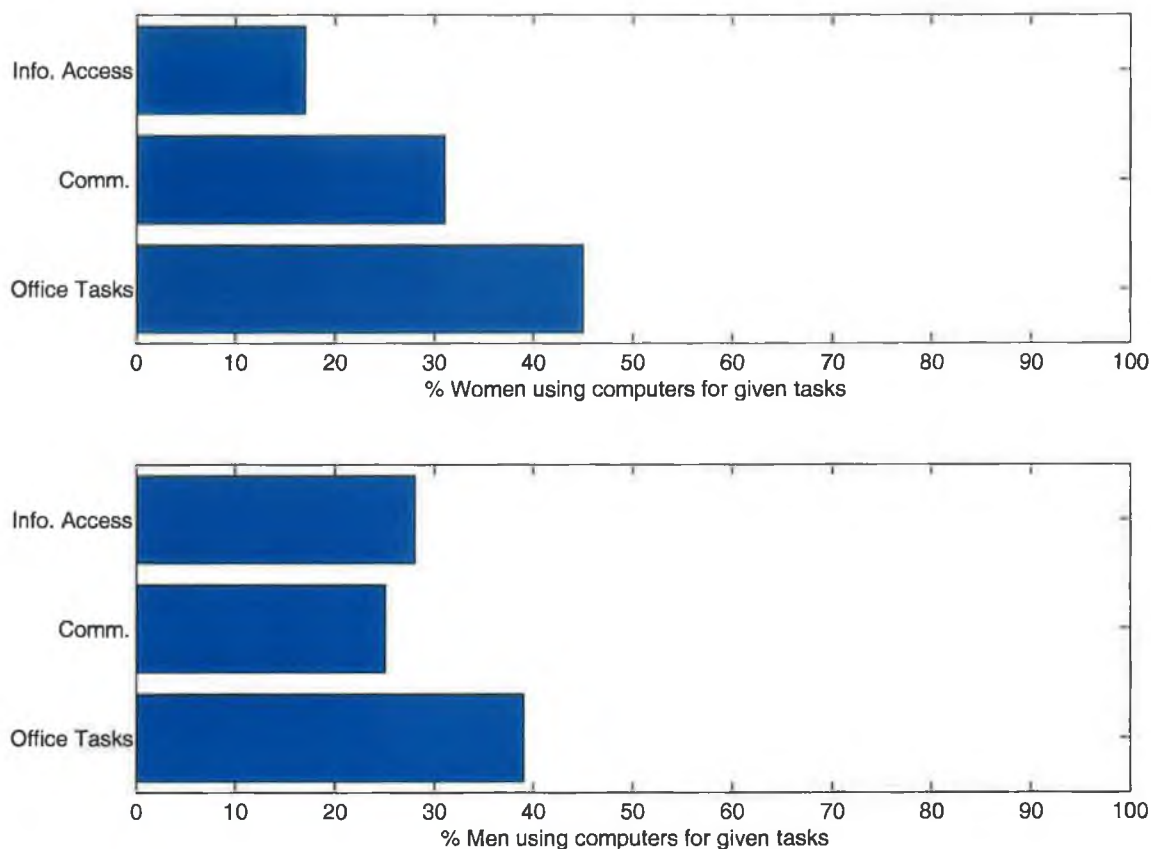
Figure 5.3: 1999 Pilot Study: Most Common Computing Tasks.

ternet pornography offensive?' 57% of women but only 31% of men responded positively (see Figure 5.6).

5.2.2 Summary

The main findings of the pilot study centred on the differences in female and male computer usage. While all findings were helpful in establishing the field of study and pointing up a number of key areas of research foci, it would seem that the most interesting of these differences relates to communication patterns. While computers are considered a useful word-processing and organising tool for both women and men, of those surveyed, more women than men make use of computers as a communication tool while more men than women make use of computers as an information access and gathering tool. In addition, while the majority of male respondents use email to communicate with colleagues, the majority of female respondents use email to link up with friends. This would suggest that male respondents view computers as mainly a work-oriented tool while females consider computers to be most useful as a leisure-oriented tool. This finding concurs with the gender differences in communication and ICT usage described in chapter three which found that women's communication patterns and use of ICTs centred on the maintenance of social networks while men's communication patterns and and use of ICTs functioned as
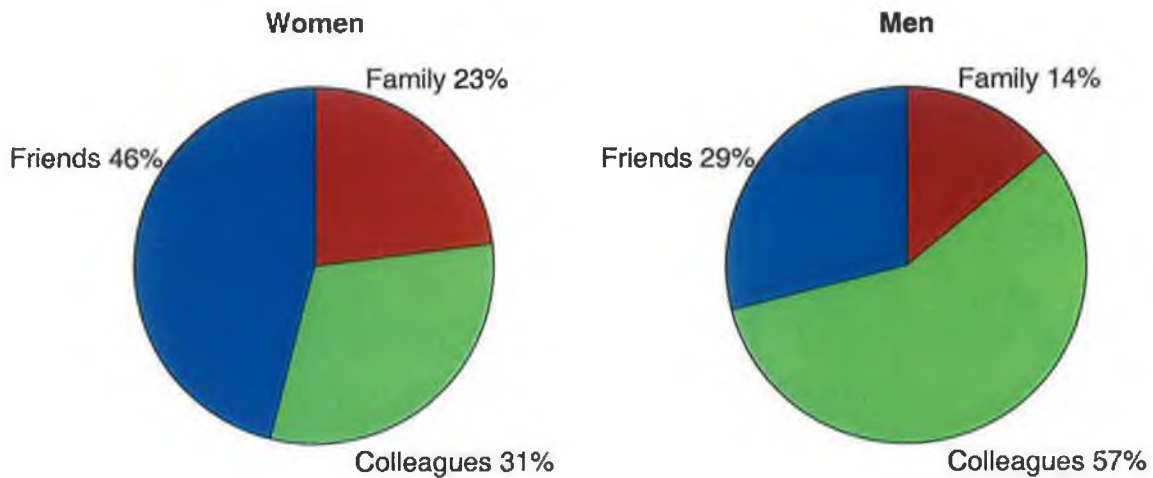
Figure 5.4: 1999 Pilot Study: Email Usage.
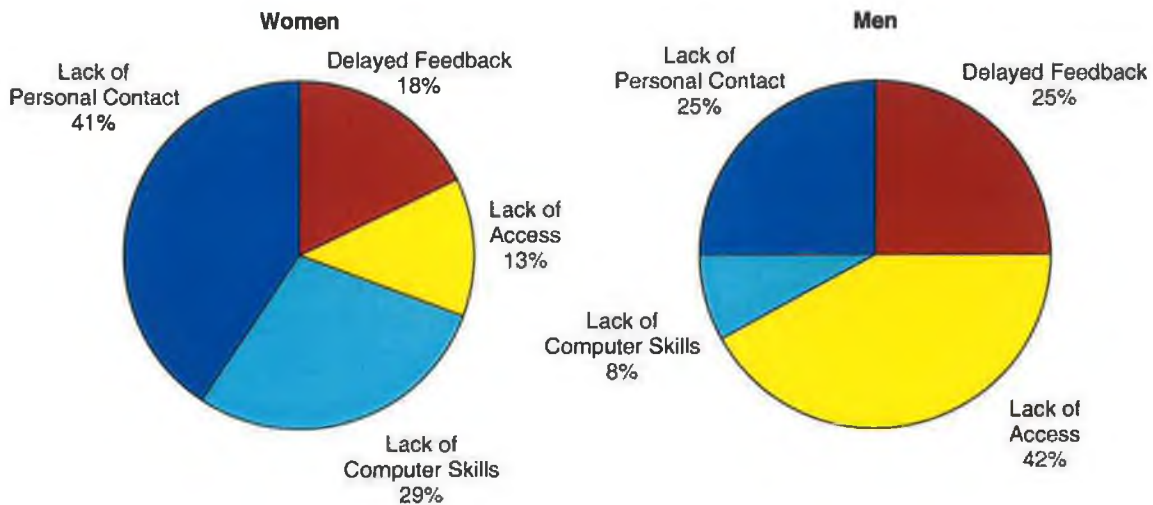
Figure 5.5: 1999 Pilot Study: Disadvantages of Email.

a work tool. It would also appear that while the men surveyed see a lack of access to equipment and training as the primary stumbling block to efficient email usage, women regret the loss of personal contact which the electronic medium entails. The responses to the question: 'Have you ever bought anything online?' suggest that while online shopping is still a very small sector of the computing market, the market may lie more easily with women than with men.

Finally, while 31% of male respondents described the availability of online pornography as offensive, 57% of women described online pornography in this way. While the questionnaire did not specifically ask whether the existence of online pornography acted as a deterrent to women's use of computer technology, it would seem that for the majority of women, the existence of online pornography is a negative element of the online environment. This would not appear to be the case with the majority of male respondents. These findings recall the research on pornography described in chapter three. With the main

Women

Yes 57%

No 43%

Men

Yes 31%

No 69%
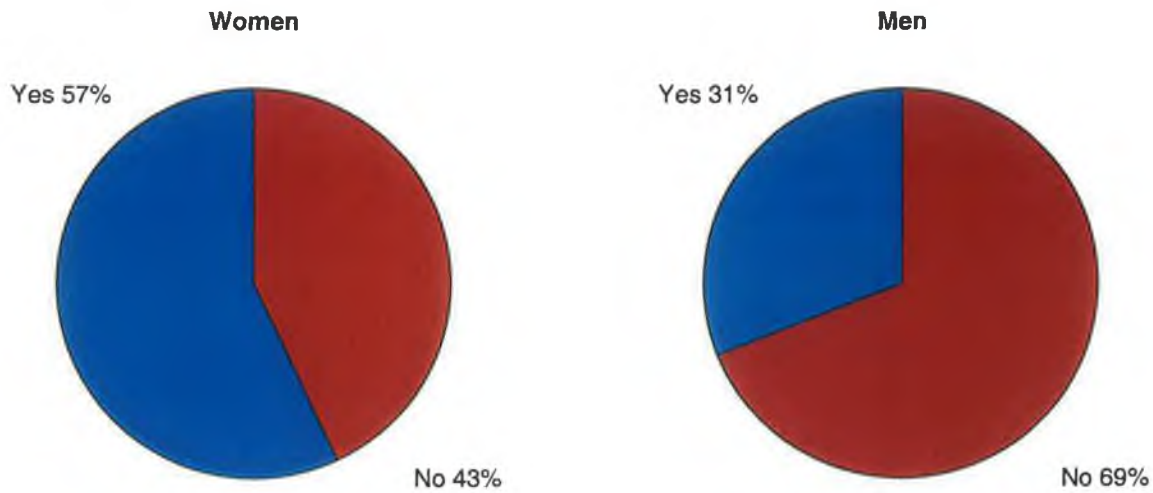
Figure 5.6: 1999 Pilot Study: Attitudes to Pornography.

accessors of online pornography being men, for many women, the online environment is an unsafe one due to the presence of pornographic websites.

5.3   1999 - The EIAT Task Force

Later in 1999, we presented a short paper entitled 'Technology and Society: Ireland in the Next Millennium' to the EIAT Task Force at their annual symposium. In it, we outlined the developments in ICTs taking place in Ireland, the impacts which these are having on Irish society and in particular, the apprehensions felt by many Irish people about these technological developments. During discussions with the task force, we described the EIAT project as a microcosm of the changes which developments in ICTs are bringing to Irish society in general. We also pointed out that fieldwork conducted in Ennis during the period of the EIAT project should give a great insight into how people perceive technology and take it into their lives. The assistant CEO stated that the apprehensions associated with ICT technology which had been discussed in the paper had been very evident in Ennis since the beginning of the project. She stated that many people in Ennis, even those who eventually found that they passed the initial computer test with no difficulty, had viewed the test sceptically. She also stated that as the technology became more commonplace within people's lives and particularly, as more and more training was offered, these initial fears were gradually allayed. A number of interesting informal discussions of the education/technology relation in the Irish context also took place with a member of the task force who worked as a primary school principal in Ennis. Discussions of this nature during the symposium were followed by more in-depth discussions with the CEO and the assistant CEO of the project. These were helpful in identifying many of the aims and objectives of the project and some of the difficulties being experienced at that time.

5.4   2000 - Initial Interviews

In 2000, the EIAT Task Force supplied us with a list of names of people who were involved with the project in some way. We contacted three of these people by telephone and all agreed to be interviewed. We also contacted the school principal and member of the EIAT task force whom we had met in 1999 and who had invited us to visit the school where she worked. This woman agreed to be interviewed and to facilitate an interview with a school student. These interviews took place in Ennis on two days in May 2000.

5.4.1   Findings

Our discussions with the primary school principal focused on the means by which the initial *'avalanche of boxes'* had now become an integral part of school life. Although generally enthusiastic regarding the educational possibilities of such technology, the teacher also expressed concern that the educational policy which promoted the use of ICTs as a learning tool was under-developed. She felt that more thought needed to be given to the way in which technology training could both complement and influence the overall curriculum. The primary school student talked of how she used the Internet to find information for projects and how much she and her other classmates enjoyed having access to the Internet. It was interesting to encounter such enthusiasm from the student and was an early indicator that further fieldwork dealing with technology and education would be needed.

The interview conducted with the Ennis-based tele-worker uncovered many interesting aspects. The interviewee, who had recently had her first baby, discussed how she intended to use ICTs to facilitate her working from home for half the week. Interestingly, she felt that actually being in the home would distract her and so had built a separate structure at the bottom of the garden where she could be contacted but where she could also have both physical and mental space to concentrate. The interviewee said that if the option of tele-working were not available to her, she would not have returned to work after her maternity leave as she was unwilling to be separated from her baby in her earliest years. Projecting into the future, she surmised that if she left the workforce in her daughter's infancy, in ten years, her child would be gone for most of the day while she, with outdated skills and lacking motivation, would find it very difficult to return to the workforce.[1]

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[1] This interview had particular resonance for the researcher who at the time of the interview was seven months pregnant with her first child. While the interview proper focused on the interviewee's story, both before and after the interview, much of the discussion centred on the researcher's own hopes to combine research tasks with child-minding tasks with the interviewee giving advice on some means to achieve this. This strong personal connection between interviewer and interviewee certainly facilitated an easy establishment of trust and openness during the interview, in the manner suggested by Merton and Kendall (1946).

The interviewee works as a web content editor for the EIAT project, a job which evinces many of the characteristics most suitable to tele-working i.e. a high information content, requiring long periods of concentration, and with clearly defined targets and deadlines. As such, the interviewee felt that all necessary communication could take place during the half-week that she was on site in the office. She also felt that these days in the office would be essential to her mental well being, as they would facilitate social interaction and visibility within the workplace.

The interview with the Ennis-based business person focused initially on the positive benefits which she felt were the result of the communications audit of her business which the EIAT project facilitated. As a result of this audit, she was informed of the best means of introducing ICTs into her business in a gradual and controlled manner. She was also informed as to the best type of technology to avail herself of and given training to enable her to use that technology. She stated that she was in the process of establishing a website (designed by a family member) and hoped that this would both widen her potential market and free her from frequent attendances at local and national trade fairs. The interviewee was emphatic in her descriptions of herself as 'non'technical'. She even stated that her sons were the ones who made most use of ICTs in the home. Once again, this concurs with the research reviewed in chapter three which describes technology as outside the feminine gender. It also shows the ways that ICT usage in the home can affect family discourse and practices.

The interview with the sight-impaired man using assistive technology was useful both in terms of the topics discussed but also in terms of the way that the interview was set up and conducted. The interviewee stated that while he was glad to have received both a computer and training, he felt that more on-going training was needed in order for his skills to be usefully developed. He described using the computer for creative writing purposes and was particularly enthusiastic about the possibilities for communicating with people all over the world which the Internet offered him. He mentioned that just the previous day, he had been in contact with a creative writers' group in the USA and had sent them some of his material while receiving some work in return. The interview took place in the interviewee's home so that he could demonstrate the technology in action. However, the presence of the researcher appeared to impact negatively on his ability to follow the verbal cues which the assistive technology was giving. Despite reassurances, he appeared to be flustered and embarrassed by these difficulties. In hindsight, a more suitable interview schedule would have allowed for an initial 'ice-breaker' session which would have allowed the interviewee to become more comfortable with the idea of a researcher in his home. This could then have been followed a few days later with a second session during which the interviewee could, if he wished, demonstrate the technology in use. For this particular interviewee, a one-off session with a stranger which included use of the technology was far too threatening a situation and resulted in the interviewee's feeling unnecessary anxiety

and stress.

Dealing with many different types of people in a short period of time is of course an inherent difficulty in fieldwork but this experience demonstrated how important it is for the interviewer to be sensitive to the different needs of interviewees. While the tele-worker was very comfortable dealing with new people and had no problem sitting with a female researcher and chatting about family life, work, etc., the interviewee using assistive technology appeared to find the interview quite a stressful and anxiety-ridden experience. These differing needs bear out Jorgensen (1989)'s warning regarding the importance of establishing a relationship with the subject in order to ensure the most naturalistic study possible:

'The quality of the data is improved when the participant observer establishes and sustains trusting and co-operative relationships with people in the field' (Jorgensen, 1989: 69).

5.4.2   Summary

These interviews were a useful first visit to Ennis. They allowed the researcher to test out some different questioning techniques. We found that open-ended questions such as *how do you feel about ...?* or *what do you think about ...?* worked well when questioning about feelings and opinions, while closed questions were a more effective means of finding out specific information such as *have you ever bought anything online?* or *what changes has this technology brought to your business?* This knowledge was helpful in 2001 when designing and administering a random survey of townspeople's attitudes to the EIAT project and ICTs. We also found that interview length varied depending on the interviewee. As the interview with the school pupil took place during a scheduled school break, it was the shortest in duration, lasting just forty minutes. However, it is possible that a longer interview would have been overly taxing for the student and would not have yielded any more insight. Later, when we were conducting more extensive fieldwork in schools, we ensured that no observation or discussion session lasted longer than about thirty minutes. The interviews were also an aid to identifying research foci which were further examined both in 2001 and in 2002. We found that, in general, the interviewees had positive attitudes towards the EIAT project, technological developments in the area of ICTs and viewed the Information Age changes being brought to Irish society with optimism. However, we also found that the interviewees were almost suspicious of this optimism, making comments such as:

[Information Age] changes are mostly working to improve people's lives, although of course, this mightn't always be the case

it all [the advantages of the Information Age] seems to be a bit too good to be true, doesn't it?.

It would appear that even for people who have positive experiences with ICTs, apprehensions regarding possible social and cultural effects still remain.

5.5   2001 - Questionnaire

In 2001, we administered a random questionnaire in Ennis, examining the townspeople's opinions regarding the Information Age in general and the EIAT project in particular. This survey was conducted at two central locations within the town (the library and the main shopping centre) on two consecutive days in July 2001. Within multiple choice questions, respondents were asked to tick as many categories as applied to them in order to build the most complete picture possible of their relationship with technology.

5.5.1   Profile of Respondents and Findings

5.5.2   Male Respondents

Of the twenty-four men who responded, the largest single age-group was a group of seven men in the age bracket 20-26. Of the entire group of men, twelve were single, ten were married or co-habiting and four were widowed with three-quarters of the group aged below fifty and the remainder aged over fifty (see Figure 5.7). Nine of the group had children. All of the group under fifty had completed the Intermediate/Junior Certificate or higher while five men had continued to third level education. Of the six men over fifty who responded, four had not proceeded past primary education while one had completed the Intermediate/Junior Certificate and one the Leaving Certificate. Of the listed skills, the greatest number (nine) ticked computing skills with practical skills (seven) the next most frequently chosen skill (see Figure 5.8). In mainly choosing computer skills, the male group demonstrate that, in popular culture, technology skills are often considered suitable skills for men. Fifteen of the group under fifty were in full-time, paid employment with two of this group working in the IT sector, two working as managers in the retail sector, two working in banking, two working as bar-men, one working as a gardener and six who gave no details of the nature of their employment. Both of the respondents in the 15-19 age bracket were working part-time with one man in the 35-39 age bracket also working part-time. Of the group over fifty, one man worked full-time in paid employment, one worked part-time and four were retired.   In general, the men under fifty had a positive attitude to technology with thirteen respondents describing technology as being 'of great benefit to society' and eight believing that it could be of benefit 'if developed differently'.
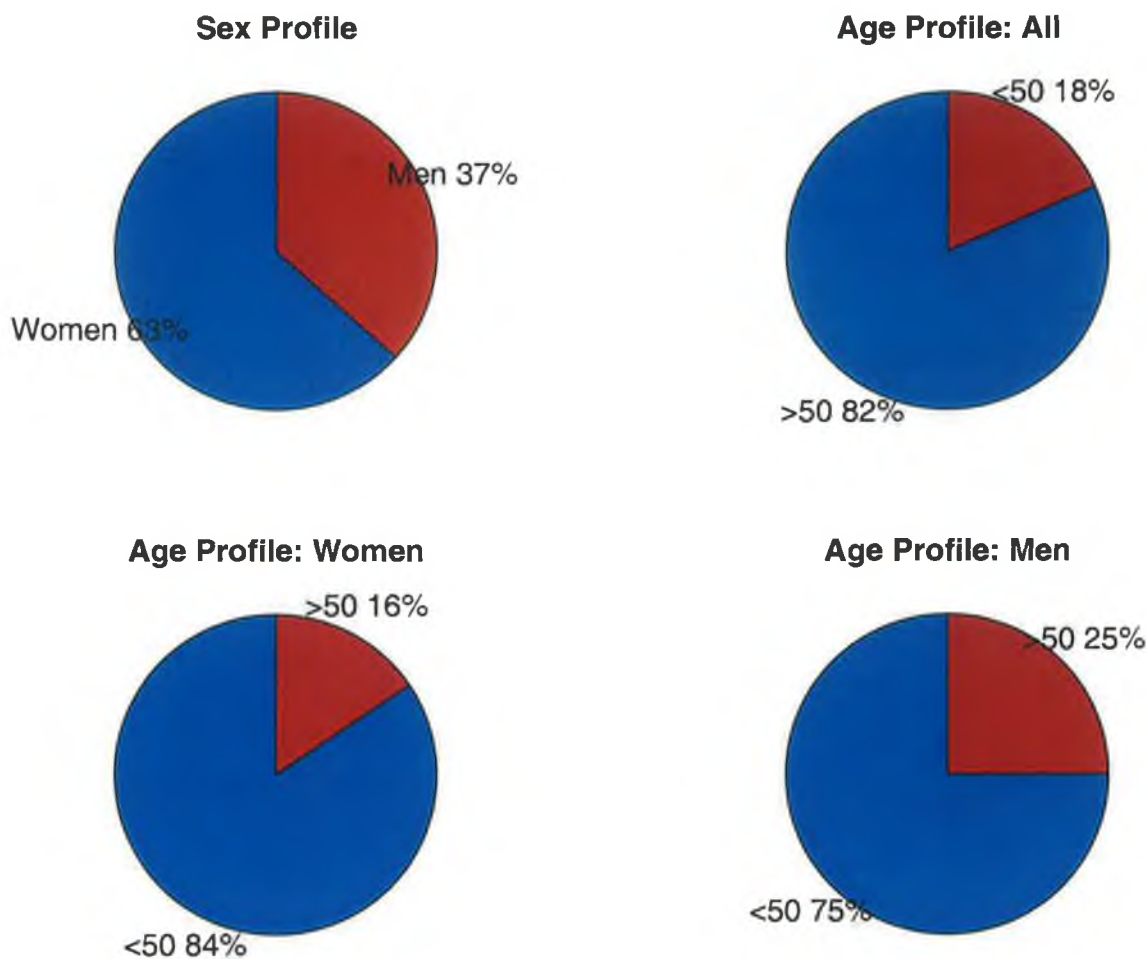
Figure 5.7: 2001 Questionnaire: Sex and Age Profile

The majority of this group also saw themselves as part of the ICT changes taking place in society with the most common self-description of the sixteen men in this group being 'very interested in technology' (see Figure 5.9). In contrast, of the eight male respondents over fifty, the two main opinions of technology were that it had 'no influence' on their lives or posed a great danger to society while a minority stated that technology could be of benefit to society if 'developed differently' (see Figure 5.10).

Overall, the male respondents were unaffected by the project with twenty-two of the twenty-four respondents stating that they were 'not involved at all' with the EIAT project, with nine citing a lack of interest as a factor influencing their non-involvement, seven citing a lack of time and seven citing a lack of knowledge of the project as barriers to their involvement. Those two who were involved described themselves as 'involved a little'. This involvement had taken the form of some technology training in the form of some computer classes (see Figures 5.11 and 5.12).

Of the group under fifty, the majority (thirteen) believed that Ennis had been 'changed a little' by the EIAT project while the majority (nine) described the results of the project on the town as 'fairly positive' with nine describing the involvement of the people of Ennis

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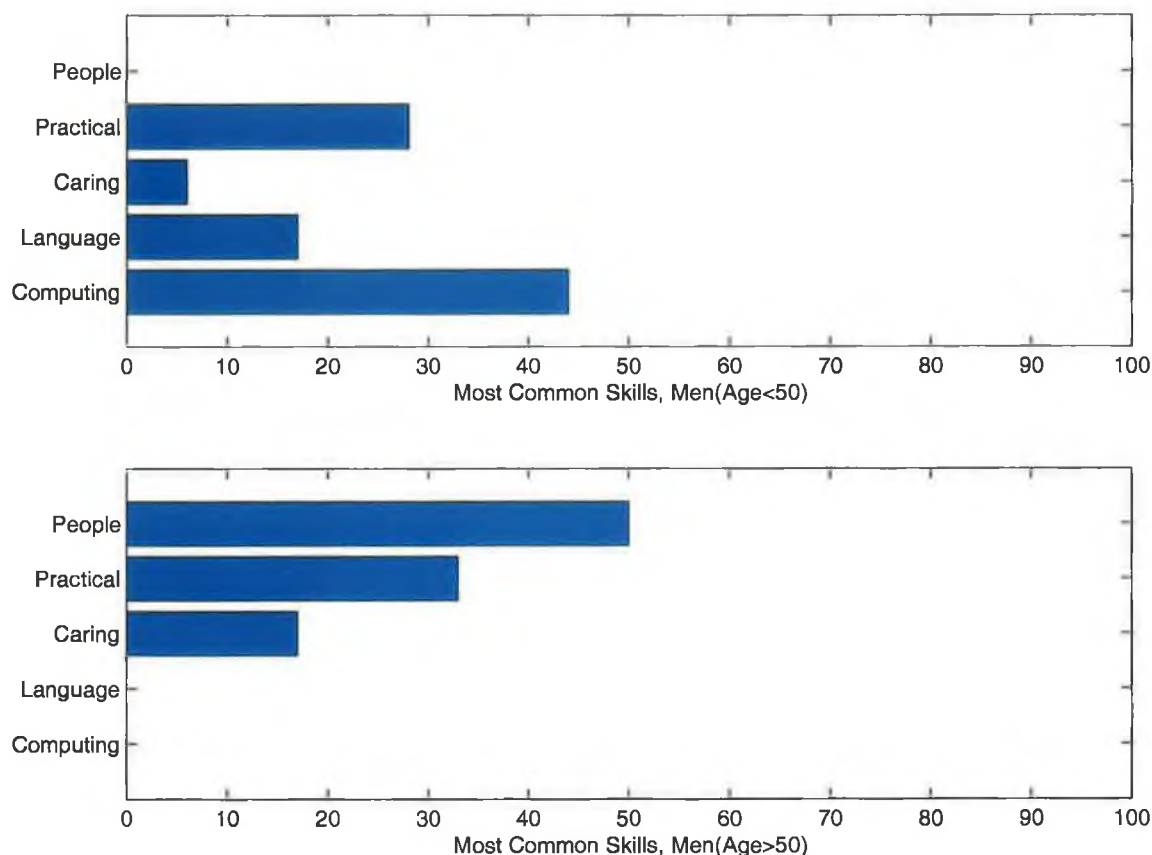
Figure 5.8: 2001 Questionnaire: Skills Profile of Male Respondents

in the project as 'minimal' and eight as 'good'. Of the group over fifty, three believed the town to have 'changed a little' due to the project while two described the results of the project as disappointing and four described the involvement of the townspeople in the project as 'minimal' (see Figures 5.13 and 5.14). Finally, two respondents in the 35-39 age group wrote additional comments. One respondent stated that more training was needed for parents to enable them to become more fully involved in their children's technology training. A second respondent stated that cost was a prohibitive factor which was preventing many people from undertaking training and acquiring computer equipment. One respondent in the 60-69 age bracket stated that more retirement groups should be involved in the project.

5.5.3 Female Respondents

Of the forty-five women who responded to the survey, thirty-eight were aged below fifty and seven were aged over fifty. The majority (fifteen) were in the 20-26 age bracket with seven aged between 15-19, seven aged between 27-34, six aged between 35-39, three aged between 40-49, five aged between 50-59 and two aged between 60-69 (see Figure 5.7). Of the group under fifty, sixteen were married or co-habiting, fifteen were single, one
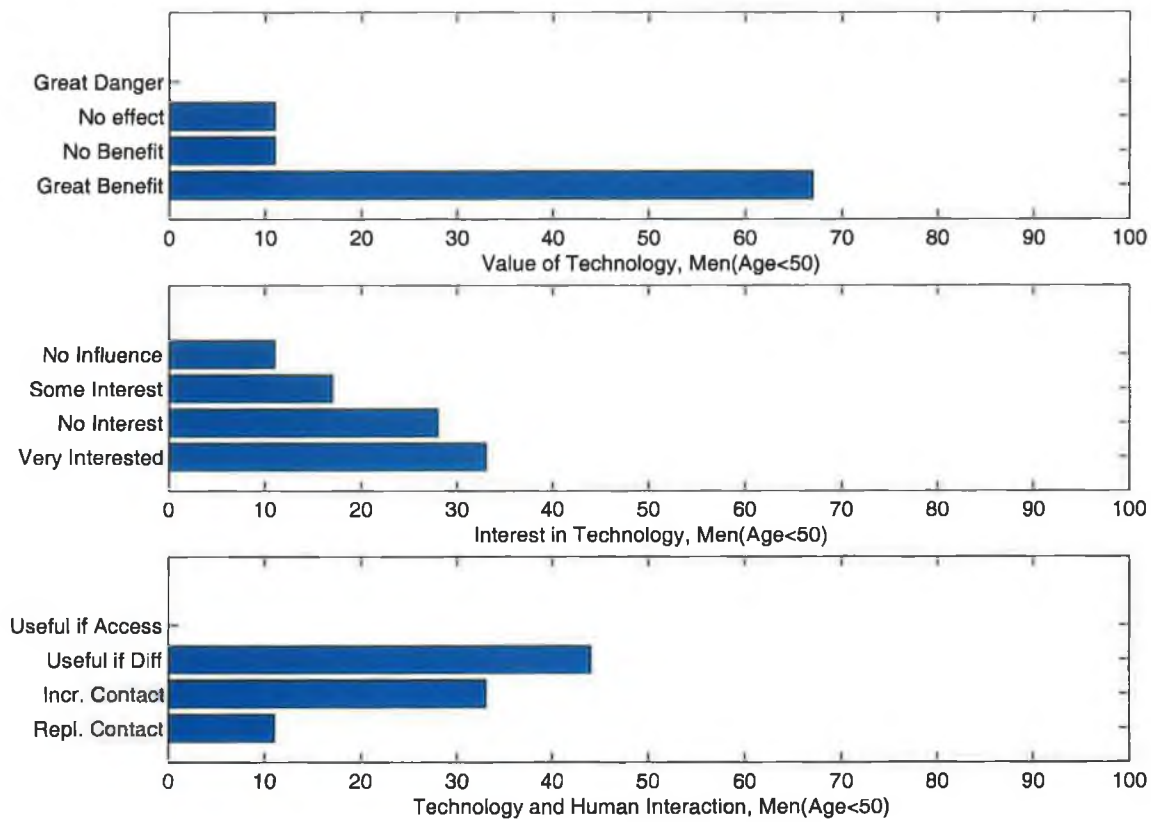
Figure 5.9: 2001 Questionnaire: Attitudes to Technology, Men Under 50

Figure 5.10: 2001 Questionnaire: Attitudes to Technology, Men Over 50

Figure 5.11: 2001 Questionnaire: Level of Involvement in EIAT Project and Why, Men Under 50

Figure 5.12: 2001 Questionnaire: Level of Involvement in EIAT Project and Why, Men Over 50

Figure 5.13: 2001 Questionnaire: Attitudes to EIAT Project, Men Under 50
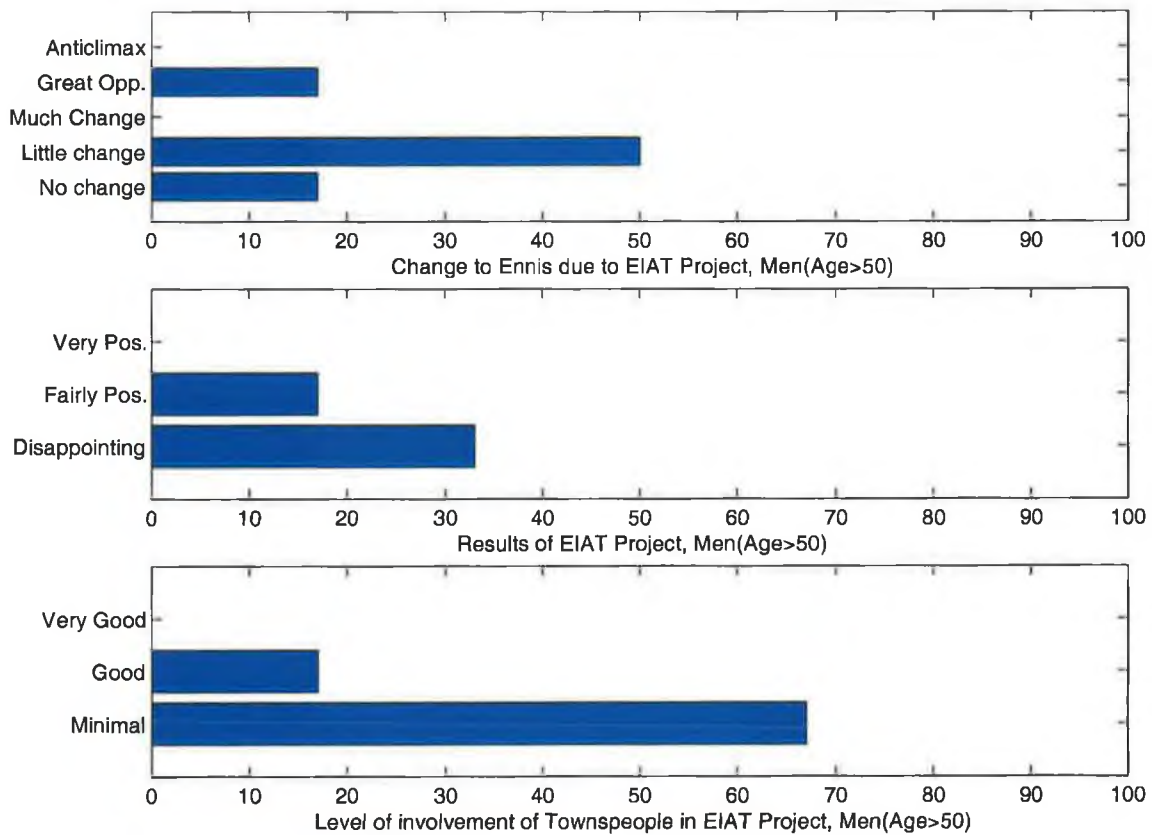
Figure 5.14: 2001 Questionnaire: Attitudes to EIAT Project, Men Over 50

was separated and fourteen had children. Of the group over fifty, two were married or co-habiting, two were separated, two were widowed, one was single and seven had children. Of the group under fifty, all had completed the Intermediate/Junior Certificate or higher while six women had progressed to third level education. Of the group over fifty, four had left school after primary education, two had completed the Intermediate/Junior Certificate and one had completed the Leaving Certificate. Of the group under fifty, twenty-three worked part-time or were full-time home-makers while fifteen worked in full-time, paid employment. Of the group over fifty, three worked part-time while four were either full-time home-makers, retired or pursuing voluntary work. In common with
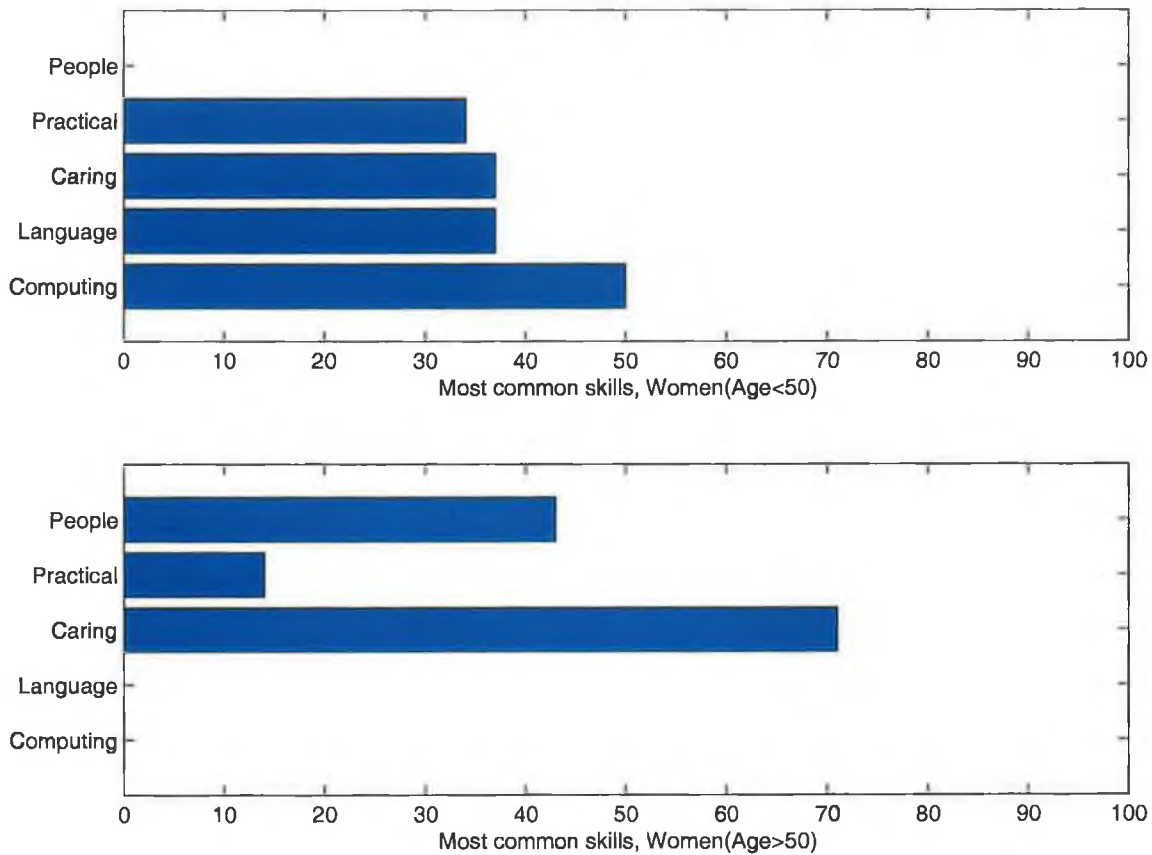
Figure 5.15: 2001 Questionnaire: Skills Profile of Female Respondents

the male respondents, the female respondents showed definite splits along age lines. In general, the women under fifty had a positive attitude towards technology with computing skills the most commonly ticked skill of this group, language skills and caring skills both coming second with fourteen and practical skills coming third with thirteen. In contrast, none of the group over fifty ticked computer skills with the skill most commonly ticked by this group being caring (five) with three respondents ticking people skills and one ticking practical skills (see Figure 5.15). This contrasts with the male respondents, the majority of whom ticked computer skills, and fits with the assumptions (referred to in chapter three) that technology fits more easily within the masculine gender.

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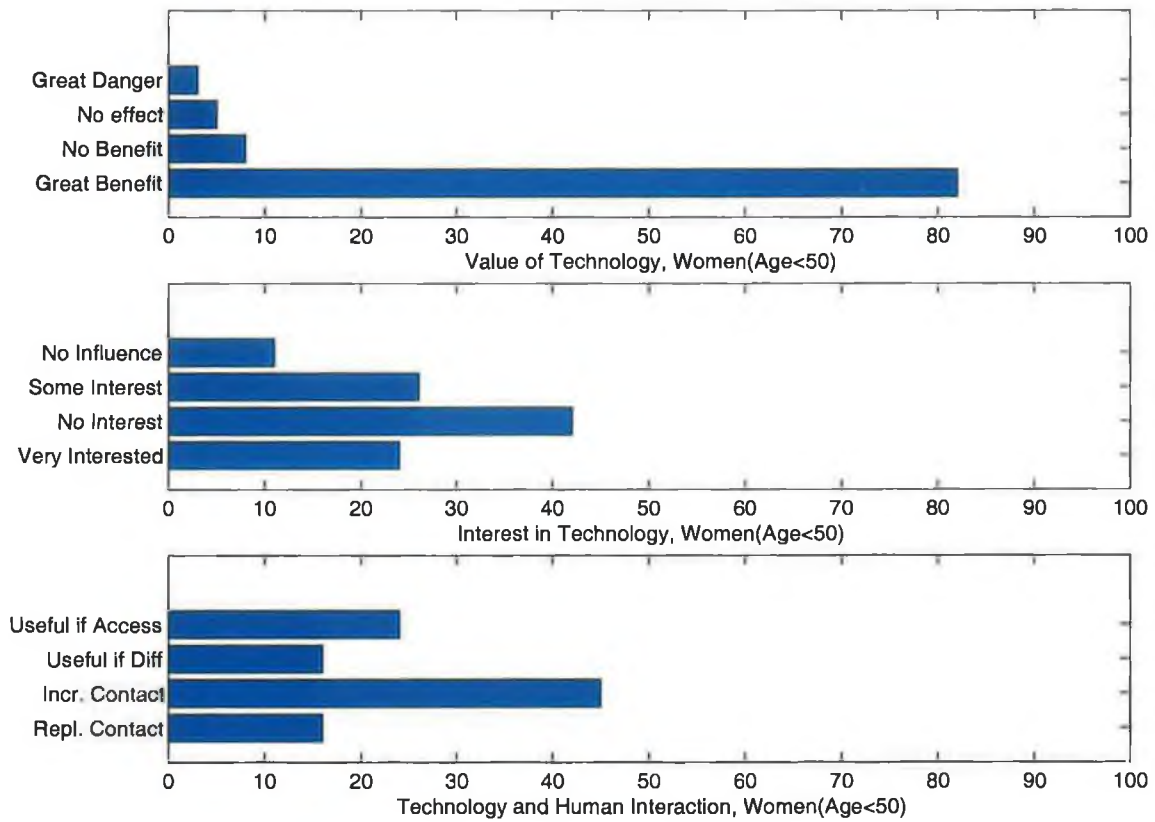
Figure 5.16: 2001 Questionnaire: Attitudes to Technology, Women Under 50
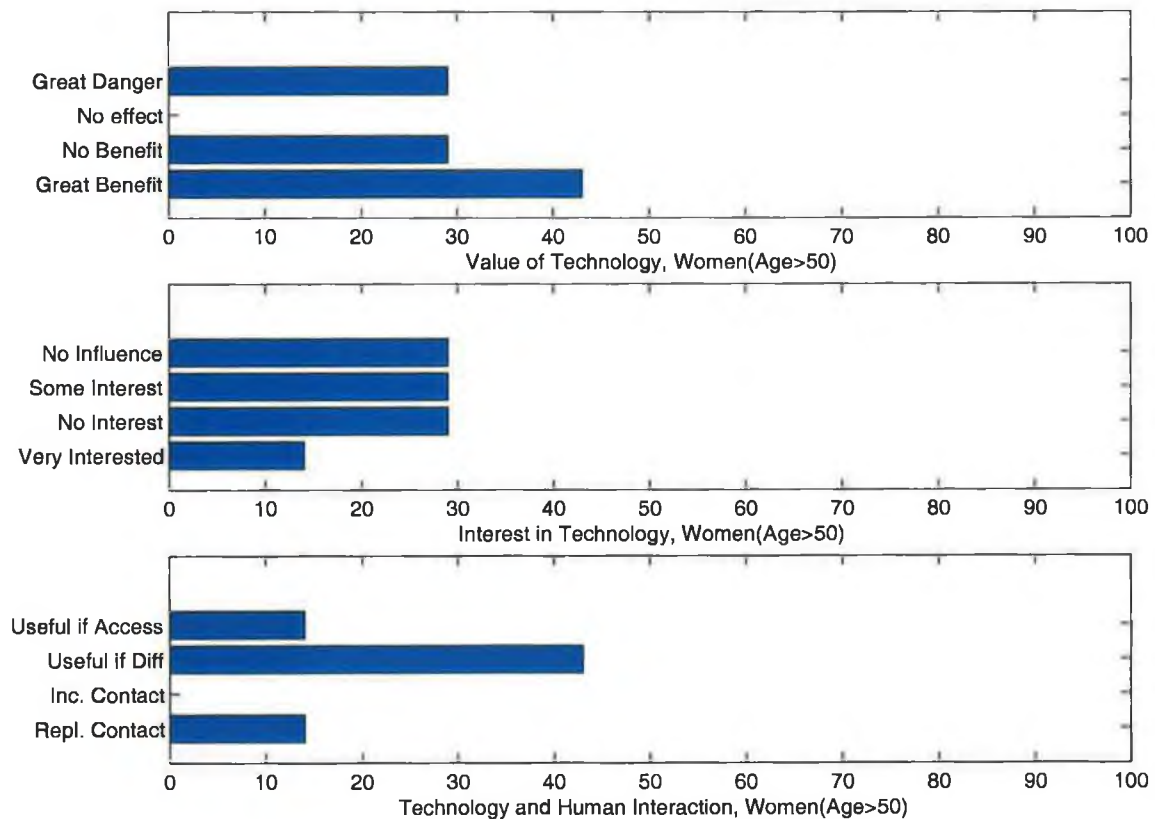
Figure 5.17: 2001 Questionnaire: Attitudes to Technology, Women Over 50
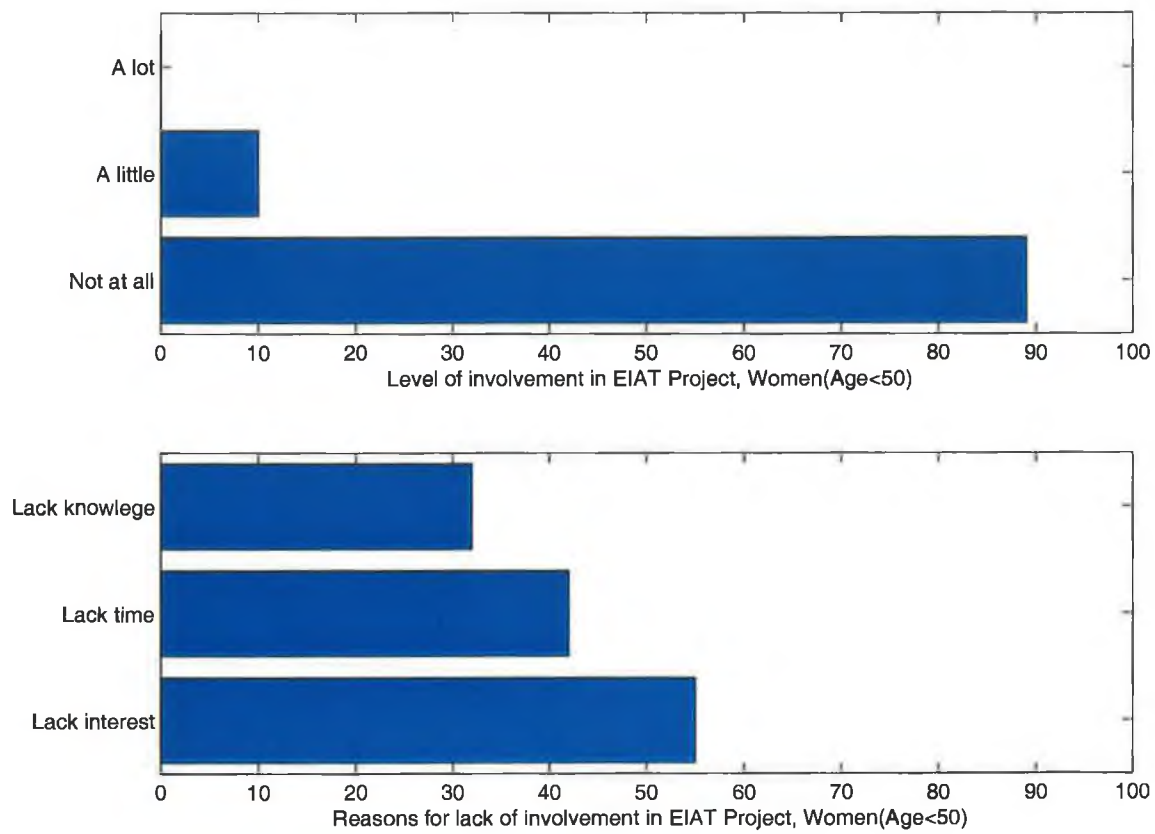
Figure 5.18: 2001 Questionnaire: Level of Involvement in EIAT Project and Why, Women Under 50
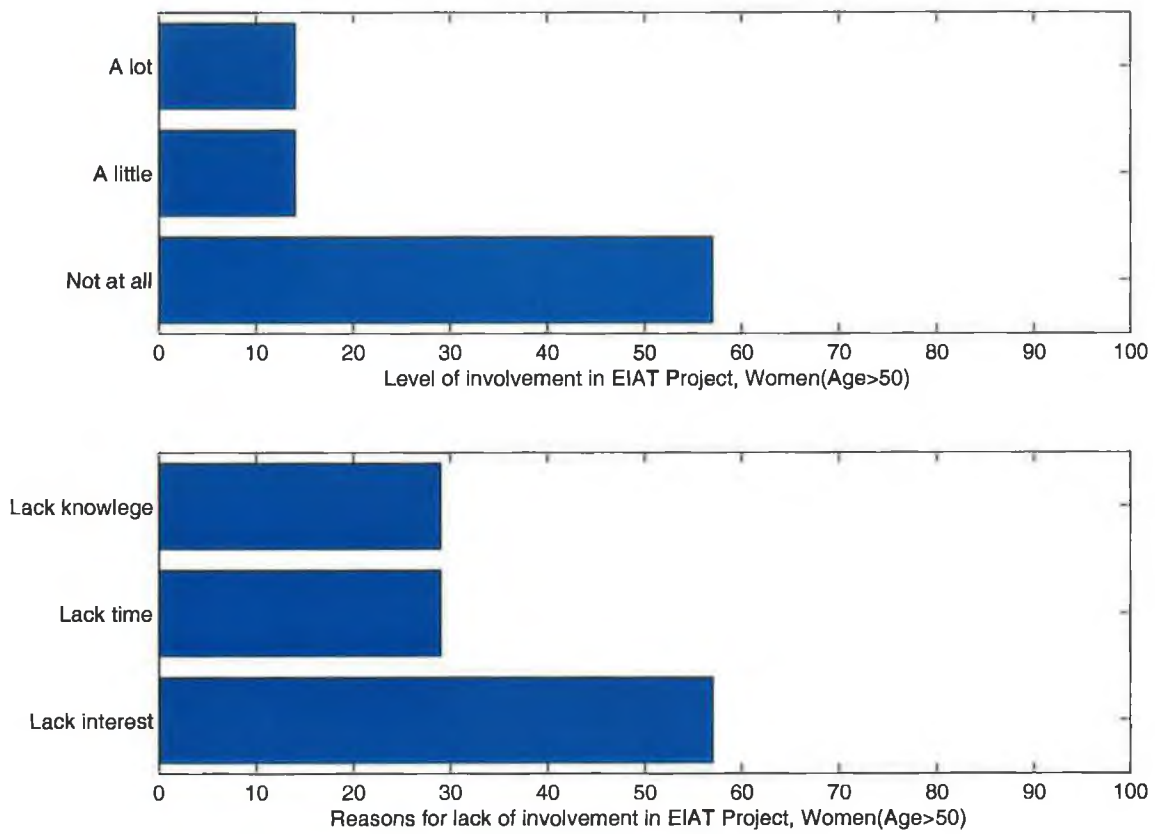
Figure 5.19: 2001 Questionnaire: Level of Involvement in EIAT Project and Why, Women Over 50
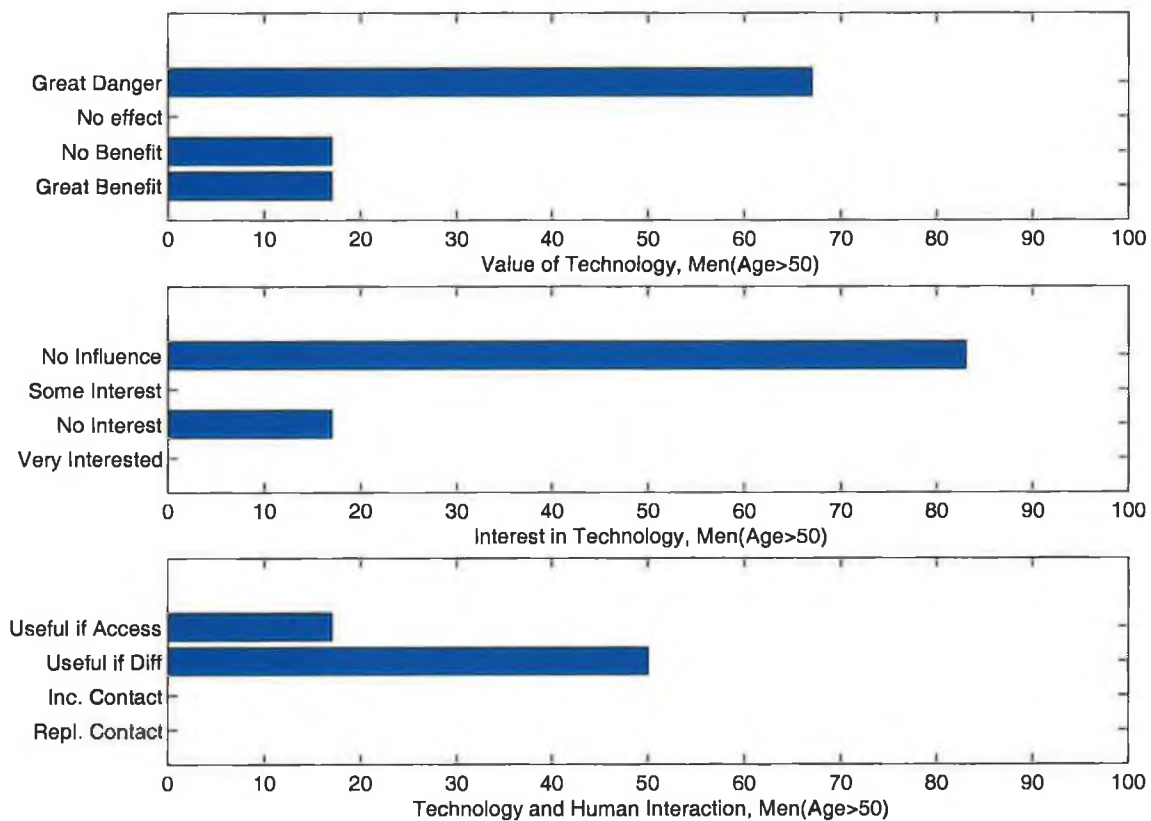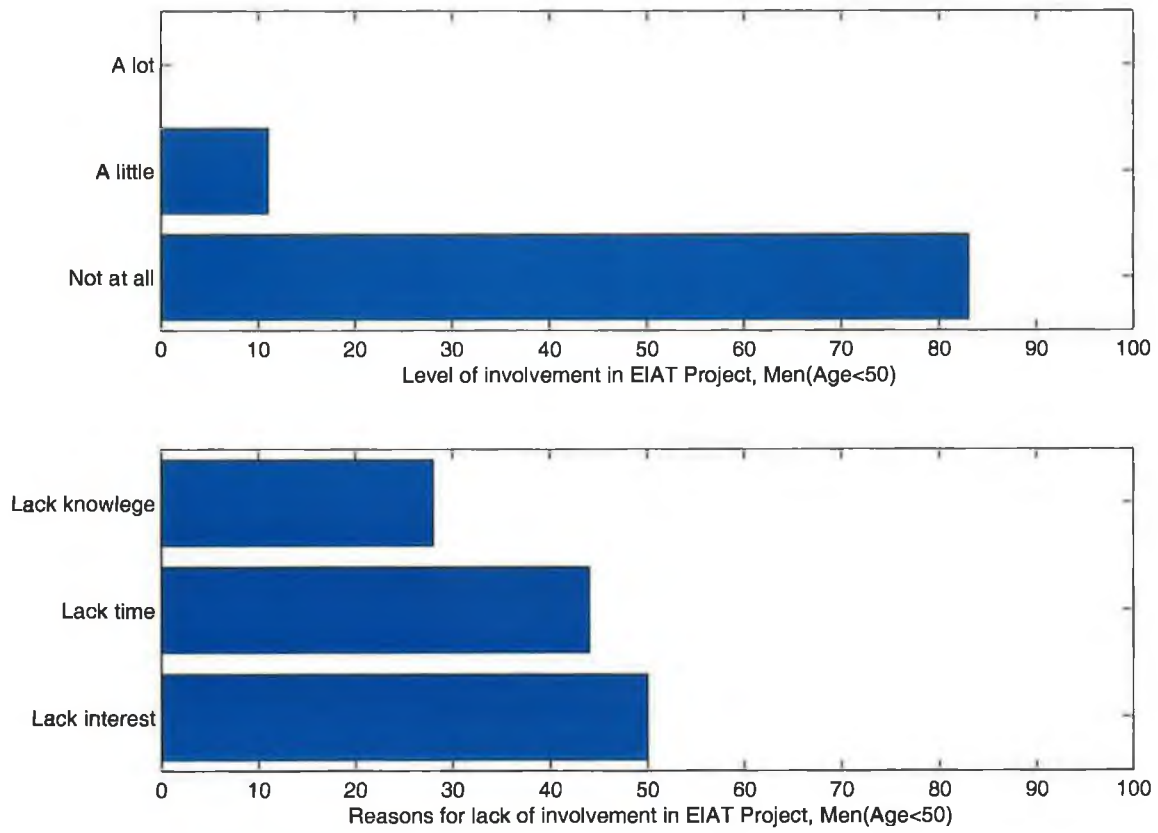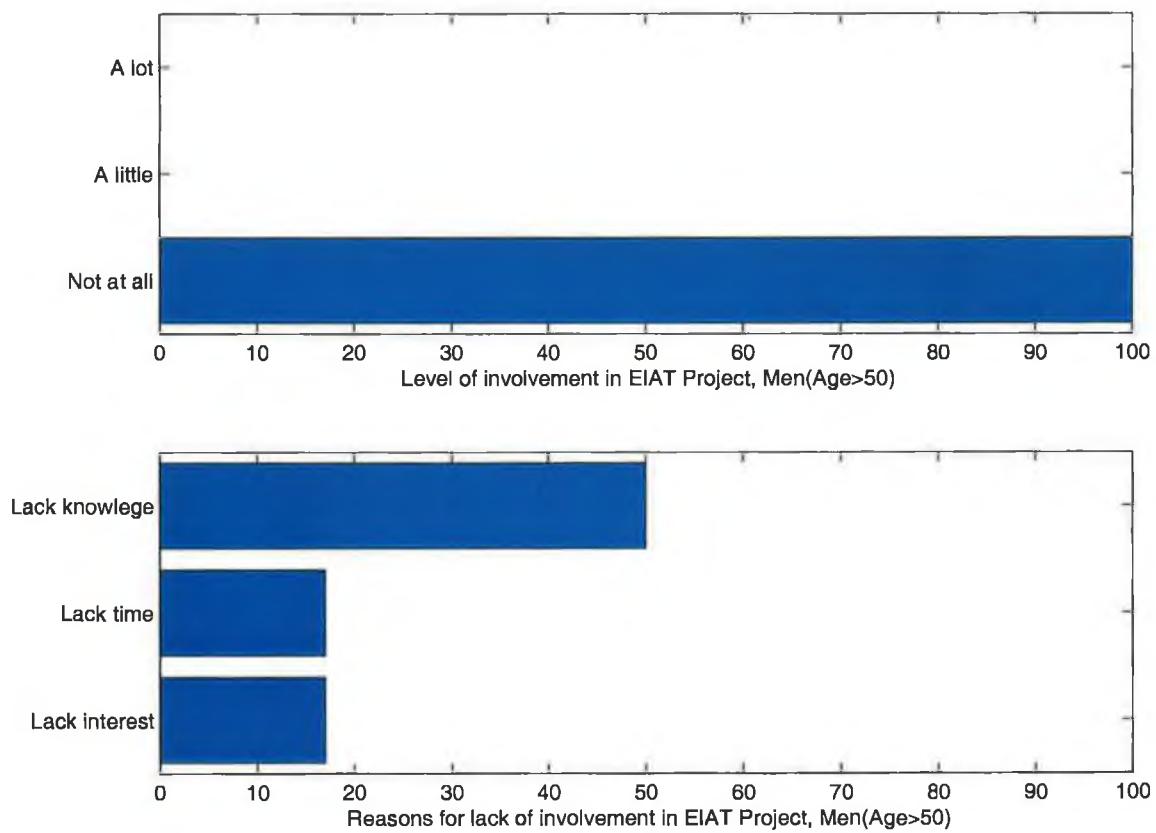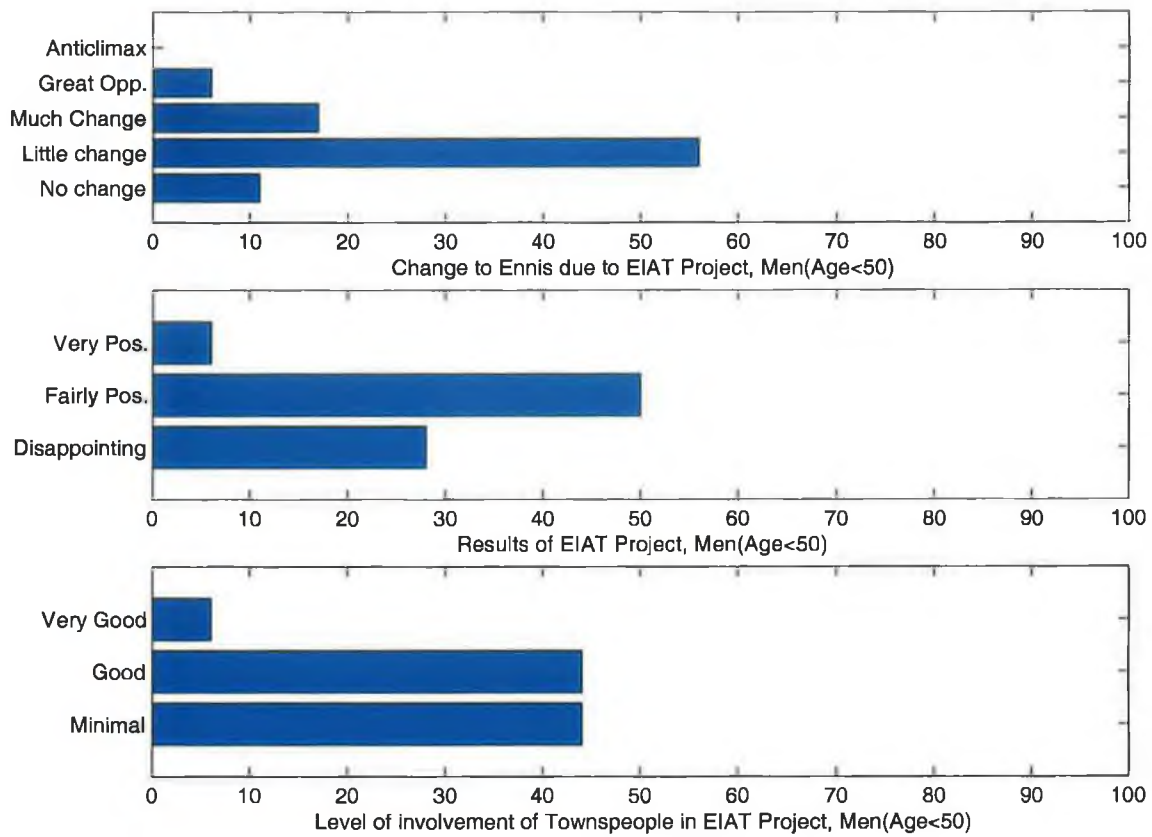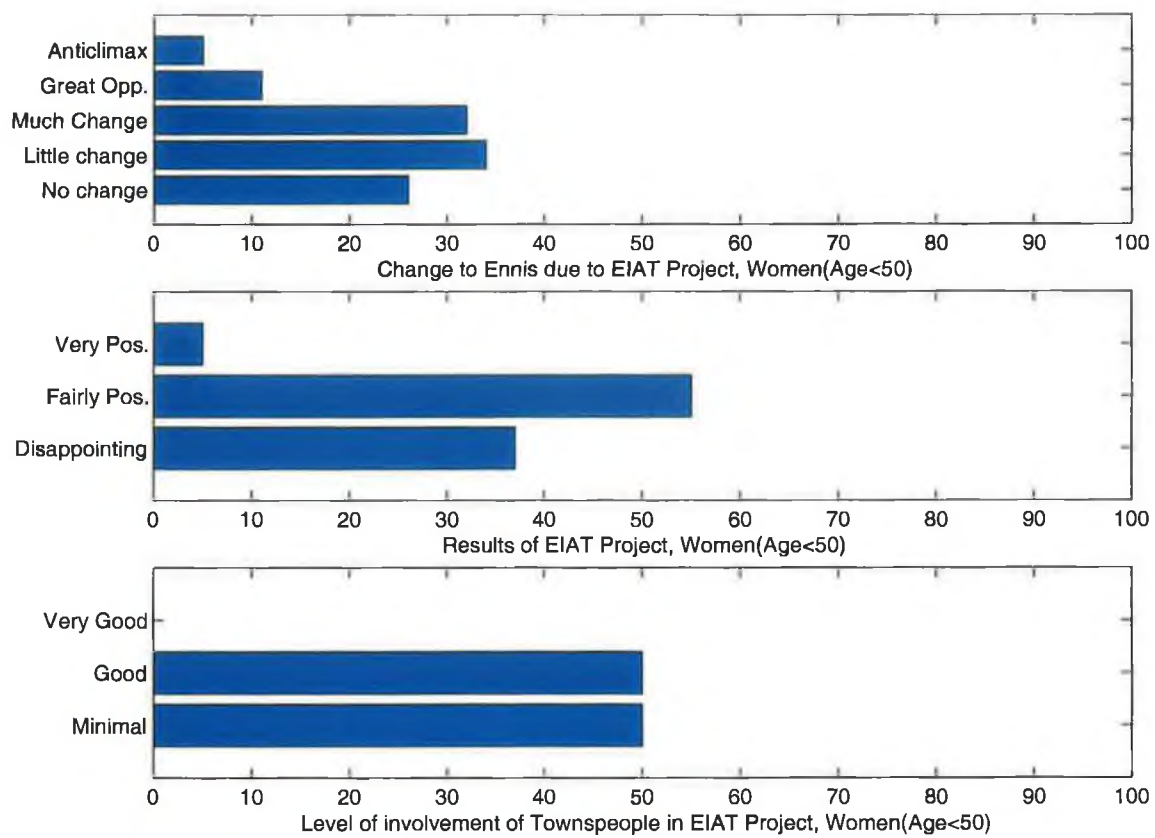
Figure 5.20: 2001 Questionnaire: Attitudes to EIAT Project, Women Under 50
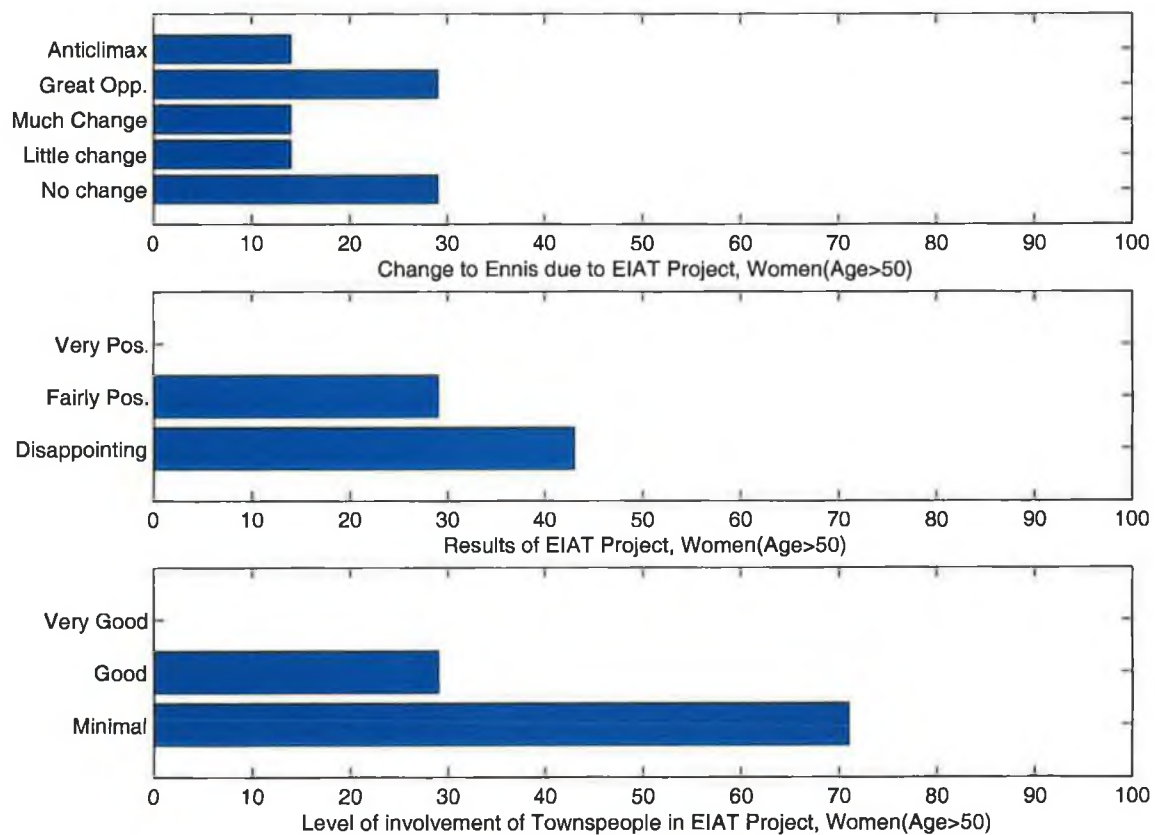
Figure 5.21: 2001 Questionnaire: Attitudes to EIAT Project, Women Over 50

In addition, of the group under fifty, thirty believed that technology has brought 'great benefit' to society with sixteen stating that the most prevalent characteristic was that technology put 'more people in touch than ever before'. However, in contrast with the male respondents under fifty, the majority of whom described themselves as 'very interested' in technology, fifteen of the female respondents under fifty stated that they had some interest in technology while ten stated that they had no interest. In contrast to the men over fifty, there was a fairly even split between positive and negative opinions of technology with three female respondents over fifty stating that technology is of 'great benefit' to society with two stating that technology is a danger to society and two stating that technology has 'no benefit' to society (see Figures 5.16 and 5.17).

In common with the male respondents, the majority (thirty-three) of the under fifty female respondents stated that they had not been involved 'at all' in the project with the most frequently cited reason (twenty-two) being a lack of interest. Five of the over fifty group had also not been involved 'at all' with four of these stating a 'lack of interest' as the deciding factor in this non-involvement (see Figures 5.18 and 5.19).

In common with the male respondents under fifty, the majority (twenty-two) of the under fifty female respondents group characterised the results of the project as being 'fairly positive' with eleven stating that the town had changed a lot due to the project and nineteen stating that the involvement of the townspeople in the project had been 'minimal'. While three of the over fifty group stated that they believed the project to be a 'great opportunity' for the town of Ennis, three also stated the results had been 'disappointing' and five stating that the involvement of the townspeople had been 'minimal' (see Figures 5.20 and 5.21). Some final comments were that young people had not been greatly involved in the project as they were using computers already; young people needed to be more involved through such organisations as youth clubs and schools; there had been a good involvement of the townspeople in the project, particularly those who had not been involved before (the example given was the unemployed); and that more training was needed.

5.5.4 Summary

A brief examination of official figures published by the EIAT project shows that household telephone penetration in Ennis is now at 93% (the highest in Ireland), up to 82% of the town's 5,600 households have received a home PC, 2,200 people sat a computer proficiency 'Usage Test', 2,400 completed the basic Computer Familiarisation Programme and three hundred people were involved in the pilot programme of the European Computer Driving Licence (ECDL) training course. Yet of the sixty-nine respondents to the random questionnaire conducted in August 2001, fifty-five respondents stated that they had no involvement 'at all' in the EIAT project. The most frequently cited reason for this non-involvement from both the female (twenty-two) and male (twenty-two) respondents

was a 'lack of interest' in the project. Yet sixteen of the men stated that they were 'very interested in technology' while fifteen of the women stated that they had 'some interest in technology'. In addition, thirteen men and thirty-three women (forty three of the sixty nine respondents) described technology as being of 'great benefit' to society.

Two major short-falls can be identified. The first short-fall appears between the official EIAT figures which show high involvement of the townspeople of Ennis in the EIAT project contrasted with the high non-involvement reported in the questionnaire. A useful comparison may be made with the results published in the Behaviours and Attitudes Survey carried out on behalf of the EIAT project in June 2001. This survey found that ownership of PC and Internet access in Ennis were more than twice the national average. It also found that the average estimate of household usage per week to be eight and a half hours for PC use and five hours and twelve minutes for Internet use, a result which, the report stated, puts:

> 'Ennis people [are] significantly ahead of national and international bench-
> marks in their frequency of use of the Internet; suggesting that one of the
> main objective of the development of the Information Age Town has been
> achieved' (EIAT, 2001: 6).

However, when we examine more closely, we find that this high usage may be limited to only one person within the family. The survey bases these figures on the reported usage of 'at least one person per household'. Therefore, while there may be one member of the family with very high levels of PC and Internet usage, this may mask the very low or non-existent usage of other family members. It would appear that having a computer in the home is not in itself sufficient to encourage all members of the family to become involved with technology. There may still be certain members of the family group who never use the home computer and therefore do not consider it to be relevant to them or their lives. Indeed, the very term 'home computer' may be as mis-leading as the term 'family car' which may be driven exclusively by one person. These discrepancies concur with sociological work examining the notion of a family 'unit' considered in chapter three.

The second short-fall appears between the majority of respondents' stated interest in technology and the high numbers citing a lack of interest in the EIAT project as a principal reason for this non-involvement. We may again compare with the Behaviours and Attitudes Survey of 2001 which reports that 90% of Ennis residents consider the EIAT project to be a good idea, giving as their reasons both a sense of individuals benefiting personally and the community benefiting economically (with 83% stating that they believe that Ennis benefits from its status as Ireland's Information Age Town). However while this survey found that six out of ten household members had taken some formal computer training, our survey found that while the majority of respondents to the survey believed

technology to be of benefit to people, this did not translate into actual involvement in the project in the form of up-take of training. We may question why those who believe that technology is of benefit to society do not see themselves partaking in these benefits or directing them in any meaningful way. We may conjecture that the respondents' stated lack of interest in the project may result from a belief that technology (and the EIAT project), while generally a good thing, is outside the sphere of 'normal' adult society, only of use or interest to children or those in full-time education or those already using computers in their work.

The additional comments included in the questionnaires may also be of some help in deciphering possible reasons for this short-fall. These point to the need for more targeted training, i.e. training aimed at a specific group with specific goals in mind. Such groups include parents whose training would be of benefit to them in their interactions with their children, those outside the formal work-place such as those who have retired or young people who may already be using computers and who require training of a more specific, focused nature. While not specifically mentioned, we would add to this list those working part-time and/or acting as full-time home-makers i.e. those operating predominantly in the domestic sphere. Of the respondents to our survey, this group is predominantly female and aged below fifty. This group characterised their best skills as predominantly in the areas of computing, languages and caring. Two specific prerequisites are required if these women are to be encouraged to become involved in technology training. It is firstly important that their existing skills are recognised and valued so that they are not required to relearn skills which they have already mastered which will speed up the educational process. It is secondly important that flexibility should be an integral feature of any training courses aimed at these women. This flexibility would facilitate trainees learning in their own homes and at their own pace.

When we compare the results of the female and male respondents, we find some interesting points of difference. While 29% of men described themselves as being 'very interested' in technology, this figure drops to 17% for women. However, there were higher levels of reported satisfaction with the project among women, 48% of whom stated that the results were 'fairly positive' while only 37.5% of men were of this opinion. In addition, 28% of men stated that they believed the results of the project to be disappointing while only 4% of women took such a negative viewpoint. The majority of both groups described the involvement of the townspeople in the project as minimal (53% of men and 54% of women). It seems therefore that of those surveyed, more men than women considered technology to be very relevant in their lives, yet more women than men considered the EIAT project to be a positive influence in the town. While there is a 90% satisfaction level reported in the Behaviours and Attitudes Survey 2001, this figure is not reported along gender lines so a comparison in this respect is not possible.

5.6   2002 - Interviews, Focus Groups and Observations

In 2002, we conducted a series of individual interviews and focus group discussions with groups of women in Ennis, Galway and Sligo. The women interviewed in Ennis were all outside the formal workplace, the women interviewed in Galway were all aged over-55 and the women interviewed in Sligo were all full-time primary school teachers. Those interviewed in Ennis had all taken part in ECDL computer usage training, those interviewed in Galway were all currently engaged in ECDL training and those interviewed in Sligo had all undertaken some technology training and were actively using ICTs in the classroom as a teaching aid. Therefore, while the three groups of women had different age and educational and occupational profiles and lived in three different towns on the western seaboard, the one factor that they all had in common was that they had all undertaken technology training. We wished to examine whether the experiences of these women varied according to the variables of age, education and work or whether similarities would be found despite these variables. The interviews took place in two weeks in May, 2002.

5.6.1   Findings

These interviews and focus groups yielded very interesting information about a number of research foci. We discuss these findings under a number of relevant headings. These are:

1. Technology training: reasons for undertaking;

2. Technology training: barriers (fears, costs, assumptions;

3. Technology training: delivery methods;

4. Technology training: gender differences;

5. Technology training: successes;

6. Technology training: changes;

7. Social Networks;

8. ICTs and the family;

9. The EIAT project;

10. Use of the Internet;

11. Pornography;

12. The Information Society.

5.6.1.1   Technology training: reasons for undertaking

Reported reasons for undertaking technology training ranged from general interest (the over-55 group) to a need to learn word-processing skills for hobbies and work (organising community games events, writing letters to family members or improving typing speeds to help with preparation of materials for work) to a need for knowledge of the Internet to take business bookings and keep in touch with family abroad. Other reasons included the need to re-skill and re-enter the workplace (following time spent at home to rear children) or the need to 'move with the times' at work following changes in work practices due to the introduction of computerisation. Members of the Sligo focus group all professed great fear of computers which they managed to at least partially overcome through necessity i.e. they felt that computers were becoming increasingly important in society and as such would become a more common feature of the primary school curriculum. They did not want to be 'left behind'. They also felt that they had no choice about whether or not to become technology-proficient:

It wasn't really a case of deciding to do courses. Almost every teacher I knew was booking themselves on a summer IT course. Computers were arriving at the school (even if they were only for the principal's or secretary's offices in the beginning) and most importantly, the kids were beginning to talk about 'Gameboy' and 'PlayStation' and the Internet. If the kids were getting to know computers, I knew that I had to as well.

The members of the over-55 group stated a 'general interest and an opportunity to get together' as their reasons for undertaking technology training. As detailed later, this group were so determined to receive training that they organised their own facilities and teacher. This contrasted strongly with the youngest woman interviewed (a member of the Sligo group) who could not identify a reason for undertaking training as technology usage had been an essential element of her university years, for project write-ups and research purposes. She also stated that her university class were occasionally required to use and evaluate software for schools which allowed her to build up her confidence in computer usage in a practical manner. Finally, there was even mention of a 'mid-life crisis' as a reason for undertaking training:

I was a typical woman with no interest whatsoever in computers. In fact, I was actively against them and would never have had one in the house if it weren't for the boys. My husband and the boys used the computer. I just thought: 'gadgets for boys'. And then I hit forty and thought: 'what am I going to do with my life?' I did one course which was

all women together, all equally stupid - there was great camaraderie and that was it. Now I use it at home every night and try to do one new course every year.

These findings recall the popular notion (considered in chapters two and three) which sees technology as an essential component of modern society and the Information Age.

5.6.1.2 Technology training: Barriers

<u>Fears</u>

The reasons for undertaking technology training varied depending on each woman's circumstances but the one constant was the fact that all bar one (as mentioned in the previous paragraph) of the women interviewed said that the decision to undertake training was a difficult one to make. All reported nervousness, fears, and apprehensions. The degree of such nervousness and the duration of its effect also varied. As all of the interviewees in Ennis had completed the ECDL pilot programme and all of the interviewees in Sligo had completed training courses and were using computers in the classroom and all of the interviewees in Galway were currently involved in technology training, they all demonstrate that fears of technology can be overcome. However, this is not to pretend that such fears do not exist and do not constitute a significant barrier to women's involvement in technology training. Detailed discussions of such fears provided telling insights into the extent of this influence. Women reported being:

Very apprehensive;

Very frightened;

Terrified;

Afraid I'd break this expensive piece of equipment;

Afraid of looking like a complete 'eejit';

Unable to even turn on a computer;

Afraid of this box in the corner;

I was afraid of the computer, I hadn't a clue, I was very, very afraid of it, I would get one of the others to turn it on. And even now, I'm still afraid. I use it lots for what I need it for but it isn't something I enjoy or feel that I have a talent for.

These fears have similarities with those felt by participants in both the pilot study and the random questionnaire. They also concur with the examination of the fears of technology common in popular culture discussed in chapter two. All these fears were magnified by the perceived expertise and ease of use which others demonstrated (quite often other family members, both children and husbands were often described as *already brilliant at*

computers). Significantly, in the majority of cases, this 'family knowledge' did not act as an encouragement to women but served to increase the pressure on these women. The women acknowledged that they were worried that:

If 'they' can do it, I will look even more stupid if I can't manage it.

This factor is an important point to consider when measuring home computer ownership and use. Reports of ten and twelve hours spent using the computer in the home every week must be carefully analysed. Who is actually using the computer? Who is booking the family holiday? Who is checking their email and bank account details? Studies which do not differentiate between family members are poor measurement instruments. Non-users within so-called technology-enabled families can remain ignorant of technology with this ignorance remaining invisible.

The discussion with the over-55 group in Galway rendered some interesting generational differences. These women were the only interviewees who mentioned the effect of constraints placed upon them by others, specifically men. These constraints acted to curb women's social freedom, making it very difficult or in some cases impossible, to be involved in any activities outside the home. The women stated that in the past, this might have been involvement with the Catholic Girl Guides of Ireland, church groups or card-playing groups. The majority of the interviewees stressed that even though they had been full-time stay-at-home mothers, they had always remained active outside the home. However, they all mentioned knowing women who did not have such freedoms, either because their husbands 'did not allow' them to undertake out-of-home activities or because their husbands continuously undermined their confidence and self-esteem to such an extent that they did not believe themselves capable of such activities. Examples given ranged from not being 'allowed' to go on Girl Guide weekends away to being told that any activities outside of the strict wife and mother role would be completely beyond their capabilities. One member of the group admitted that her own husband had had a less than complimentary view of her abilities:

If I hadn't known the other women involved, I never would have pushed myself forward. The first time I had to speak in front of a group, I pushed Sheila (another woman in the group) up to do it instead. When you continuously hear that you wouldn't be able to do something, you begin to believe it. Now, I have no problem doing those kinds of things. I always tell my husband that the day he let me go to Brownies was the day he lost me (laughs).

Costs

One factor which was mentioned by almost all of the interviewees in Ennis (except the teacher who received free training) was the factor of cost. For many women, cost was a prohibition to taking part in technology training. In Ennis, the ECDL pilot training programme provided training free of charge which many of the women admitted removed

one of the major factors which had previously prevented them from availing of training. For some, technology training was something that they just could never have afforded; for others, not having to pay for the course meant that the pressure to 'succeed' at the course was somewhat alleviated. It could be said that the cost factor raises the stakes: 'failure' means both that you appear stupid to those around you, (your husband, your children, your friends, the other trainees on the course, even the tutor) but failure also means that you have wasted money. It seems that for women used to managing the household finances, to 'waste' money which could, for example, be spent on the children carries a great burden of guilt. When asked about cost, the Sligo focus group members all stated that being able to receive all their technology training for free at the teachers' centre was an essential factor in their getting involved:

Teachers are so used to getting training for free that we don't really think about it but of course, if we had to pay for these courses, there would be very few getting involved. Mind you, it is only fair that we receive training for free because we, in turn, pass on that knowledge to the students.

In this way, there were strong similarities between the Sligo and Ennis focus groups as both sets of women received free training and both agreed that the elimination of the cost barrier was an essential element in encouraging them to overcome other barriers such as fear of technology or the belief that it was outside the 'normal' women's sphere. The group in Galway also mentioned cost as a factor in their customising of their training course. They stated that in choosing their own tutor and location rather than enrolling on an existing course, they were able to keep the cost of the course to a minimum.

These worries regarding cost reflect the concerns regarding a 'digital divide' discussed in earlier chapters. Research in Ireland and elsewhere (CRITE, 2000; Green, 2001) has shown that if access to the benefits of the Information Society is dependent on economic advantage, then the Information Society is the eventual loser, restricted to the skills and interests of a limited section of society.

Assumptions

Another barrier which was mentioned by many of the interviewees was the assumptions which they held in relation to technology, computers etc. Technology was assumed to be within the male sphere, the work sphere, the school sphere, the sphere of those with mathematical abilities, the sphere of single women, the sphere of younger women, the sphere of those living in the major urban centres; in fact technology was within any sphere other than the sphere within which they themselves operated. Whether real or imagined, these assumptions had all served to place women on the periphery of all things technological and led to their exclusion/self-exclusion from participation in any technology training. Within the context of the EIAT project, the publicity which surrounded the introduction of the project and the continued dissemination of information about the broad range of

courses available were considered by the women interviewed to be an important aid in helping them to break through the barriers associated with their assumptions:

In a way, the fact that the whole town was talking about the Information Age Town and everybody seemed to be getting a computer - it just made me think about it a bit more and for the first time, I thought that maybe if everyone was getting involved, I could too.

These assumptions demonstrate the power of cultural stereotypes which denote technology as essential to masculinity and its absence as essential to femininity. These stereotypes (discussed in chapters two and three) dissuade many women from undertaking technology training. They may also lead some women who have some technical knowledge to under-value their abilities as 'only' word-processing, or 'only' office work.

5.6.1.3 Technology training: delivery methods

Initial fears also included a fear of being placed in a formal education environment. All interviewees, other than the women working as teachers reported this fear. In each case, women reported a fear of *appearing stupid in front of the others* as a major inhibiting factor. Interestingly, those women taking part in the ECDL pilot training programme in Ennis (which employed a CD-ROM home-based delivery method) also appeared to suffer from this fear. It emerged in both the interviews and the focus group sessions that learning itself, being taught (whether at home or by personal contact within a physical classroom environment) was a situation which caused feelings of fear and anxiety. This point needs to be addressed fully, and practically, if technology training is to be effectively delivered. For example, the Ennis focus group members all reported knowing people (both women and men) who had dropped out of the training programme due to:

Fear of the whole thing, the classes, the computer, the manual, particularly the 'final exam';

(even the use of such a phrase as 'final exam' has a 'doomsday' tone).

Some women also referred to instances of self-exclusion that they were aware of i.e. people they knew who:

Had heard that the course (or the exam) was really hard and wouldn't sign up for it in case they ended up failing.

Comments such as these are similar to those made by some of the participants in the random questionnaire. They show that the delivery of technology training in Ireland needs to undergo significant changes if it is to attract greater numbers of trainees but also to provide encouragement and support to these trainees so that dropout rates are greatly reduced. As already discussed in chapter two and earlier in this chapter, 'old style' technology training which assumes identical entry levels, skills, interests and time

commitments from each student are not an efficient means of education for the Information Society. Training courses must facilitate students with diverse skills and interests who may not wish to be present in a physical classroom and who may wish to undertake training in conjunction with other responsibilities. For example, some of the women interviewed in Ennis found that the CD-Rom home-based delivery method had both drawbacks and advantages, describing it as:

both good and bad: it was great to be able to go at your own pace and go back over stuff that you didn't understand but it was also hard to keep focused and motivated.

While tutorial sessions lasting two hours were provided both in the introductory period and prior to exams, many of the interviewees spoke of the need for more face-to-face training, not only so that explanations of material could be given at the correct pace and with suitable vocabulary but also so that a bond of trust was established, both between the tutor and the trainees and among the trainees themselves. This need has budgetary repercussions, as extra class contact time will ultimately lead to increased costs. However, this disadvantage should be weighed against the advantage of a possible fall in attrition rates and higher overall satisfaction levels.

The over-55 group decided that they would organise their own training for two main reasons. One was the prohibitive cost of existing courses in schools and colleges while the other was the apprehension which they felt about being taught with a group of strangers:

We were worried about who else would be there, in particular men but also students.

In order to organise their own training course, they made use of a personal contact (a friend working as a teacher in a local secondary school) who contacted another teacher who was teaching ECDL to post leaving certificate (PLC) students. This man agreed to train the group for a reasonable cost if they could organise a suitable classroom. Another personal contact organised their use of the computer room in a local secondary school. The women felt that without their personal contacts, they would never have been able to undertake training whereas they all expressed great satisfaction with their customised course which they felt perfectly suited their needs. The experiences of this group also shows that barriers to technology training can be effectively overcome by innovative approaches to course design and delivery so as to answer the specific needs and interests of trainees.

5.6.1.4 Technology training: gender differences

The teacher/technology trainer made a number of references to gender differences in course participation. She stated that she felt that in general, women doubted their abilities to understand technical details and were anxious to work on discrete tasks during training sessions. She also stated that women asked many questions throughout the course, most particularly at the beginning of courses:

The women that I train ask loads of questions, both of the trainer and of each other. They have no worries about appearing stupid. In particular, they ask questions during the opening session of a course so that they don't fall behind.

In contrast, men were very unlikely to ask questions:

Many of the men won't ask questions for fear of losing face, (particularly in front of a female trainer). Myself and another (female) trainer have regularly trained men who cover their lack of knowledge with aggressive challenges to our training methods, making negative comparisons between these methods and those of a colleague (an older male). If they would just stop posturing and being aggressive and actually admitted to ignorance like most of the women, they would learn much more.

These comments regarding gender differences in technology training demonstrate once again the strong cultural links between technological knowledge and masculinity. In training situations, this stereotype can work to men's disadvantage and women's advantage. Because technological enablement is expected of men, some men may have difficulties either taking technological training from a woman or admitting to gaps in their knowledge. On the other hand, because technological enablement is not expected of women, some women may more readily ask questions and take instruction, thus progressing at a faster pace than their male counterparts.

5.6.1.5 Technology training: successes

While the women interviewed did encounter barriers to their involvement with technology, it would be incorrect to state that all of their dealings with technology were negative and unfulfilling. Many of the women interviewed reported great feelings of fulfillment and satisfaction following their successful familiarisation with computers. The following are a selection of the positive feelings that were expressed:

I love technology and gadgets now.

Since doing the course, I am stone-mad about the computer.

I was delighted that I did it. I use the letter writing part all the time.

I built up my courage as I went along and began to feel that this was something that I might actually be good at.

I loved my computer - I felt sad when it got taken away

I was able to set up a website for a group that I was involved with which isn't particularly fancy but which does the job grand.

I can now keep in touch with my daughter abroad without having to ask my husband (who would always crib about it - 'yeah, yeah, I'll do it later' etc'.

There is no way that I would have been able to go straight back into the work place - I had to learn the computers first and now that I have, I can't stop.

During the course of this research programme, we interviewed women of differing social, educational and generational backgrounds in three different towns in the West of Ireland. All of these women described their uptake of technology as a 'success'. For some, this was a personal success in terms of their sense of satisfaction with their achievement. For others, it enhanced their role as parents, enabling them to make use of ICTs in a meaningful way with their children. For others, it facilitated the move back into the paid workforce. For others, it greatly enhanced their job performance and career prospects. It is essential that this multitude of successes is understood and valued to avoid adopting a narrow approach to technology training which measures success only in terms of qualifications achieved or promotions secured.

5.6.1.6 Technology training: changes

Many women interviewed referred to feeling surprised by their success with technology. In Ennis, many had applied for the ECDL pilot training programme because it was free and so they felt that they could:

Take a shot at it and sure if it didn't work out, what harm?

However, these thoughts of possible failure were wide of the mark and initial difficulties were worked through. One woman spoke of failing her first exam:

It was partly due to the manual which led me to believe that the format of the questions would be a certain way and they were completely different which really threw me. Anyway, I decided that I wasn't going to be beaten and I got help (from a male friend) and re-sat the exam. This time I passed. And that was all I needed to encourage me to keep going.

There was frequent reference made to the difference to self-esteem that success with technology brought to these women. For some, it was the first time since finishing secondary school that they had been involved with a course of study. For many, it was the first thing that they had done for a long time that was for themselves only with no obvious benefit to their husbands or children:

Of course, the kids all have it from school and my husband has it at work but I had never had a clue about computers and never imagined that I would, so this came as a complete shock - to them too.

When conducting the focus group in Ennis, it seemed that some of these women felt surprised about their success for two reasons: one reason being that they were successful with technology but another reason being that they were successful outside the domain

of the family. The Sligo focus group did not see technology as having raised their self-confidence but they did feel that their increased knowledge in this area had opened up new opportunities for them, both at work and in their leisure time:

For me, it was a new lease of life. At work, I was no longer waiting for the secretary to type up stuff for me. I could go on-line and book my holidays without waiting for my husband to find the time to do it.

It has become a part of my life. I check my bank account, get car insurance quotations, book for concerts, whatever I need.

These comments are an important reminder of the positive personal effects which technology training can have upon women's self-esteem and confidence, a point which is rarely considered in analyses of uptake of technology training. Success in persuading more women to undertake technology training so as to learn new skills and become familiar with ICTs is not simply a means of addressing the current skills shortage in IT in Ireland, or a means of reducing unemployment figures, although these are social benefits which may come about. For many of those who successfully cross the many barriers to their engagement with ICTs, we believe that the most immediate benefits are deeply personal whereby women re-imagine themselves and reject established gender boundaries and behaviours in favour of multiple new roles and responsibilities.

5.6.1.7   Social Networks

The majority of the women interviewed made reference to the ways in which existing social networks influenced their engagement with ICTs and uptake of training. These social networks were important to all three groups of women; those working mainly in the home; those over-55; and those working as teachers. For the women working in the home, these networks were a means of finding out how other women were engaging with ICTs. In most instances, these women were female relatives or friends who were already using ICTs within the home or who had undertaken technology training:

The turning point for me was when my mother got her (female) friend to show her how to use the email so that she could start to send messages to her family in England and America. I thought well if my mum can use email, it can't be that hard.

My (female) friend was doing a 'Fás' course (community employment and training course) and she did an 'Introduction to Computers' course. They already had a computer in the house for the kids, so one day, she showed me a few things and another day, she showed me a few other things and that's how I started to get the courage and interest to do a training course myself.

A few women I knew had become interested in computers and we started talking. I realised that they were just as nervous as I was and that gave me confidence. It (engaging with

ICTs) seemed more 'doable' somehow when I talked to other women about it, rather than just thinking that I would like to get involved but feeling afraid that it would be over my head.

For the women over-55, the group decided to undertake training together. They felt that as a group, they could pool their resources and contacts which would help in the organisation of the course. They also felt that the network would act as a powerful motivator in completing the course as each woman would be helped by the others in the group:

We decided that we were going to help each other. It wasn't competitive (we're all a bit old for that now (laughs)) but no-one was going to get left behind. During the course, if we need to go back over bits, we did and there have even been a few times when we have telephoned each other or talked to each other about bits we didn't understand.

For the women working as teachers, the sense of women trying things out together was important:

I did one course which was all women together, all equally stupid - there was great camaraderie and that was it.

The importance of the female support network was also mentioned by the teacher who worked as a technology trainer:

It's amazing to see how the women on the courses band together. They tend to ask each other questions and support each other. They don't see each other as competitors but colleagues.

These comments demonstrate the importance to women of their social networks, both in their personal lives and in their engagement with ICTs. These networks were described by all the interviewees as the most important catalyst in their decision to engage with ICTs, more effective in persuading them to undertake training than media reports, governments campaigns or local information initiatives. Once again, this point should be considered in future campaigns to attract women to undertake technology training.

5.6.1.8 ICTs and the family

The first study of parents' and children's attitudes to ICTs in Ireland found that the majority of parents expressed apprehensions regarding their children's use of the Internet and were unable to adequately monitor their children's use of the Internet due to a lack of ICT skills:

> 'More than 75% of Irish parents believe they are unable to control and monitor their children's use of the Internet as they do not know enough about it' (Pope,

2001).[2]

Our research found that even moderate engagement with ICTs encourages parents to discuss ICTs with their children and helps them to monitor their children's home use of ICTs.

Many of the women interviewed talked about the changes to family relationships which resulted from their participation in technology training. They spoke of how they could now help their children to conduct research on the Internet for their homework or get involved in researching the family holiday online. They also felt that their new knowledge meant that they now had more in common with their children:

I help the kids now - before they always went to their dad.

My kids ask me for help now.

I suppose the kids and I have more to talk about now.

I helped my sister when she was doing her ECDL course.

I spent all of St. Patrick's Day last year (2001) writing up my daughter's dissertation. We fought continuously about margins and headings but it was great to be able to help her and afterwards, she admitted to being impressed (against her will, I think) that I was so good at it (word-processing, formatting etc.).

These changes in the interviewee's relationships with their children do not seem to have been replicated in their relationships with their partners. For those interviewees whose partners had already been using computers for some time, either at work or in the home, the women's growing engagement with ICTs does not seem to have brought about increased levels of interaction or common interests with their partners. Certainly, no interviewees mentioned using computers with their partners or even discussing computers with them. For those women whose partners were not using computers, either at work or in the home, the women's engagement with computers seems to be viewed as a hobby specific to women and of no relevance to their partners. This appears to be the view taken both by the women and by their partners:

I think my husband just saw it as another evening course (the interviewee had previously taken undertaken an interior design course). He minded the kids for a few hours while I studied but that was the extent of his involvement, really.

I suppose it was my fault really. I didn't think he would be interested so I didn't really tell him much about the course.

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[2]There is evidence that these worries are now being recognised and addressed. For example, *Barnados*, Ireland's leading charitable agency for children and families has, in conjunction with *eircom*, published a 'Family Guide to the Internet' leaflet which gives advice to both parents and children regarding the safe use of the Internet.

I remember one day telling him that Mary X (a friend of the interviewee's) was also doing the course and his response was, 'well, you can see that she might need it alright for work and that'. This annoyed me to tell you the truth because I felt that he was saying that the training would be of no use to me because I'm at home with the kids. I just decided then to get on with the course myself and didn't really bring it up again.

Some interviewees mentioned how their familiarisation with technology had merely served to reinforce existing domestic roles:

I used to tidy up the house after my husband and the boys. Now I could spend twenty minutes to a half-an-hour a night tidying up the computer after them. They might have sixty emails that they never read: they clutter up the D:drive with downloads from Napster: the desktop is full of rubbish; and they even forget to empty the trash! The computer has increased the amount of work that I have to do, not lessened it. And of course, I'm so often online myself that the ordinary housework suffers.

Therefore, although engagement with ICTs brought about changes in family dynamics which the interviewees categorised as positive, these changes were mainly in parent-child relationships, rather than parent-parent relationships. While taking part in a technology training course led to an improvement in the self-esteem of many women, many also felt that it served to raise their standing in the eyes of their children who began to see their mother as a person worth consulting about matters relating to the outside world, a person with understanding and intellect. In other words, an educated person. Those interviewed pointed to the difference that this change had made in their lives. The question is whether this change will have a ripple effect in the wider community. If large numbers of women become thought of (by themselves and others) as intelligent and knowledgeable, will this image of women replace other less favourable ones?[3]

As one interviewee put it:

I'm really glad that I have all this training under my belt. It is easy to tell people it is just a tool but if I didn't think it was important, why did I do all this training? I'm glad to be an insider, not an outsider.

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[3]It takes time for popular understandings of gender boundaries to shift and reflect changes in 'accepted' gender behaviours. For example, large numbers of women may learn to drive cars but popular opinion may undervalue these women drivers, considering them to be second-rate to men. The 'family' car may still be considered the man's property (even where the prime user is the woman) and the man may be considered the 'main' driver when both the man and the woman are present in the car. Therefore, the woman is merely considered to have learned a masculine behaviour without the gender boundaries undergoing any transformation:

> 'after all, the basic 21st century skills are mainly manly ones: drive a car, work a computer, lift heavy furniture, grout a bathroom, chop logs, understand endowment mortgages, kick tyres in thoughtful, expert manner' (Bathurst, 2002: 9).

Many researchers have found that the introduction of ICTs into the domestic sphere effects many changes in the family dynamic and relationship. The use of ICTs in the domestic sphere may encourage new patterns of communication or establish new levels of interaction between family members. Our research found similar changes occurring in the family dynamic in response to the engagement of women with ICTs. In general, these changes involved increased communication between the women interviewed and their children and positive changes in the children's opinions of their mother's abilities. However, our research did not uncover any changes in the women's relationship with their partners in light of the women's increasing level of skill and awareness of ICTs. Many of the women stated that a prior aim of undertaking technology training was to facilitate their increased communication with their children. However, increased communication with their partners was not a stated aim of any of the interviewees. It is possible therefore that increased communication between partners did not occur because it was not an expected outcome i.e. the opportunities for increased communication were not recognised and were therefore lost. It is also possible that while the interviewees may have succeeded in disregarding the notion of technology as a masculine preserve, their partners may still have kept that belief and so undervalued the new skills and interests of the women, rating them 'second-rate' ICT users. It may also be possible that some of these women's partners are themselves non-users of ICTs and as such are uninterested in their partner's engagement with ICTs. For whatever reason, it is unfortunate that the interviewee's engagement with ICTs which led to improved communication and interaction between mother and children does not seem to have been replicated between the interviewees and their partners.

5.6.1.9 Use of the Internet

Those women interviewed said that before undertaking technology training, they had never used the Internet (although a number had sat beside their husbands while he booked the family holiday). Most of those interviewed admitted to initial amazement when they found that they could access the Internet after very little training. However, this amazement gave way to less positive feelings with the progress of time. Many of the women interviewed could not afford the large telephone bills which large amounts of time online would produce while others felt overwhelmed by the amount of information available online:

I can't have bills of one and two hundred euro coming through the door so I don't really use the Internet at all any more.

My husband gets free Internet access at home (as he is participating in an ADSL trial). If it weren't for that, there is no way that I would use it (the Internet) as much as I do.

I love the Internet but there is so much stuff - how can you be sure what is useful or not?

I never surf the Internet. There is no end to the information and no way of knowing if it is relevant or not. All I ever do is go to designated websites.

For those women who continued to use the Internet after the training course had finished, the advantages out-weighed such disadvantages as cost, amount of information or the difficulties caused by the non-hierarchical structure of the Web. Some descriptions of ways that these women used the Internet included:

I found that email was too slow for keeping in touch with my friend in New York so now we both go into the Yahoo chat-room and have a chat (in real time).

This comment shows that developments in ICTs may bring about changes in both the quantity and quality of personal interactions.

At the moment, I am trying to trace my family history (on the Internet) but I am finding it very difficult to find relevant sites.

None of the women could mention specific sites that they regularly visit. It seems that they access the Internet with specific tasks in mind or specific sites to visit rather than as a means to pass the time.[4]

These comments reflect many of the views of technology discussed in chapters two and three. The Internet is in part viewed in a positive light, a useful information and learning tool of particular benefit to children. However, it is also viewed as an unlawful place, its many (perceived) dangers serving to dissuade many of the interviewees from fully engaging with it and making them apprehensive regarding their children's time online.

5.6.1.10 Pornography

One interesting point which emerged from the discussions was that the availability of online pornography did not overly worry the younger women but was mentioned by the over-55 group as being a major worry and a deterrent to their Internet usage:

The availability of porn online is very worrying. I feel that they are trying to pollute our minds.

These people (those who create and distribute the porn) are creating a need which never existed before and it is all for profit.

To tell the truth, it (porn) puts me off the Internet altogether. I'm not sure that I want to be associated with it in any way.

It is difficult to definitively answer why the existence of pornography online should prove a greater deterrent to older women than to those under-55. It is possible that older women

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[4]This concurs with a recent American study which found that women do not surf as much as men but instead repeatedly access sites that help them save time or money. (Power, 2000b)

in Ireland may have stronger religious convictions and so have stronger objections to what they perceive to be the 'immorality' of pornography. It may be that older women have greater feelings of vulnerability in general and so are more likely to see danger and threat in the world around them (including the online world). It may also be that some younger women use pornography and do not therefore view the existence of online pornography as a personal threat. What is certain is that for those women interviewed, the great numbers of useful and interesting sites which are specifically targeted at the older age-groups are not sufficiently attractive or interesting to dispel the worries which the existence of other 'less suitable' sites induce.

5.6.1.11   The EIAT project

The discussions with the women in Ennis included discussions of the EIAT project. In general, they described it as a 'good thing' for the town. As previously mentioned, many of the women referred to the fact that the ECDL pilot training programme was provided free of charge as having been a major factor in their decision to undertake training. Some of the women felt that there had been insufficient technical support for those who availed of the home PC offer:

When I got a virus (in my home PC), I had to physically bring the computer into the EIAT offices. There just weren't enough technical staff employed in the early days when they were most needed. This wouldn't have been so bad if there had been more technical training provided when people got their computers but as it was I felt that I was taking up too much of their time.

I was left very much alone.

I needed more help, focus and training.

Apart from these technical problems, some of the interviewees felt that there were still lots of people in Ennis who had not been touched by the EIAT project:

I know lots of people who say that the EIAT project was all hype or that all the money was given to the schools. I don't think that but there are people who do.

More should have been done to get people involved. People on low wages or unemployed people can't see the benefit in getting training.

One woman felt that the EIAT project had prioritised the townspeople of Ennis over the 'ordinary' people of Clare, re-inforcing the existing urban-rural divide:

If you were within the UDC (Urban District Council) area, you got free computers and what have you but two miles outside the town, and you got nothing. Schools outside of Ennis have as much need of computers but they get nothing. Houses within the UDC areas got PCs and training. Those in the countryside did not. That's unfair.

Other women felt that Ennis had received excellent publicity through the EIAT project;

It has put us on the map.

There have definitely been great advantages for the town (because of the project). Employment and that.

Overall, the interviewees saw the EIAT project in a positive light, bringing increased publicity and revenue to the town and effecting a positive change in the local community. Interestingly, they did not view the positive changes effected in their personal lives (e.g. their increased self-esteem and improved parent-child relationship) as being part of the positive changes which the EIAT project effected in the general community. The changes to their own lives were considered to be of personal relevance only. There was no sense in the interviews that the interviewees valued their engagement with ICTs for the positive social changes it might bring to the community. Their increased effectiveness as parents, their status as role-models for other women, their increased effectiveness in the workplace - these were not considered by the interviewees to extend to the wider community. Our research shows that the social benefits of ICTs may sometimes be lost in the popular pre-occupation with the perceived ills. It is important that we fully appreciate the benefits to society of those (such as these interviewees) who are positively engaging with ICTs.

5.6.1.12 The Information Society

The interviews all concluded with a general discussion of the Information Society, where it is going and where it may take us. Some of the Ennis interviewees were unsure whether the project had brought any real benefit to the town. They felt that any changes brought about by the EIAT project would have come about anyway as:

All of Ireland is being computerised now anyway. When the project started (five years ago), anyone with a PC at home was a nerd and anyone with an interest in computers was a nerd. Now we're all nerds - Nerds of the World Unite!

Most of the women interviewed saw the changes which technology is bringing to society in a positive light:

It definitely makes life easier.

Being connected is easier - the world is smaller now.

Technology makes us more competitive and makes everything happen faster.

Many women spoke of the usefulness of certain applications such as word-processing packages or spreadsheet packages in their everyday lives:

When I am writing letters to my aunt, I might get to the end and realise that there is something else that I wanted to tell her that should be in at the top so it is great that I can write it anyway and paste it in on top.

Writing in general is much easier with spell-checks. You can also enlarge the print for older people or people with poor eye-sight.

I use Excel now for putting together material for the community games.

I keep a spreadsheet of household money over the month which I find is really handy for budgeting properly.

The over-55 group also agreed that technology is often useful:

Some technology is brilliant and we can't get away from it.

It is great for keeping in touch.

However, the women in the over-55 group were much more interested than the younger women in discussing the down-sides of the Information Society. One of the women in the over-55 group stated that:

Technology is out of the order of things, not natural.

This statement was agreed with by all of the women in the group. All of the women also agreed that technology had a huge effect on family life and communication (as we have already seen in relation to the use of the Yahoo chat room for real-time interactions):

It is definitely de-humanising.

Children still need to be held - can a computer do that?

Email is convenient but you can't see the other person's face and that definitely does affect the communication.

Email is cheaper and easier. It is more efficient but less personal.

It (technology) stops people from communicating. It's all machines.

Young people (these days) have everything and nothing. They have DVDs and computers and PlayStations but there is no personal communication, no human contact.

Children come home from school and Mammy is working. That's fine - maybe she needs to work, I can't say, but what happens? They eat dinner in front of the telly.

There was a general agreement that technology interfered with long-established eating patterns within families:

Nobody cooks anymore. It's all ready meals in front of the telly.

There is no such thing as Sunday lunch. That was always the most important meal of the week, when the family would sit down together and talk. Now that is gone.

We should also consider the possibility that the role played by family meal-times in facilitating communication may in part be replaced by time spent using the computer together.

Some of the women in the over-55 group felt that technology also adversely affected how children are reared:

It's like Big Brother controlling. We are like puppets really.

There seems to be no control of the process (of taking technology into all aspects of our lives).

The mums and dads now have less control over the children. They get it (influence) from the television, the Internet wherever.

It was also felt that technology (particularly the Internet) was diluting the uniqueness of Irish culture so that:

There is no Irish or English culture now; globalisation is so much more a part of our lives now. And that is mostly coming from America.

It was agreed that some technological advances were positive. In particular, medical technology such as heart bypasses and organ transplants were considered positive developments. However, all of the women in the over-55 group agreed that developments in mobile telephony were not positive:

All the kids have mobiles now but they never seem to talk.

They should only use them (mobile phones) for emergencies.

One woman gave an example from her own experience of taking a group of six to ten year olds away for a weekend and having to make a rule that mobile phones could not be used after nine p.m. as the children were texting each other co-ordinating their 'break-out' of the dormitories!

Once again, it is important to try to understand why the over-55 group expressed so many more misgivings about the Information Society. As already stated, it may be that women in this age group are generally more nervous of new things. It may also be that technology is more alien to women in this group because quite a lot of the technological developments in ICTs which were being discussed have come into being quite recently (in the last ten years). It may also be that this group is not being adequately targeted for technology training and so feel excluded from developments in ICTs. If this were the case, it would seem that changes should be made which would attempt to redress this imbalance so that the talents and skills of the older generation would not be wasted.

Regarding technology in the education system, the interviewees in the Sligo focus group felt that there was no clear pathway for technology training from the primary curriculum, through secondary school to third level training. They felt that technology training was an *ad-hoc* add-on to existing curriculums and technology programmes were neither properly constructed nor implemented. They believed that greater resources and incentives for

teacher training were essential if Irish students were not to miss out on the benefits of the Information Society. These thoughts were mirrored in the interview with the teacher living in Ennis. As she worked in a school outside of the Ennis Urban District Council (UDC) area which therefore did not qualify for funding from the EIAT project but had numerous friends working as teachers within the UDC area whose schools did qualify, she felt that she had a good understanding of the difference between 'normal' schools and 'EIAT' schools. At her own school, she felt that there was insufficient support for technology in the curriculum. She suggested that specific reasons for this might include: the fact that computers are not an exam subject; insufficient funding within the school budget for technology purposes; the lack of technical support which meant that simple problems could take a long time to rectify and certain individuals (often herself) were burdened with sorting out these problems; the lack of personal interest on the part of the principal of the school; and neither encouragement, recognition nor time-off being given to teachers who had undertaken technology training. The interviewee stated that at schools within the UDC area, there were:

Still many problems - the kids can access porn, they see computers as a mess class, they want to play games all the time - but at least there aren't the problems of thirty kids looking into one screen or twenty teachers sharing one lap-top.

The Sligo focus group also discussed the down-sides of technology in education. In common with the teacher based in Ennis, they also felt that the lack of either extra accreditation or pay for teachers who became involved in technology training was a definite barrier to many teachers' involvement in technology training. They also felt that there was a definite pressure on those teachers who did undertake technology training to continue to up-skill and this challenge was considered to be stressful and time-consuming.

5.6.2 Summary

All interviewees mentioned the sense of empowerment that being involved in technology training gave them. Most of the women interviewed in Ennis continued their training past the initial courses offered by the EIAT project and many had offered encouragement leading to the involvement of family members, friends, neighbours and colleagues in the project. This sense of empowerment stemmed partly from social and economic factors and partly from psychological ones. Many interviewees mentioned the 'buzz' which their engagement with technology had generated. The women interviewed in Ennis also said that they felt like pioneers, creating something new from the outset and being actively involved in changing Ennis and its people for the better. This sense of community feeling was also helped by the fact that so many groups were involved who might not have been so actively involved in the past. The sense of belonging and taking part in a shared experience had a strong, empowering effect, as had the increased sense of personal achievement and

creativity. Many of the women in Ennis said that they felt that this helped to change the previous perception of the town from geographically isolated and technologically poor to being a vibrant centre of new developments and communities with commensurate economic benefits.

5.7 Secondary Research

Much of the secondary research which we conducted which investigates the confluence of women, technology and society is detailed in chapters two and three. The secondary research which we conducted which relates to the formulation of an appropriate methodological framework and the execution of methodological tasks is detailed in chapter four. However, we also conducted secondary research directly related to the EIAT project which we now detail in this section.

The Clare Champion

We conducted an analysis over time of the coverage given to the EIAT project in the local newspaper *The Clare Champion* as a means of tracking the local opinion of the project. We conducted this analysis with the aid of the extensive media files kept in the offices of the EIAT project. In general, we found that many of the earlier articles were highly optimistic and ambitious in tone with a certain amount of tempering of this tone with the progress of time. For example, in April 1999, an article entitled *'Ennis Business to Benefit from 2 million pound Information Age Plan'*, the CEO of the EIAT Task Force is quoted as saying that the town of Ennis is entering the 'most exciting and creative phases of information technology development' which will lead to the town becoming established as a 'leading light of the information age, nationally and internationally'. In addition, the *eircom* liaison officer is quoted as saying that the company is delighted with the progress achieved in enthusiasm and that 'it is particularly gratifying that the business community have entered into the spirit of the project with such enthusiasm'. Finally, the President of the Ennis Chamber of Commerce describes the project as 'one of the most important developments in the recent history of Ennis business'.

By comparison, an article entitled *Praise for the Information Age Town* published in February 2001 quotes the chairman of the Ennis Urban District Council who states that while the town has developed significantly and is continuing with the provision of fine infrastructural, educational, recreational and social facilities', Ennis is also 'conscious of its history and concerned with the need to preserve its character and heritage'. This suggests that while the development of the town which has come about due to the project is welcome, there are some fears that the unique identity of the town will be lost in the face of this progress.

These fears may be due in part to the worldwide interest in Ennis which has been evident since the beginning of the project. One example of this media interest is contained in an April 2001 report in the same newspaper which describes the visit to the town of a Korean journalist doing research for his newspaper's special edition coverage of 'Cities of Tomorrow' with Ennis as the Information Age City. Such worldwide media interest may lead to some in Ennis feeling that their town's geographical distance from the country's capital is no longer any guarantee of a retention of established traditions and local identity.

As a local paper, *The Clare Champion* also functions as an information conduit for the project. For example, *'Mum's the Word'*, published in March 2001 provides information on a morning of free Internet training and advice for mothers only: 'allowing mothers from all over Clare to get together and enjoy learning about how technology can be used as part of their daily lives'.

The paper also covers the developments in technology in education in Ennis. An article published in November 2000 quotes the director of the Clare Education Centre who says that the successful integration of computers in primary school classrooms is the 'jewel in the crown of the Information Age achievements in Ennis'.[5] The article also quotes the Schools Integration Programme (SIP) co-ordinator who says that 'because of the *eircom* EIAT [project], we are in a unique position. However, it's an old saying that to whom much is given, much is expected'. The article includes some very generalised statements such as 'boredom has been banished from the classroom'. This is unlikely and indeed, would contradict our data.

Such coverage suggests that the high levels of optimism evident at the beginning of the project gave way to the reality of implementing the project and engaging the community. This concurs with our data which also shows that some of the initial optimism which greeted the winning of the competition was dampened by the reality of integrating ICTs into daily life, whether in the home or in the classroom.

Other Media Coverage

Outside the local area, much of the coverage of the EIAT project deals with specific happenings within the project. For example, an article entitled *'Information Age town still prefers ring of the cash register'* published in January 1999 in *The Examiner* describes the difficulties encountered in the Visa Cash programme while *'Ennis activity report'* published in September 2000 in *The Sunday Business Post* previews the release of the interim report of the project. The majority of the coverage deals with the economic benefits resulting from the project with a limited few examining social and cultural changes. However, *'Well-connected families get their hi-tech awards'* published in October 2000 in *The Irish Examiner* describes the changes in family dynamics which followed the introduction of

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[5]This same phrase 'jewel in the crown' is also used in an article, published in February 2001 which describes the Ennis library service which provides 'a one-stop shop for Clare people all over the world'.

ICTs in homes in Ennis. The families interviewed for the article were all prize-winners in the Residents section of the Best Practice Awards 2000. Some describe using the Internet as a resource tool so that all the family could work together to create projects on topics of family history. Other tasks described include the design of the family kitchen, use of CD-ROMs for language learning, online shopping and playing computer games. Some interviewees describe how quickly the Internet had become indispensable to the life of the family: 'it has become an everyday feature of our life and I can't contemplate living without it'.

Media coverage from further afield tends to focus on Irish stereotypes such as donkeys drawing turf from the bog or the slow pace of life in the countryside, contrasting these images with the opportunities available in Ennis. For example, in *'From Agrarian Age . . . to Information Age'*, published in July 2000 in *Philadelphia Daily News*, Ennis is described as 'a tiny village in the west of Ireland' while the project is described as having 'shoved Ireland out of the Agrarian Age and into the Information Age'. The fact that Ennis is in fact a town of approximately 20,000 residents which has long ceased to be identified as 'agrarian' is not considered. Other examples of the reliance on stereotypes include the description of those involved in the project as 'techno-savvy whizzes' and the contrasts drawn between the history of Ennis (references are made to Catholic Emancipation in the nineteenth century) and the present day reality of life in the town: 'conversation has expanded from politics and hurling to Web surfing and e-mail'.

Another article demonstrating the use of stereotypes is *'High-Tech Heart Pulses in Old-World Irish Town'*, published online in *Microtimes Issue 212*, September 2000. This article opens with a description of the 'winding medieval streets and old-world charm' of Ennis, 'nestled in the heart of Ireland's wild and mystical west-coast landscape'. This idyllic description is then contrasted with the image of new technology:

'But looks can be deceptive. Listen carefully and one can almost hear the hum of massive fiber-optic cables sneaking beneath the town's winding lanes.'

Such reliance on the contrast between Ireland's 'wild and mystical' past and the digital opportunities available in Ennis detract from the achievements of the project. The EIAT project has led to many Ennis people engaging with technology who might not otherwise have had that opportunity. However, Ireland is now firmly established as a thriving, modern member of the EU and the opportunities of the digital age are becoming available to many Irish citizens and businesses.

5.7.1 Reports on the EIAT project

5.7.1.1 'eircom Ennis Information Age Town: A Connected Community (2000)

This interim report prepared by the EIAT Task Force opens with an address by the Chairman of *eircom* who describes the EIAT project as 'a catalyst for all the citizens of Ireland to embrace the opportunities afforded by Information and Communications Technologies' (EIAT, 2000: 7). This notion of Ennis as setting an example for the rest of Ireland is echoed in the main report which opens with the words 'Ennis is a pioneer town'. The report analyses the progress of the various programmes of the project such as the Residents' Programme, the Business Programme etc. For example, the report details the positive uptake of the technology by the people of the town, stating that 93% of the households of Ennis now have a telephone line with 83% owning Internet-enabled, multimedia computers. In addition, people with disabilities are reported to be benefitting from specialised ICT supports and training within the Community Programme. Similarly, the Education Programme has delivered state-of-the-art facilities to all schools in Ennis, producing 'ICT champions and advocates, willing to share their experiences and their learning' (EIAT, 2000: 175).

However, this success is not present in all programmes of the project. For example, the Business Programme is reported as being behind schedule: 'the ambitious targets . . . have not been met . . . the majority of businesses remain cautious about investment and commitment to an ICT strategy because cost benefit is not immediately apparent' (EIAT, 2000: 76). In addition, the Electronic Purse trial was unsuccessful due to 'the perceived inefficiency of the system' (EIAT, 2000: 199). The report concludes with a cautious reminder of the need to integrate ICTs into existing societal structures:

'(T)here is a common perception that ICT is instant and promises immediate solutions. It does not. Awareness of and access to ICT do not guarantee meaningful use or benefit. ICT programmes are most successful when they build on existing social and organisational contexts' (EIAT, 2000: 219).

5.7.1.2 Behaviours and Attitudes - Report on the EIAT Project(2001)

This report, commissioned by the EIAT project, found that levels of ownership of all types of telecommunications and computer equipment are high in Ennis with levels of PC and Internet access being twice the national average. The report also states that use of the Internet is highest for adult males with third level education, with this being the case generally in Ireland. Contact with friends and family is the most common computer task while the incidence of online shopping is very low (these results have similarities with

our data). 4 in 10 people in Ennis are found to be undergoing technology training with those with third level education completing the most advanced courses. Interestingly, the report also states the importance of informal coaching between family members, data also present in our research. However, the report states that 'the main barrier to increased usage is simply time availability' which contrasts with our data which found that a lack of necessary skills was the significant barrier to ICT usage.

5.7.2 Summary

This analysis of secondary research specifically related to the EIAT project provides a useful counterpoint to our primary examination of the project. Analysis of selected media coverage, local, national and international, allows us to assess the ways that the project is portrayed. We found that local coverage underwent a modulation in tone from high optimism to tempered realism as the project progressed while national coverage focused mainly on specific events and international coverage dealt mainly with the perceived differences either between 'modern' Ennis and the rest of Ireland or between 'modern' Ennis and 'old' Ireland. We found that both of these contrasts were strained and showed a lack of understanding of the changes which Irish society has undergone in recent times.

Our analysis of reports on the EIAT project at different periods also aided in our understanding of the progress of the project overall and in relation to specific sectors. We found that some of the data resembled the findings of our research, particularly in relation to use of the Internet and the importance of informal coaching between family members. However, our data found that the lack of sufficient knowledge was a major barrier to involvement in ICTs while the reported data found the greatest barrier to be a lack of time.

Chapter 6

Technology in Education - Primary Research

This chapter details the fieldwork completed in two co-educational, primary schools in Ennis and Sligo in the period of a week in May 2002. It outlines the technology-based activities and interactions being carried out in the classroom. It also details the individual and classroom discussions carried out with each group of students. It concludes with a consideration of the outcomes of this fieldwork.

6.1   Background

As discussed in chapter four, these classroom observations and discussions were undertaken with a dual mandate: firstly, to make comparisons with the findings in the areas of technology and education and ICTs in the private sphere reviewed in chapter three; and secondly, to give additional insights to the experiences of the women interviewed in 2002, who had mentioned that they felt their role of parents was changing in response to changes occurring in the education sector.

In 2000, as part of the pre-test period, we conducted interviews with a school principal and a pupil in Ennis. These interviews dealt with the interviewees' opinions of the EIAT project and the use of ICTs in the classroom. During the interviews, the interviewees introduced topics such as fears of technology and social assumptions of technological ability which fell within the remit of the main focus of the research programme i.e. the examination of the gender/technology relation in the emerging Irish Information Age. In addition, during the interviews conducted in 2002, many of those interviewed responded that they felt that the increased use of ICTs in Irish schools was a positive element of an Information Age society in Ireland. Many interviewees also said that if such positive exposure to ICTs had been available during their own schooling years, this might have dispelled their own negative opinions of ICTs and prevented their exclusion/self-exclusion from using these technologies. Finally, many of the interviewees felt that their role as parents was evolving in line with changes in the delivery of technology training within

the school environment. They stated that as their children's ICT knowledge and skills were increasing, the pressure on parents also to possess such skills and knowledge was also increasing. They also stated that these skills were effecting change in family relations and interactions, with the traditional role of the parent as teacher often being reversed as children passed on information and skills learned in the classroom to their parents. Many of the interviewees viewed these changes with a mixture of excitement and nervousness, stating that they felt that more technology training should be available free of charge to parents to facilitate this coaching role.

6.2 Classroom Observations

In discussing the fieldwork conducted within schools, it is important to state first that in general, the researcher was amazed at how comfortable all of the children observed (even those aged four) were with computers. In general, computers seemed to be considered just another tool, one which could be fun, or useful, but never daunting or frightening. None of the children appeared nervous of the computers or afraid to make mistakes. Comments such as those made by the women interviewed about a fear of the 'box in the corner' or fear of 'breaking this expensive piece of equipment' were in direct contrast with the views of the children observed and interviewed.

6.2.1 Observation 1: Junior Infants' Computer Class (Holy Family Junior School, Ennis)

This was a forty-minute class of twenty-two four- and five-year-olds which took place in the computer laboratory. There were four adults in the room (including the researcher) during the class. The class teacher (female) accompanied her pupils and was involved in keeping the pupils focused and attentive. The computer training teacher (female) conducted the class and a third teacher (female) (retired) helped out by manipulating the mouse while demonstrations of the computer package were being carried out. There were both advantages and disadvantages with this method which will be discussed in detail later. The students were initially asked to kneel on the floor around a number of coloured rubber mats. They were then introduced to the researcher and told:

Bernie is here today to see how good you all are in computer class so I want you all to be very good and listen very carefully.

As might be expected with small children, some of the students showed some initial curiosity in what the researcher was doing (sitting to the side and taking notes) but as the class activities got underway, this curiosity died down. There was great excitement when the teacher asked the students:

Would you all like to play with Roamer again today?

Roamer (a robot in the shape of a dog) was then placed on a series of coloured mats. The first twenty minutes of the class saw the children taking turns to programme *Roamer's* movement along the mats. The children learned to make *Roamer* move a specific number of steps (mats) forward and backward, turn both left and right, and make a number of turns; once (90 degrees), twice (180 degrees), three times (270 degrees) and four times (360 degrees). The computer teacher discussed the task with each student, asking questions of the other pupils as to the rules of what *Roamer* could and could not do. In many instances, other pupils in the class reminded the pupil carrying out the task of *Roamer's* properties. In this way, the robot exercise was developing not only the pupils' cognitive abilities but also their communication and group skills. Both girls and boys were fully involved in the task and seemed to be enjoying the class.

Following the practical manipulation of *Roamer*, the teacher demonstrated the *Storymaker* package, showing the pupils how to click on icons in order to incorporate them into the story. This demonstration was effected with the use of an LCD projector. The pupils sat on the floor and the computer teacher stood beside the projected image directing the pupils' attention to specific areas of the screen and the mouse was manipulated by the class assistant. This arrangement meant that the computer teacher's attention (and gaze) was continuously focused on the children. Following the demonstration, the pupils were paired off and allocated a computer in order to practice using *Storymaker*. At this stage, the researcher circled the class, chatting to the pupils, asking them whether they liked using computers, whether they had computers at home etc. All the pupils said that they liked using computers and three-quarters said that there was a computer in the family home. Of those with a home PC, all said that they liked to play computer games. Most of the pupils said that both of their parents used the computer. One female student could even relate that her mother used the computer for work and writing to her granny. Overall, the researcher was impressed by the high levels of participation and interest demonstrated by the Junior Infant students.

Considering the young age of these pupils, the use of the robot *Roamer* which allowed for practical, active interaction with technology seemed particularly successful. It was also obvious that the data projector improved the 'show and tell' part of the class for both the teacher and the pupils. From the teacher's viewpoint, the size of the screen ensured that all students had a perfect view of the material while the aid of the classroom assistant meant that all unnecessary distractions (such as searching for icons or manipulating the mouse) were eliminated. ¿From the pupils' viewpoint, there was no difficulty in viewing the screen and there was a sense of excitement in all the pupils sitting on the floor together in front of a large screen. Finally, the fact that the class took place in a designated computer laboratory obviously heightened the pupils' sense of the class as an occasion out of the ordinary, out of their normal classroom environment. There was plenty of space

to move around and there were plenty of computers to use. Due to the small class size, some students even had computers for their own exclusive use during the class. While the floor-based work involved both girls and boys all mixed together, for these practical sessions boys sat with other boys and girls with other girls. This did not appear to have any effect on the pace of work completed.

The interview with the computer teacher uncovered some useful background information. The teacher stated that due to on-going building works in the school, there had been a period of about four months when the children had not been able to come to the computer laboratory at all. The teacher felt that this had definitely adversely affected the group's development and stated:

Normally this class would have been here for one class a week since September but these (students) only started in February and we only began using Roamer last week so they are behind in their development. They should have better mouse skills, be more used to using icons, dragging and clicking, all of that. They should also be more familiar with Storymaker and be already working with a number of different story-boards.

She felt that it was essential to the students that computer training was as much an element of the school-day as word-work or maths training:

It should be normal for them, not something out of the ordinary or a treat for good behaviour. We don't suggest that learning to write is a privilege so why should learning to use computers be any different?

She also pointed to the importance of having a designated computer laboratory with a data projector:

It would be almost impossible to bring the children on as quickly without the computer lab. It means that they all get equal turns using the mouse and being involved. The data projector is so much a part of how we operate now that I can't imagine being without it. You saw how they all sit on the floor and were completely into the demonstration of the package. Compare this to one computer in a classroom of thirty or thirty-five pupils where some of the kids can't even see the screen, never mind use the mouse.

This observation and class discussion demonstrates that well-designed ICT training employing age-specific materials and activities can lead to students enjoying and benefitting from the use of ICTs in the classroom.

6.2.2 Observation 2: Fourth Class - Computer Class (Holy Family Senior School, Ennis)

This class comprised 25 pupils and took place in a designated computer laboratory. Students were arranged in groups of two with four students working alone. All four students

working alone were girls with most other groupings comprising girls working with girls and boys with boys. A variety of software packages was being used. These included *Storymaker*, *Creative Writer* and *Maths Circus*. In most instances, the pupils had used these packages in the past and were able to demonstrate their salient features. Two boys demonstrated the school web-site (http://hfss.ennis.ie), navigating with ease through the various projects on display.

During discussions with the students, most stated that they enjoyed using computers, with the majority of boys preferring to play computer games while the girls' stated preference was for using creative writing and art packages with playing computer games being their second most common choice of computer activity. Most students said that they had computers at home and a small number of female students said that they helped other members of the family to use the computer:

I teach my mammy the computer.

My friend is doing a course in computers and she gets me to help her (the friend is aged 33).

Two girls also stated that they were considered the 'experts' in their house:

My mam says that I'm very good at computers and I should work at computers when I'm older.

This comment shows that the use of computers in the home can engender positive interactions between parents and children in a manner similar to the positive interactions reported by the women interviewees in chapter five.

When asked if she thought that this would be something that she would like to do, the pupil replied:

I suppose that using them (computers) now and again might be fun but I think using them every day might get a bit boring.

The second pupil was also receiving positive affirmation at home:

My mam tells me that I'm very good on computers too but I would prefer to be a teacher than use computers when I grow up.

Overall, these positive comments show that success in learning ICT skills can raise girls' self-esteem and belief in their abilities.

Two boys using the maths package made an interesting comparison between an ordinary maths class and one in the computer laboratory using the computers:

Computers are fun and they help you to waste time. You can just play the easier parts of the game that you know already and not bother with the harder parts where you have to work out the maths as you go along.

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His friend agreed:

The computer classes are fun because you work in groups and can talk more. The teacher sometimes gets really into the games and we don't have to learn new stuff.

It would appear that for some students, the use of computers in the classroom is a new means of diverting the teacher's attention from the task in hand. One might say, 'new tools, old techniques'.

During the interview with the class teacher (male), there was much discussion of these time-wasting or distracting aspects of computer usage in the classroom:

The problem is that the children expect every computer class to be an entertainment and feel hard done by if they feel that there isn't enough happening.

There had also been difficulties with having Internet access available to the pupils during class-time which had led to Internet access being cut for a period of approximately four months. However, with Internet access now re-established, the teacher stated that there were still problems, ones that were more intrinsic to the children's use of the Internet and as such, less simple to rectify:

The kids are always talking about the Internet, whether it is a new film that they have seen or a new cartoon on the telly - they immediately want to visit the web-site and very often when they get there, they are just being targeted to buy official merchandise. They are disappointed and often feel that they are missing out on something. It is unfair to publicise web-sites but then not put enough development or whatever into them to make them rewarding for kids.

In chapter three, we saw that much popular coverage of new media serves to position the user as customer. We now see that this commercialisation of the ICT user extends to children.

Finally, the teacher pointed out that even with the EIAT project, there were still children who did not have access to computers outside of class-time and this led to some inequalities between the students:

Some students have no computers at home and their typing skills are not as good as that of the students with computers in the home. I wouldn't say that that holds them back that much but I suppose there are some who suffer as a result.

In chapter two, we discussed the 'digital divide'. These comments show that in the classroom environment, ICTs may act to reinforce existing social divisions.

6.2.3 Observation 3: Junior Infants' Class - (St. Brendan's Primary School, Sligo)

This class comprised a group of nineteen pupils. The arrival of the researcher had been timed to coincide with 'activities' time. This meant that while the majority of the class were engaged in colouring the Irish flag (the Irish team were playing in the World Cup Soccer Tournament the following day), the teacher (female) worked with five pupils at the class computer. The five girls and boys of this first group began by forming a single line, one behind the other, which meant that they could not see the screen very well. The teacher eventually persuaded them to gather around the screen although even then, there were a couple of smaller pupils who still had difficulties seeing the screen properly. Taking turns, the pupils copied a piece of text such as: *I am Conor* or *I am Helen*. Due to their lack of typing skills, this took a considerable amount of time during which some of the five pupils were pointing out letters to the pupil typing but those not close to the screen or the keyboard were un-involved. All in all, this activity took twenty minutes. The main training was in word-processing and using the mouse. The pupils used lower and upper case, backspaces, returns, and full-stops and used both the arrow keys and the mouse to scroll up and down through the document. As the rest of the class finished their activities, the teacher's attention was called away from the computer work quite often.

The problems which resulted from having only one computer for a full class were even more obvious when all the class were called to the computer in the second half of the lesson. Even though the class was small by average standards, there simply was not enough room around the computer for nineteen pupils and their teacher. Inevitably, some smaller pupils at the back were unable to see the screen and those who could see the screen could not see the keyboard. This meant that at least half of the pupils were completely un-involved in the activities which the teacher was over-seeing. Some began to play with toys close to where they were standing while others were talking to each other or looking out of the window. Two boys were jostling each other throughout the lesson and never once took notice of the content of the lesson. When five children had typed the short sentence, the teacher demonstrated how to print the page. During the discussion with the class, all professed to 'like' computers, while sixteen students (ten boys and six girls) said that there was a computer at home. Two boys and one girl stated that their fathers used the computer 'for work' while just one boy said that his mother and father played cards together on the computer. (The teacher later explained that this boy's parents both work in the local electronics factory and are familiar with computer technologies.)

Both girls and boys stated that their favourite use for computers was to make jigsaws and play games like *Pokemon* and football. This stated preference of girls for games differs from the stated preference of the girls in fourth class in Ennis although this may possibly

be related to age-differences.

The interview with the teacher of the Junior Infants class began with her acknowledging (without prompting), the difficulties which the observation of the class had demonstrated:

We really need a data projector. You saw how difficult it is to have that many students gathered around one key-board and one mouse. The funny part is that I'm actually very lucky this year (I only have twenty-three students) but next year, I will have twenty-eight and after that anything up to thirty-four which would make physically fitting them in front of the computer impossible. When we get this new data projector, every student will have a perfect view of the screen.

When asked how the staff envisaged sharing one data projector among twelve classrooms, the teacher replied:

I would say that it will work like the television and video recorder. You book them in advance and bring them to your room on a trolley so I suppose that the data projector will be shared out the same way.

The discussion with the teacher also dealt with the difficulties which funding problems cause in the school:

We really have a problem with funding. We have received subsidies but they are all for hardware (we used them for software before it was specified and got away with it). For example, yesterday I was outside with the children taking digital photographs for the 'Seashore' project. All the class were outside, the lesson was all planned and then the camera needed a colour cartridge. I got the last one - God knows when we will get any more. In this school, when it's gone, it's gone.

This problem was demonstrated very well by a coincidental happening during the interview. Another teacher came to the room to try to print a document from a disc. After she had left, the researcher enquired as to why the teacher hadn't used the computer in her own room. The Junior Infants teacher said:

Probably because she had no ink left in the printer. The computers are actually networked now so she could have sent it to my printer from her own room but she probably doesn't know how to do that yet.

After the second teacher was unsuccessful in getting her document to print, she left and about two minutes later, the machine crashed. The teacher was philosophical about such difficulties:

Oh that, I'm not a bit surprised. I have had to replace the motherboard on that machine twice already and it is fairly new (less than two years old anyway). I installed a scanner - it crashed again. I am terrified to install any new software in case it causes more damage.

These technical difficulties seemed to be on-going and caused quite a lot of disruption to the teacher's work schedule:

I use the computer mostly as a tool for my class plans, materials etc. I'm terrified that it will break down because if it does, I'm lost. This computer has caused me so much trouble that I am nearly afraid to use it now. I use the same bits of software all the time and am afraid to put on any more.

These stated fears are further evidence of the strength of apprehensions as a barrier to use of ICTs. While this teacher could be described as ICT-enabled, she still saw computers as items of fear and mystery.

The researcher asked why there was no help with these technical difficulties:

We have some technical support now which we pay for. It is a help but it's not enough.

The teacher claimed to have very little technical knowledge notwithstanding the fact that she carried out most of the technical requirements on the machine in the classroom:

I've done the standard INTO 'Internet in the Classroom' Levels 1 and 2 but that's all. I used a Mac at home and so when we started getting computers (Macs) in school, I was sort of the person called upon to install, use, fix etc. It is a laugh because I'm the most non-techie person you could meet.

This description of herself as a 'non-techie' suggests that for this teacher, her technological skills do not sit well with her learned gender identity, which causes her to downplay her knowledge and abilities.

Finally, the discussion focused on the specific computer needs of Junior Infant students. The teacher felt that a standard computer (in particular, a standard size mouse) was not suitable for such young children. As a result, she had ordered a *Kidsmart* console (one developed specifically for younger children) but was not sure if the school would qualify for this aid.

Considering the success of *Roamer* with the Junior Infants in Ennis, it would appear that the purchase of a computer interface specifically designed for younger students would bring great benefits to these younger children. While the teacher of this class of Junior Infants has considerable technical skills and is committed to passing these on to her students, a lack of the basic requirements of ICT training is proving a great drawback to the successful ICT progress of these children.

6.2.4 Observation 4: Resource Class (St. Brendan's Primary School, Sligo)

This class comprised three boys, aged seven, nine and thirteen. In a small, designated room, all three were receiving extra tuition with a resource teacher (female). The

seven-year-old had hearing difficulties, the nine-year-old had learning difficulties and the thirteen-year-old had emotional difficulties. During the observation, the thirteen-year-old used a lap-top to type a poem that he had written and added some illustrations. The seven- and nine-year-olds were working through some maths problems to begin with and later they demonstrated a maths tutor package on the lap-top. The three pupils said that they liked using computers and liked most of all to play games. This stated preference concurs with the stated preference of the fourth class boys in Ennis.

The thirteen-year-old was quite assured in his description of his abilities:

I'm the expert in my house. I help my Mum and Dad with the computer and sometimes I help my brother. He has 'cerebral palsy' and uses a computer to help him talk.

We have seen that the use of the computer in the home can give rise to additional layers of communication and interaction, both between parents and children and between siblings. In this case, the presence of ICTs in the home seems to provide a positive forum for interaction between family members.

The discussion with the resource teacher focused initially on the organisational advantages of the computer:

I usually have three students here at any one time so one is usually using the computer while I work with the other two. We sometimes do project work together.

The teacher felt that the special needs (whether educational or emotional) of students who received extra tuition meant that the computer was a necessary aid:

Some of these students are switched off school. They see it as boring and a chore. The computer helps us to get past that. It is a great tool for getting them interested and keeping them motivated.

The teacher gave examples of activities for which the pupils liked to use the computer. These included:

1. Making notices, banners and labels

2. Designing and printing merit awards, certificates and greeting cards

3. Using the Internet to link with other schools and to research projects.

The teacher said that the computer was also a great aid to her own organisation. She used it to plan her lessons, organise her timetable, keep records and write correspondence (to parents and the Department of Education). This teacher later took part in the focus group discussion, during which she described her pathway to ICT-enablement as *partly mid-life crisis, partly general interest.*

6.2.5 Observation 5: First and Second Class (St. Brendan's Primary School, Sligo)

This class comprised twenty-nine students from first and second class. All the students were involved in art work while small groups (of three or four girls and boys mixed) used the computer at a time. The art work and the computer work (a maths package) were unrelated although this did not appear to cause the students any difficulties. The problems observed in the Junior Infants class were also obvious here i.e. even in small groups, there were some students who could not see the screen easily and there was only one keyboard and one mouse.

In the discussion with the students, the researcher questioned them about these difficulties. All of the students said that there had been times when they could not see the screen or the keyboard:

We can't see the screen from our seats but if we stand around the computer, everyone gets in everyone else's way;

It would be great if everyone could have their own computer so that we wouldn't have to wait to get on (to use the keyboard).

These comments concur with previously described difficulties caused by using one screen for large groups of students.

The students said that they liked using computers and both girls and boys stated that they especially liked playing games:

Computers are fun.

I like drawing pictures and making cards

I have Pokemon at home and I love playing that.

The discussion with the class teacher (female) focused on the lack of software which the Junior Infants teacher had already highlighted:

There are so many great packages out there for children of this age - 'the Living Books Series', 'Crayola Magic Wardrobe' but the school has so little funding that these are seen as luxuries. And it seems to be getting worse, not better. Now we have computers in every classroom, we are supposed to get on with it and not be bothering the Department (of Education) for fiddly stuff like funding for software.

Therefore, while the Junior Infants class suffers through lack of suitable hardware, this first and second class is in need of suitable software.

In general, the teacher found that the computers were like all other pedagogical tools:

It is like everything else - it is the context that matters. If you just brought in a dog to the class-room, the children would like it and play with it for a while but they might not learn a huge amount from it. However, if you were to spend some time prior to bringing in the dog, discussing dogs, getting the students to find out about all aspects of owning a dog and caring for it, then the lesson with the dog present in the class-room would have far greater benefit to the students. With computers, they are a novelty and a distraction but if you make the computer lesson specific and targeted, then the kids will learn a lot more.

This description of computers as a distracting novelty has resonance with similar comments of the fourth class boys in Ennis. This observation and class discussion shows that computers can be employed as just another teaching tool and ICT training can be successfully integrated with other classroom activities.

6.2.6 Observation 6: Fifth Class (St. Brendan's Primary School, Sligo)

This class of thirty-four pupils took part in a discussion which was lively and engaging and lasted approximately thirty minutes. The teacher (female) explained that using the class computer was almost impossible in a class of this size and at this stage of development:

They're too big (in age and number) to leave them to their own devices. All they will do is mess when my back is turned and I will be so distracted keeping an eye on them that I won't be of any use to the three using the computer. When this famous data projector arrives, I will have much less trouble in that way.

The discussion centred on their experiences of computers in their lives, in school, at home, even in the library:

Computers are great fun.

I use them for projects mostly.

I send messages to my auntie in America.

I love playing games.

When asked whether they used the Internet, a snigger went round the class. The students behaved as if the researcher had just used a dirty word, particularly one which the teacher would not like. In particular, the boys found the idea of discussing the Internet with a 'teacher' a source of great amusement, looking around at boys behind them and making comments among themselves. The researcher felt that the boys saw this discussion as an opportunity to 'show-off' their knowledge of illicit things to both their classmates, the teacher and the researcher. This was not observed among the girls. This may have

been due to greater shyness on the part of the girls for as the first two comments below demonstrate, the girls also imagined the Internet to contain illicit material. They just did not seem to want to joke openly about this issue. Perhaps for the boys, knowledge of proscribed material is a more acceptable trait. The researcher asked for a volunteer to explain what the Internet is. A girl in the front row said:

It is not nice things.

Another girl agreed:

It's a bit nasty.

The researcher probed more but all mention of the Internet was flavoured by this feeling that it was a slightly risque topic that they were uncomfortable to talk about in front of their teacher. Even questions related to enjoyable elements of the Internet were considered funny and embarrassing. Finally, the researcher likened the Internet to a big city like Dublin:

It is true that some not very nice things happen in Dublin and you wouldn't just go there on your own and wander all over without knowing where you were going. But if you were to go on a visit with a friend and go to nice places, you might really enjoy it. It would be a pity to never go to Dublin because some 'not nice things' happen there.

This city analogy seemed to make sense to them although it is difficult to say whether it really dispelled their negative feelings towards the Internet.

In previous chapters, we saw that the Internet is often characterised in popular media as a dangerous environment. Consider recent comments by David Blunkett, the British Home Secretary, who states:

> 'we now live in a world of global communications, with children two clicks away from Internet porn sites generated by a multimillion-pound sex industry' Burrell (2002).

The students' comments would suggest that such negative images of the online environment are adversely colouring some children's understanding of the characteristics of the Internet.

About half the pupils (equal parts girls and boys) said that they had computers at home which they said they mostly used for games. However, when these pupils were asked who else used the computer at home, fourteen said that their fathers used the home computer while nine said that their mothers used the home computer. When asked why they thought fewer mothers than fathers used computers, there were three main answers. These were:

- *Mammies are not able to use computers;*

- *Mammies are too busy with the housework;*

- *Mammies don't sit down as much as Dads.*

While boys were certainly more vocal in these descriptions, some girls also agreed with these observations. It appears that most of these eleven-year-olds view the household computer as being for their or their father's use but definitely not for their mother's use.

The discussion with the class teacher developed this point:

I often hear the kids talk about Dad using the computer but very rarely do I hear them mentioning Mammy using the computer. It is hard to know exactly why this is but it's a bit depressing, isn't it?

This early stereotyping of computer usage as suitable for fathers but not mothers is interesting. Some of the women in Ennis mentioned that they undertook technology training in order to aid their children in their computer usage. They also stated that their increased skills improved their interactions with their children, to the point where their children now consider their mothers to be worth consulting about schoolwork. It would appear that for most of the children in this class in Sligo, their mothers are not technologically enabled, with the result that the opportunities for increased communication and interaction between mothers and children are being lost with possible negative effects on the children's educational progress.

The teacher stated that there were many needs which needed to be addressed:

We need more space, more time and more funding. The biggest need of all is the data projector. The best time to use the computer is when the class goes to choir and four or five stay behind. Then it is great - you can really do some good work with the computer then.

These four or five pupils were usually boys who were allowed to miss choir because they could not or wouldn't sing and it seemed that these boys were receiving extra ICT training as a result of this distinction.[1]

The teacher demonstrated the *Seashore* work project which her class had been preparing for a number of weeks. This was a collaborative project between twelve primary schools along the coast of Co. Sligo which required the students to investigate the types of marine

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[1]This reminds the researcher of her own primary school education when every Wednesday afternoon, the girls took classes in either Irish dancing or sewing while the boys were given extra maths tuition. At the time, we girls thought we were getting the better part of the bargain although in hindsight, this early gender stereotyping probably contributed to our belief that maths (and by extension, science and computing) were the province of boys.

life living along the coast-line. The project was developed as a *Powerpoint* presentation and displayed in each school. The work was artistic and well-constructed. The teacher admitted that the pupils had done the research and she had typed up the results. In other words, the pupils could not be accommodated within the school to facilitate their writing up of their work.

Once again, this observation and class discussion points to the drawbacks in ICT training which these pupils are experiencing due to lack of proper funding. It also demonstrates the positive outcomes of the use of ICT tools in the classroom.

6.2.7 Interviews with School Management

We conducted interviews with the school principals of both the Junior and Senior divisions of the Holy Family School in Ennis and with the principal of St. Brendan's School in Sligo. During the interviews with the two principals in Ennis, it quickly became evident that the EIAT project had radically changed the place of ICTs in the curriculum. Both principals referred to the huge improvement in facilities which the financial support from the project had effected. From having been delighted to receive second-hand computers from local businesses in 1995 and 1996, the school in Ennis had received sufficient new computers with appropriate software to establish two new computer laboratories containing thirty networked computers and a data projector. This hardware was supplemented by a raft of suitable software. Thirdly, the project provided technical support so that initial and on-going technical difficulties were dealt with quickly.

This was in direct contrast with the situation in St. Brendan's School in Sligo. The principal stated that although the IT 2000 programme (which aimed to connect each school in Ireland to the Internet) had seen some investment in hardware in the education sector, funding was only sufficient to place one computer in each classroom and the cost of Internet access was prohibitive. In addition, the school was greatly in need of new educational software for which funding was unavailable. Finally, there were continuing on-going difficulties with technical problems with a small number of teachers being required to give both class time and personal time solving these problems although this problem had been partly helped by the school's part-time retention of the services of a local man in this regard. When questioned regarding the possibility of purchasing additional teaching aids such as the *Roamer* robot or the *Kidsmart* console, the principal's reply was that it was unlikely that such aids could be purchased when the funding for software was so lacking.

All three principals stated that they felt that developments in ICTs in society would necessarily lead to developments in ICTs in the classroom. However, all three also believed that to date, the focus of the Department of Education in this regard had been to provide

some funding for the purchase of hardware with very little thought given to training for teachers. All three also believed that the existing curriculum was already overloaded and the imposition of computer classes upon this curriculum without consideration of time constraints was an unworkable proposition. The principal of the Junior School in Ennis stated that in general, the use of ICTs in the education of the very young was a positive development and an important means of instilling in young children a life-long interest in and openness to ICT technologies. The principal of the Senior School in Ennis agreed but felt that parents had a great part to play in this regard. When questioned regarding possible training for parents, the principal agreed that such training was certainly needed but she expressed doubts as to whether the State would fund such training. The principal in Sligo stated that, in his opinion, technical problems often deflected teachers from the pedagogical possibilities of ICTs. He also felt that his experience in St. Brendan's had taught him the importance of having one or two technologically-enabled teachers in a school to act as an inspiration and motivation to other teachers in the school.[2]

These discussions with school management aided our understanding of some financial and educational aspects of the use of ICTs in the classroom.

6.3 Summary

In conducting this technology in education fieldwork, we hoped to observe at first hand some of the ways in which ICTs are in use in Irish classrooms. We also aimed to compare both the facilities and usage in classrooms in Ennis which are benefitting from the EIAT project and in classrooms outside Ennis which are not benefitting in this way. Finally, we were interested in finding out the opinions of some pupils and teachers regarding ICTs in the classroom.

We found that most pupils had positive experiences of ICTs. We also found that these positive experiences were expressed both by students in Ennis and in Sligo, notwithstanding that some students in Sligo mentioned some difficulties which resulted from the limited availability of equipment in St. Brendan's School. While playing computer games was the preferred use of computers, this was more strongly associated with the male students. In addition, the oldest boys in the study (those in fifth class in Sligo) had very negative opinions regarding their mothers' use/non-use of computers. Finally, both the boys and the girls of this class had negative opinions of the Internet, viewing it as a 'taboo' environment, off-limits and dangerous.

Our discussions with both teachers and principals centred primarily on the financial and technical problems associated with the use of ICTs in the classroom but also covered some

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[2]This last point concurs with comments made by many interviewees regarding the importance of personal contacts with technologically-enabled people in encouraging them to engage with technology.

of the pedagogical difficulties experienced. Briefly, these were:

- students associate computers with game-playing and so expect computer classes to be continuously 'entertaining'

- students are often reluctant to learn new skills and packages, preferring to re-visit skills and packages known to them

- pressure to complete an overly full curriculum can mean that ICT training is relegated to a supporting role.

These difficulties notwithstanding, the teachers and management interviewed stated that they were optimistic about the future use of ICTs in the classroom and saw ICTs as a useful means of engaging students with learning in a practical and innovative way.

Chapter 7

Conclusions and Recommendations

This chapter draws together the research findings of this programme, grouping them into the following research headings and considering them in the context of the Information Age in Ireland:

1. Apprehensions;

2. Social Networks;

3. Implications for Empowerment;

4. Implications for Equality of Access;

5. Implications for Education;

6. Implications for Technology Training Programmes.

7.1   Introduction

This research programme examines the views of women involved in the EIAT project so as to understand their feelings regarding ICTs and the Information Age. We compare these views with the views of two other groups of women who are also engaging in ICT training and usage. Despite the differences between the groups (the women in Ennis were mostly caring for children full-time or were combining part-time childcare with paid work outside the home and had undertaken training as part of a ECDL training programme sponsored by the EIAT project; the women in Galway were all over-55 and had organised their own technology training; the women in Sligo were all primary school teachers who had undertaken training through their professional connections), we found far greater similarities than differences between the groups. In general, we found that most of the women were engaged in a personal journey, one which almost invariably began with apprehensions regarding technology and their ability to integrate ICT skills with their gender identity. As these women successfully took part in training programmes, they came to the realisation that ICTs could be integrated within their personal and professional

lives. Many of the women interviewed stated that there were many gains to be had from their uptake of technology training and many stated that they felt that these gains could be taken advantage of by other women who are currently not engaged in technology training or use. The most commonly expressed notion throughout the study being *if I can do it,any other woman can.*

We begin our discussion of the findings of the research by examining the common starting point for most women regarding technology i.e. apprehensions.

7.2 Apprehensions

We have already referred to the apprehensions regarding technology felt by many interviewees. These apprehensions also feature in the journey of this research programme. In order to understand the effects of these apprehensions regarding technology on women's engagement with ICTs, we firstly considered our own relationship with technology in general and ICTs in particular.

I[1] also felt great trepidation at the outset of the research programme. With no formal technological training, I had originally established an uneasy working relationship with computers, regarding them as useful tools which might inexplicably break down or refuse to work for no apparent reason. With greater experience and knowledge, I became enthused by the possibilities which my growing technological skills were bringing. In addition to the usefulness of office packages such as *Microsoft Word* and *Microsoft Excel*, my techniques of communication and information gathering were radicalised by the use of email and the Internet. This last point in particular formed the turning point in my relationship with technology. On both a personal and professional level, these technologies facilitated a sense of 'connectedness', primarily with my family and friends but also with my colleagues and members of my research community. The establishment of a network of connectivity which was not adversely affected by physical distance or my fairly basic computing skills was greatly empowering and exciting. All the barriers which had previously seemed so insurmountable (computers are difficult, computers are only suited to people with mathematical abilities, computers are boring) were all now irrelevant. ICTs instead became a gateway to areas of interest and a means of connecting with others. This last point became even more evident after my children were born when I was able to combine taking care of them with continuing my research and staying in contact with my supervisor. These experiences in relation to technology echo the experiences of other women, as related in chapters three and five. Understanding these fears was an important step in the progress of the research programme.

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[1]This section begins with a description of the changing relationship of the researcher with technology and ICTs, for which we employ the 'I' persona.

Winston (1998) sees technological developments and social forces as intrinsically inter-connected. An important element of this interconnection is the ways in which these developments are viewed by society. A common response to change or development is fear. In the physical world, we fear any threat to our personal safety, whether real or imagined. This threat may be the result of any change in the status quo, any variation in our circumstances. At a community level, the effects of change are relevant to many and therefore the dangers of such changes are magnified. A brief examination of some popular and academic responses to technological developments examines some of these fears and their relevance to the response of the women of Ennis to the EIAT project.

Firstly, as expressed above, change itself is feared, in particular when, as in the EIAT project, this change occurs quickly. The worry of 'too much, too soon' is expressed by the community. In addition, such change is particularly feared as it is judged to be 'artificially introduced' to the community. This commonly-held view of technology sees it as outside of society, the preserve of a technical elite. This idea is expressed by many researchers; 'technology is powerful, remote, incomprehensible, inhuman, scientific [and] expensive' (Faulkner and Arnold, 1985: 12). Such an apprehension can only be allayed if the needs for and the benefits of change are made obvious. For example, changes in medical practice are much more widely accepted if they are shown to improve the health and safety of the general populace. Certainly, the CEO and assistant CEO of the EIAT project stated during discussions that the public meetings and information sessions which were held to involve the people of Ennis in the progress of the project were successful in allaying some of the fears of the community of Ennis in this regard. It is also common for such fears to be allayed, at least in part, as the benefits of the technological changes under way become apparent in people's lives. Once again, this point was made during interviews with members of the EIAT task force and was also expressed by some of the townspeople surveyed and interviewed.

Secondly, the operation of the technology itself is feared i.e. people are apprehensive about using the technology. They fear not only that they will be unable to learn how to use the new technology but also that they will somehow 'break' it through mis-use. This consideration of technology as a tool which can be broken recalls the 'technology-as-instrumentality' concept described in McOmber (1999) and discussed in chapter two. Children are used to engaging in the conscious process of learning, whether physical (when we learn to crawl and walk) or mental (when we learn to read and count). Adults are more distrustful of any skill which requires conscious learning (whether learning to drive a car or design a webpage). Many of the interviewees mentioned that both they and others they knew in Ennis had had such initial fears. The assistant CEO of the project referred to these fears during our interview. She stated that the initial usage test had been viewed sceptically by many people in Ennis, even by those who eventually found that they passed the test with no difficulty. Both she and other interviewees agreed that

as the technology became more common-place within people's lives and particularly, as more and more training was offered, these initial fears were gradually allayed. Therefore, it would seem that in being aware of these apprehensions and taking active steps to deal with them, the EIAT project had some success in reaching out to those for whom this fear was a major barrier to their participation in the project.

Thirdly, a sense of community identity and local pride is an important element of most cultures. Many communities fear that outside influences will have a negative impact on cultural identity, eroding away that which makes the culture special and unique. This fear follows the concept of 'tech-anxiety' discussed in Dean (1999) and referred to in chapter two. Ireland relies in large part on multinationals and international conglomerates for its economic success. Yet the very presence of these outside influences will, it is feared, bring cultural convergence and a resulting loss of Irish uniqueness. The people of Ennis, like many Irish people, have a very strong sense of local identity and pride, based partly on a sense of shared geography and partly, on a shared regional culture. It is understandable that misgivings regarding the loss of this local identity and uniqueness should exist. However, the technologies of the Information Age can be used as much to combat this loss of identity as to promote it. By attempting to include local groups and individuals in the on-going development of the project, fears regarding the loss of this local uniqueness were, in part, allayed. However, a changing sense of community may also result from developments in ICTs whereby one's 'sphere of connectedness' may take a more global perspective. This erosion of cultural identity recalls the 'silver bullet' model described by Rule (1999) and referred to in chapter two.

Fourthly, with the ability to convey information digitally comes the fear regarding the ways in which this information will be used. Such fears, commonly referred to as 'cyber-authoritarianism' is referred to chapter two in the discussion of the work of Kroker and Weinstein (1994) and Sussman (1997). Commonly, people fear that the information being accessed might be used in some negative manner, whether to blackmail them, plagiarise their work or even censor their actions. The greatest fears revolve around issues such as privacy, copyright, means of payment and policing safeguards. These worries regarding digital transactions, in particular those of a financial nature, are of relevance to the EIAT project. For example, the Visacash scheme (the town's local digital cash card) was originally viewed with suspicion but as time progressed and the scheme was shown to be safe, easy to use and dependable, its use became more widely acceptable for certain specific transactions. It is essential that the message that the information environment is a safe one in which to conduct transactions is continuously reinforced if these worries are to be allayed and the benefits of, for example, electronic commerce are to be fully realised throughout Ireland.

A fifth fear relates to the Internet itself, which is viewed by many as a means of promoting dis-information or 'unsuitable' content such as pornography. In chapter three, we

discussed the ways in which the existence of online pornography has contributed to the popular understanding of the Internet as the new, untamed, dangerous frontier, in need of radical new regulations and state control. This is also partly due to the regular references in the media to the Internet as an uncontrolled frontier, comparable to Huxley's *Brave New World*. In chapter three, we also referred to the work of Castells (1996, 1997, 1998) and Slevin (2000) who examine these fears of the Internet which serve to detract from the positive characteristics of the Internet and to lead many women to exclude themselves from cyberspace.

Governments and companies around the world are struggling to address these fears, in many instances by creating new legislation facilitating greater state control of electronic transactions. The belief that the Internet is a domain exclusively populated by paedophiles and pornography suppliers is as widely-held in Ennis as elsewhere. The worry that unsuitable content might be downloaded by children was mentioned by many of the women interviewed as a factor causing many people in Ennis serious misgivings. We also found that these fears are being related to children and colouring their opinions of the Internet. Within the schools system, the response to such fears is usually the installation of policing technologies such as Cyber Nannies and Net Nannies and also by ensuring that access to the Internet occurred only in an organised, fully supervised environment. Parents are also usually informed by school management of the advisability of installing these control devices in the home and of placing the PC in a high use common area.

It was central to the success of the project to understand these fears and to attempt to understand them. However, total control of access to online environments is impossible. This is because the very flexibility and adaptability which makes the Internet such a dynamic environment brings not just benefits and freedoms but also dangers and difficulties. In this, the virtual environment mimics the built environment. It is not an abstract space but an extension of our present experience of the world. Pornography exists in our world; it is bought, sold, traded, exchanged, swapped. It therefore also forms part of the virtual world:

> 'the Internet is just a very large city of people. There are things that you do, there are things that you don't do. There are places that you go, there are places that you don't go' (Frost, 1996: 13).

7.3 Social Networks

We began this research programme with the hypothesis that for many women, informal social networks are a vital means of both gathering information and receiving personal support. In our review of research in the area of social networks in chapter three, we

stated that social networks are an important means of establishing links and creating relationships which may result in both personal benefits such as friendship or strategic benefits such as increased business etc. We also stated that one's social skills are an essential factor in the establishment of social networks. We hypothesised that these networks would prove an essential factor in women's engagement in ICTs. We have found this hypothesis to be correct.

The women interviewed stated that their personal networks provided information regarding ICTs, encouragement to undertake training and support to complete this training. In some instances, just hearing other women discussing ICTs helped to 'normalise' technology, making it a legitimate area of interest for women. The women stated that this was an important first step in their rejection of gender stereotypes which denoted technology as masculine. In other instances, women undertaking training received encouragement and support by means of their social networks. In many instances, women who were already engaging with ICTs act as opinion leaders, informing other women of the benefits of engaging with ICTs and encouraging them to undertake training. In chapter three, we discussed the success of various mentoring programmes in encouraging women to engage with ICTs which shows that increasing numbers of women engaging with ICTs acts as a strong encouragement to other women to explore the benefits of ICTs. Our research demonstrates the essential role played by technologically-enabled women who can inspire other women to take their example and believe that use of ICTs is not only possible for women in general but is also within their personal scope of achievement. This is an important consideration in future initiatives to encourage greater numbers of women to undertake technology training. Such initiatives must take account of the power of social networks and find some means of harnessing this power effectively.

7.4 Implications for Empowerment

In chapter three, we saw that women's use of ICTs often results in shifts in gender patterns and identities. For example, the use of ICTs within the domestic sphere often leads to changes in family discourse and practices. Our fieldwork concurred with this observation. Through their use of ICTs, the women's established gender identity, which had denoted the use of technology as best suited to men, underwent a change. They now saw the use of technology as of benefit to their lives. The women interviewed in Ennis mentioned the sense of empowerment that being involved in the EIAT project gave them. Most continued their training past the initial courses offered by the EIAT project and many had encouraged the involvement of family members, friends, neighbours and colleagues. This sense of empowerment stemmed partly from social and economic factors and partly from psychological ones. Interviewees mentioned the 'buzz' which the EIAT project has generated. They mentioned feeling like pioneers, creating something new

from the outset and being actively involved in changing Ennis and its people for the better. This sense of community feeling was also helped by the fact that so many groups were involved who might not have been so actively involved in the past. The sense of belonging and taking part in a shared experience had a strong, empowering effect, as had the increased sense of personal achievement and creativity. Many of those who became involved in the project and on-going training referred to the general air of excitement and increased confidence which they and others experienced. This also helped to change the previous perception of the town as being geographically isolated and technologically poor to being a vibrant centre of new developments and communities. The economic benefits stemming from such a change in perception are manifold as industry is attracted into the region and e-businesses become established but surely the greatest benefit is to these women themselves, to their self-esteem, their family lives, their participation within the community. For most of the women interviewed in Ennis, the technology training programme was essential, not just as a means of learning new skills but also as a means of personal and professional development.

7.5 Implications for Equality of Access

We have already discussed the implications for society of creating class divisions between the 'information rich' and the 'information poor'. The women interviewed for this project fell into both of the categories related to the 'digital divide' described in chapter one, i.e. 'early adopters' and 'late adopters'. The women in Ennis were predominantly within the 'late adopters' category, as the majority were outside the workforce. The women in Galway were also 'late adopters' as they were all over-55. However, the women in Sligo were all within the 'early adopters' category as they were all professional teachers. Our findings indicate that regardless of age, work status or educational standard, the women interviewed were united in their inital fears of technology and reliance upon an informal social networks in overcoming these fears. They were also united in their assessment of the personal benefits which resulted from their engagement with ICTs.

In considering the case of equality of access in relation to the EIAT project specifically, the challenge was to ensure that access to the benefits of new technology was not restricted due to social or economic circumstances, gender, age or level of education. In this way, it was hoped that the barriers which have restricted the benefits of technology to the technologically literate would be broken. The EIAT project actively encouraged the involvement of many marginalised groups such as women caring for children in the home, the elderly and the disabled. With the involvement of local schools, computer classes for the elderly were established. This was essential if the presumption that technology is 'new' and 'modern' and therefore suitable only for the young and educated was to be dispelled. The project also established access programmes for the disabled. For

example, one sight-impaired interviewee discussed the advantages of using voice-assisted technology to facilitate ease of digital communication and the use of a word-processor for creative purposes so that his disability did not exclude him from full participation in the life of the community. This interviewee also mentioned the sense of empowerment and 'connectedness' which the assistive technology afforded him.

Some additional measures aimed at ensuring equal access to all include the following:

1. the provision of special financing packages to aid those for whom the 260 pound charge to have a PC installed in their homes was prohibitive;

2. the provision of a number of free technology training programmes to the community;

3. the establishment of the Ennis Intranet, a network of local and global information and resources covering community, education, public service and commerce;

4. the accessibility of this Intranet in such places as the Ennis County Library and the local schools.

One particularly successful measure to ensure widespread access centred on the involvement of local groups in the on-going development of the project. To this end, eight training agencies which already provided services to marginalised sectors of the community in Ennis were asked to propose ways that information technology could effectively be integrated in the daily training services that they provide. As a result, training was offered to members of youth clubs, unemployment centres, centres for the travelling community etc. This inclusive policy is one which should be implemented throughout Ireland in order to realise the possibilities of technological advancement in the most equitable means possible.

7.6 Implications for Education

Developments in ICTs obviously have implications for what it means to educate and to be educated. Ten or fifteen years ago, if questioned as to what constitutes intelligence, the ordinary person might have mentioned the ability to play chess or write music. However, computers can now perform such 'intelligent' tasks easily and quickly. Therefore, even our understanding of intelligence must be revised. Traditionally, learning centred on retaining data but changes in technology force changes in the learning environment. These new ways of learning also require new ways of teaching. For example, the invention of the calculator changed the way mathematics was taught with the result that calculators are now permitted in state exams in Ireland. As information is so freely available, learning focuses on assimilating and sifting through that information in order to determine the

pertinent facts. Therefore, the challenge in the Information Age is to learn how best to convert information into knowledge.

Our fieldwork in the area of education was undertaken within the context of these understandings of what it means to be educated in the Information Age, as discussed in chapter two. The discussions with the principals of the Junior and Senior primary schools visited in Ennis focused on the means by which the initial 'avalanche of boxes' had become an integral part of school life. Although generally enthusiastic regarding the educational possibilities of such technology, the principals of the Junior and Senior Holy Family School also expressed concern that the educational policy which promoted the use of ICTs as a learning tool was under-developed. They felt that more thought was needed to be given to the way in which technology training could both complement and influence the overall curriculum. The principal of St. Brendan's in Sligo, while without an 'avalanche of boxes', also stated both satisfaction with the opportunities which technological training offered school students and dissatisfaction with the inadequate funding provided to schools to facilitate the purchase of equipment, software and technical support. He also felt that technology training was often viewed as an optional add-on to the present curriculum rather than being properly integrated at all levels.

7.7 Implications for Technology Training Programmes

The intense local interest in the EIAT project in Ennis led to discussions of technology among many who would not otherwise have been interested in such matters. This meant that technology (or at least discussions of technology) became a normal part of life in Ennis. Through their informal networks, many women came to know other women who were interested in becoming involved in the project, or who had already undertaken training or who were currently taking part in training. This encouraged greater numbers of women to have the courage to become involved. The very high take-up of the offer of a home PC was also a factor in encouraging women to overcome their fear of technology and become involved in training. As computers became an accepted artifact in many homes, so many women felt encouraged (even compelled) to take up training so as to be able to make use of the computer. Finally, the Education Programme meant that all children attending school in the Ennis UDC area received technology training. This also was a factor in encouraging many women to take up technology training as they became familiar with computer terminology and properties by talking to their children about the technology training happening in the schools and wished to be able to understand and help their children in this area of their studies. All of these factors had a snowball effect in attracting large numbers of women to become involved in the EIAT project.

The comparison groups in Galway and Sligo also bear out these findings. The women interviewed in Galway stated that, regardless of how they felt, computers were now part of their lives as their partners or children made use of the home PC. This coupled with the fact that some people they knew through their informal social networks were getting involved in technology training acted as an encouragement to them to also become involved. However, they were fearful of being involved in a standard training environment and organised a customised training course which better suited their needs. This also was accomplished through the women's informal social networks, with personal contacts being drawn upon to arrange both premises and tutor.

The findings from the women interviewed in Sligo concur with those from the Galway and Ennis interviews. As these women were all teachers, they were not fearful of undertaking training but they were very fearful of engaging with technology. These fears were allayed in a number of ways. Firstly, the fact that the tutor (a working teacher) was someone they knew both personally and professionally helped them to overcome their resistance to undertaking training. Secondly, the fact that many of their teacher-friends were also undertaking training was reassuring as they could discuss any difficulties which they were experiencing. Thirdly, the courses took place in the Teachers' Centre which is a familiar space for these women. This also was reassuring. Knowing the tutor, knowing the other trainees, knowing the space: all of these were crucial factors in encouraging these women to become involved in technology training.

Smyth (1993) states that adult education in Ireland has consistently struggled for recognition. She suggests that this may be due to the fact that the majority of both 'providers' and 'consumers' are women and points to the fact that demand for women-centred education in Ireland continues to increase. In keeping with Smyth (1993) we believe that technology training in Ireland needs to become more women-centred if it is to be successful in attracting women. We found that women are most likely to become involved in technology training if they have a personal connection either with the tutor, the other trainees or with the training space. We would advise training organisations to adopt an open-house policy, perhaps inviting local women's groups to visit the training centres. They could establish open nights at which tutors are available to meet prospective trainees. Courses for women only may also be a useful means of attracting women to undertake training. We believe that it is only with determined and focused measures such as these that large numbers of women will be attracted to undertake technology training and meaningfully engage with ICTs.

7.8 Summary

This research programme developed through a personal journey of increasing interest in ICTs as a means of communication. This engagement with technology gave rise to

research interests in the area of the gender/technology relation. The progress of this research programme was hugely influenced by the researcher's network of social contacts, both personal and professional. An awareness of this influence led to an examination of the importance of social networks in the lives of other women, most particularly in relation to women's engagement with ICTs. We have attempted during the course of this programme to connect the individual stories of women's engagement with ICTs in the context of the EIAT project and the Information Age in Ireland. We have found that when successfully encouraged and motivated, many women successfully complete technology training and use ICTs in their daily lives. We have also found that women report a great sense of personal empowerment in the face of these successes. In addition, we found that many women reported that their increased understanding and use of ICTs brought changes in the dynamics of gender and family relations. These changes broke many existing social stereotypes including shifting the borders of acceptable masculine and feminine behaviour in relation to ICTs and establishing ICT skills and knowledge as possible for women. Women also reported that their increased technological-enablement brought welcome changes in their relationship with their children so that the technological domain was now a site of positive mother/child interaction and communication. We also found that all the women interviewed, whether in Ennis, Galway, or Sligo reported these changes. Therefore, we believe that technology training can bring such changes to all women.

We believe that the success of the EIAT project in relation to empowering women to engage with ICTs lies in two main areas. Firstly, the EIAT project successfully publicised the positive possibilities of the Information Age which encouraged large numbers of women to undertake technology training. Secondly, the EIAT project successfully eliminated the prohibitive factor of cost by offering free ECDL computer training programmes which also encouraged large numbers of women to undertake technology training. These two factors must be considered if all Irish women, irrespective of age, educational or professional characteristics are to enjoy the benefits of the Information Age in Ireland.

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Appendix A

The EIAT Project

A.1 Background

In October 1996, the then semi-state telecommunications company, *Telecom Eireann*, which was later floated on the stock-exchange under the name *eircom*, launched a nation-wide competition to select a town to become Ireland's Information Age Town through an investment of IR£15 Million. In September 1997, Ennis, a town located in the south-west of the country, won the competition. Through the Ennis Information Age Town (EIAT) project, Ennis would become a test-bed for a range of new technologies that had the potential to transform people's lives. The aim was to blanket a complete town with all the communication tools of the Information Age and to see what happens when a whole community becomes "wired".

At the outset, *eircom* envisaged that the project would answer five questions:

1. What happens when every home has a telephone with voice-mail, caller-line identification and other advanced services?

2. What happens when every business, large and small, has access to an ISDN connection and high-speed access to the Internet?

3. What happens when every student in the education system, from the age of 5, has regular, intensive access to a computer with learning, knowledge-gathering and communications tools?

4. What happens when public services such as libraries and health care are fully equipped to exploit the potential of the Information Age?

5. What happens when the majority of households have a PC with Internet capacity?

The project ran for five years until the end of 2002. The funding was used to provide completely integrated information age telecommunications technology, infrastructure and training. To this end, a series of action programmes were established which targeted sectors of the community such as residents, businesses, new industry and education.

1

A.1.1 Getting Connected

The **Resident Programme** brought household telephone penetration in Ennis to 93% - the highest for any town in Ireland. 82% of the town's 5,600 households paid £260 to receive a new Pentium II multimedia personal computer with suites of software packages including Microsoft Office Pro '97 and anti-virus guard. The PCs were fitted with a modem card and were loaded with both Internet access software and Internet guard software. The package also included free connection to the Internet and free Internet rental for one year. This computer technology package was estimated to be worth £1,800 per unit.

The **Business Programme** aimed to increase the level of on-line transactions and help businesses to develop their own Information Age applications and uses. The range of technologies and applications offered to Ennis businesses included IT subsidies, Internet access, web site design, ISDN lines, database development, applications development, consultancy and training.

The **Education Programme** saw the installation of 515 multimedia computers in all thirteen of the primary, secondary and special schools in Ennis. Data projectors and printers as well as both stand-alone and networked multimedia computers were provided. All schools received free Internet connection and free line rental for two years. The Internet access was provided via high-speed ISDN lines. All 300 teachers and 5,200 students were provided with their own e-mail addresses.

The **Community Programme** was targeted through local sports and social groups, health and social care and groups in the marginalised sector such as youth services, unemployment centres, adult education centres and centres for the travelling community.

The **Technology Programme** funded the electronic purse trial which saw the introduction of the Visacash smartcard system in the town. Other trials included the Personal ATM trial, the ADSL trial and the Fibre Optic Digital Ring trial. The Personal ATM unit was distributed to 500 users in the Ennis area. These PATMs enabled the user to load cash onto the Visacash card over the telephone line from their home. The ADSL (Asymmetric Digital Subscriber Line) enabled very high-speed access to digital information from one's home. These high access speeds encouraged tele-working and part of the trial involved tele-working between companies in Shannon and employees' homes in Ennis. The Fibre Optic Digital Ring provided the first digital broadband ring around any town in Ireland, with the capacity to handle the equivalent of 250,000 telephone calls simultaneously, making Ennis attractive to potential investors in need of high information intensity.

A.2 Training

Training for residents was accomplished in two phases. In Phase One, people with computer knowledge were asked to sit a basic usage test while in Phase Two, people with little or no knowledge of computers were provided with an eight-hour basic training course. This was to ensure that at least one member of every household was able to use the computer. 2,200 people sat the specially devised computer proficiency test. 90% passed. 2,400 completed the basic Computer Familiarisation Programme.

Phase Two provided more in-depth technology training to the town's residents. In 1998, following the success of a free technology training course aimed at senior citizens only, a free, four-hour 'Introduction to Computers' training course for women only was conducted. This course was organised with the help of volunteer tutors and marketed through the use of flyers and advertisements in the local newspaper. The focus of this training course was to provide free computer training in a friendly, sociable environment with each class ending with a social gathering. One of the organisers of the course, Helen McQuillan, Head of Research at the EIAT project, recalled:

The student/tutor ratio was 3:1. This was done deliberately so as to encourage the participants to seek lots of help as they completed the course. The focus was as much on the social side as on the actual training itself. The course acted as a taster for many of the women who then went on to complete more detailed training courses.

A pilot scheme was also established to offer training for the European Computer Driving Licence (ECDL) in the summer of 1999. This course was also advertised by means of flyers and the local press with approximately 600 people attending an Open Night to submit their names for training. Of this 600, 300 people took a self-paced seven-module training CD-ROM and subsequently undertook an examination on all the modules to acquire their ECDL. These seven modules covered computer hardware equipment and software applications including work processing, spreadsheets, databases and presentations, as well as e-mail and the Internet. The CD-ROM was supported by instructor-led training provided by local training agencies in the town. Helen McQuillan recalls the Open Night:

I remember the huge numbers who turned up for the Open Night. Women and men were fairly equally represented but far more women than men actually undertook the training.

The women who were interviewed for this research programme were chosen at random from these 300 participants.

A.3 Comparisons with similar projects

While this is the first community-based project of its kind in Ireland, there are a number of projects in other countries which are run along similar lines. Many of the earliest of

these projects were based in the US e.g. the now-defunct National Public Telecomputing Network (NPTN), Santa Monica's PEN network and Community Memory in Berkeley. These early models greatly influenced later computer-mediated communities which were established. This appendix describes two such projects. These are the National Capital FreeNet (NCF) in Ottawa, Canada and networking in Chile. We briefly describe these projects and draw certain comparisons with the EIAT project.

A.3.1 National Capital FreeNet - NCF

As described in Shade (1999), the National Capital FreeNet (NCF) in Ottawa is considered to be a successful example of community networking in that it is a non-commercial, co-operative, community project with the participation of volunteers, the local third level institute (Carleton University) and private industry (which donated modems and the communications equipment for connecting the FreeNet to the local public library). Shade (1999) describes the project as following the 'democratic technology movement' principle whereby various stakeholders such as experts (i.e. computer professionals), community activists, librarians, teachers and ordinary citizens are brought together to design, develop and deploy the 'electronic commons'. Shade (1999) defines the characteristics of such networked communities as community-based, reciprocal, contribution-based, unrestricted, accessible, inexpensive and modifiable. She gives details of how NCF promotes democracy, life-long learning and economic equity. She also states that NCF has helped to establish a Canadian identity which in turn resists the perceived threat of American cultural imperialism.

A.3.2 The 'Wiring' of Chile

The second project which we outline for comparison purposes is more general in scope i.e. the 'wiring' of Chile. Due to political and economic factors in the 1970s and 1980s in this country, the establishment of an up-to-date telecommunications infrastructure was only accomplished in the late 1990s. Tanner (1999) describes a specific event which took place in 1997 which she feels illustrates the changes that telecommunications have brought to Chilean society. Following the arrest in that year of Carlos Mario Silva Leiva, 'El Cabro Carrera' the supposed leader of Chile's largest drug trafficking and money laundering ring, a gag order was issued, banning all publicity about the case for three months while further investigations were conducted. Within twenty-four hours, the company which publishes Chile's largest circulation daily newspaper *La Tercera* had established a web-page *La Tercera en Internet* which continued to publish information regarding the case. It seems that the gag order did not cover electronic forms of publishing and so the company was not breaking any laws. Indeed, the editor of *La Tercera*, Larrea (who had worked on

various newspapers and magazines opposed to Pinochet in the 1970s and 1980s) specu-
lated whether the military government would have survived so long if Chile had had a
successful telecommunications infrastructure in those years. Tanner, following the pub-
lic sphere concept described in Habermas (1989, 1991) argues that as the Internet has
been disseminated to more and more of the non-elite i.e. scientists and academics, its
opinion-shaping possibilities within democratic participation and community-based pub-
lishing is augmented: 'throughout Chile, people are connecting to the Internet in ever
increasing numbers ... challenging older ideas about government control of the mass me-
dia ... expanding existing spaces of discussion and opening new areas of communication'
(Tanner, 1999: 13).

A.4 Summary

Both of these projects examine the ways in which community networking can unite, inform
and educate the cultures in which they are established. While in Canada, the emphasis
was on increasing ownership of knowledge and life-long learning, in Chile the emphasis
was on increasing democratic participation.

Both in terms of funding received and amounts of national and international media cov-
erage generated, the EIAT project is the largest community based project of its type in
Ireland. Located within the Ennis Urban District Council area, the project aimed to
involve as many members of the community of Ennis as possible.

The Canadian, Chilean and Clare (EIAT) projects have all seen the 'technologising' of
the local community where citizens participate in a community greater than the tradi-
tional physical one. All three projects brought together interested stakeholders to create
and establish the community-based systems. Finally, all three projects have succeeded
in delivering technology training to members of the community so as to facilitate the
engagement of community members with the Information Age.

Appendix B

Pilot Survey 1999

B.1 Use of Computers Survey

This survey examines the use of computers in Ireland in the late twentieth century. Your involvement is greatly appreciated and fully confidential. Thank you.

1. Do you use computers?

   ○ Yes

   ○ No

If you do use computer, please answer Section A; if you do not use computers, please answer Section B

Section A: Computer Users

1. How were you introduced to computers?

   ○ Through a training course

   ○ By your parents

   ○ By your children

   ○ By your partner

   ○ By a work colleague

   ○ Self-trained

2. Approximately how many hours a week do you spend using computers?

   ○ 0 to 5

   ○ 6 to 10

○ more than 10

3. For what purposes do you use computer?

   ○ Programming/Software Development

   ○ Communication

   ○ Office Tasks (word-processing, spread sheets etc.)

   ○ Information Access and Gathering

   ○ Online Shopping

   Please answer any of the following questions that apply to your computer usage

4. How did you become established in this career?

   ○ Primary Qualification in Computing

   ○ Postgraduate Qualification in Computing

   ○ On the job training/experience

   ○ Other

5. Which of the following job description best describes your job?

   ○ Programmer

   ○ Systems Analyst

   ○ Team Leader

   ○ Other

6. How long have you been working in the computer industry?

   ○ Less than 5 years

   ○ Between 5 and 10 years

   ○ More than 10 years

7. Do you intend to work in the computer industry for the foreseeable future?

   ○ Yes

   ○ No

8. On average, how many hours a week do you work?

   ○ Forty hours a week or less

   ○ Between forty and fifty hours

○ More than fifty hours

Communication

9. Which of the following types of communication do you use most often?

   ○ One to one (email)

   ○ Group communication (newsgroups etc.)

   ○ Both

   ○ Neither

10. Who do you mostly contact by email?

    ○ Family

    ○ Friends

    ○ Colleagues

11. If you use email, what do you find most convenient about email communication?

    ○ It is fast

    ○ It is cheap

    ○ It is informal

    ○ Other reason

12. What do you find most inconvenient about email communication?

    ○ Lack of easy access to equipment

    ○ Time needed to learn computer skills

    ○ Delayed feedback from correspondents

    ○ Lack of personal contact

    ○ Other reason

13. If you engage in group communication, how often do you read newsgroups?

    ○ Frequently (at least once a day)

    ○ Regularly (at least once a week)

    ○ Occasionally (at least once a month)

    ○ Rarely (less than once a month)

14. How many newsgroups do you read regularly?

    ○ Less than five

○ Five to ten

○ More than ten

15. Which of the following subject areas do you read?

    ○ Technical Subjects

    ○ Recreational Subjects

    ○ Other

16. Are you a contributing member of any newsgroups?

    ○ yes

    ○ No

17. If yes, please write the names of the newsgroups you contribute to most regularly

    ●

18. Have you ever been the subject of flaming (verbal abuse) in newsgroups communication?

    ○ Yes

    ○ No

19. Do you ever find the tone of newsgroup discussions intimidatory?

    ○ Yes

    ○ No

    Office Tasks

20. Do you use the computers in the home?

    ○ Yes

    ○ No

21. If yes, for what purposes do you use the computer in the home?

    ○ Household budgeting

    ○ Correspondence

    ○ Keeping records (e.g. school records)

22. Do you use computers for work matters?

    ○ Yes

○ No

23. If yes, for what purposes do you use the computer at work?

  ○ Text processing

  ○ Maintaining spreadsheets

  ○ Accessing databases

  ○ Other work-specific applications

Information access/gathering

24. Do you use computers for information access/gathering?

  ○ Yes

  ○ No

25. If yes, what is your motivation for using computers for information access/gathering?

  ○ Entertainment (e.g. electronic magazines 'e-zines'

  ○ News/current events

  ○ Research

26. How often do you use the Internet?

  ○ Frequently (at least once a day)

  ○ Regularly (at least once a week)

  ○ Occasionally (at least once a month)

  ○ Rarely (less than once a month)

Pornography

27. Do you ever access pornographic sites on the Internet?

  ○ Yes

  ○ No

28. Did you use pornographic material prior to obtaining Internet access?

  ○ Yes

  ○ No

29. Do you find the free availability of Internet pornography offensive?

  ○ Yes

○ No

30. Do you feel that restrictions should be placed on Internet content?

    ○ Yes

    ○ No

31. Do you think censoring the Internet should be left up to the individual?

    ○ Yes

    ○ No

Online Shopping

32. Do you use computers for shopping online?

    ○ Yes

    ○ No

33. Have you ever bought anything online?

    ○ Yes

    ○ No

34. Please list some products or services which you have bought online

    •

35. How often do you shop on the Internet?

    ○ Frequently (at least once a day)

    ○ Regularly (at least once a week)

    ○ Occasionally (at least once a month)

    ○ Rarely (less than once a month)

36. If you haven't shopped online, is it because

    ○ You have never been aware of the possibility of online shopping

    ○ You don't know how to shop online

    ○ You don't believe the Internet is secure

    ○ There is an insufficient range of products or services

Section B: Non-computer users

1. Why do you not use computers?

   ○ Lack of knowledge

   ○ Lack of access to equipment

   ○ You feel intimidated by computer technology

   ○ Lack of interest

   ○ Lack of time

   ○ Other reason

2. Would you like to become a computer user?

   ○ Yes

   ○ No

3. Do you feel that you are disadvantaged in not being a computer user?

   ○ Yes

   ○ No

4. Do you feel that your educational background leaves you ill-equipped to become a computer user?

   ○ Yes

   ○ No

5. Do you feel that women are less encouraged to become computer users than men?

   ○ Yes

   ○ No

Section C: Background Information

1. What sex are you?

   ○ Female

   ○ Male

   The following questions may be answered at your own discretion

2. What age are you?

○ 18-25

○ 26-50

○ 51-70

○ Over 70

3. Are you engaged in full-time paid employment?

○ Yes

○ No

4. If so, state your occupation

•

5. Are you

○ Married

○ Single

○ Divorced

○ Separated

○ Co-habiting

Thank you for taking the time to answer our survey.

Appendix C

Random Questionnaire 2001

C.1 Questionnaire about EIAT Project

What is this questionnaire about and why should I get involved?

The *Ennis Information Age Town (EIAT)* project, established in 1997, aims to make Ennis Ireland's first completely integrated information age town. The most up-to-date communication technologies and tools are being installed throughout the town, in shops, homes, schools, local centres etc. while training and information is being made available to all the citizens in the use of these technologies.

This questionnaire is part of a research project based at Dublin City University. In this research, we are examining recent developments in technology and how these are affecting the way that people live, work, communicate, spend their leisure time, shop etc. It will take just twenty minutes or less to complete and allow you to air your views regarding the EIAT project.

The results of this research and your involvement in it will hopefully help future understanding of the ways that technological developments affect people and their communities, in Ennis, Ireland and elsewhere.

There is no need to give your name: the questionnaire is totally anonymous. However, if you would like to take part in further research, such as upcoming interviews, please add your name and a contact number or email address at the end.

The questions are all designed to give as complete a picture of you, your background, skills, interests etc. as possible. We hope that you will be able to complete all the questions but if any question seems unclear or unsuitable, leave it blank and move to the next one.

Finally, thank you for your help and interest.

Section 1: You

1. Are you

female

male

2. Are you aged 15-19 20-26 27-34 35-39 40-49 50-59 60-69 70 and over

3. What is your marital status?

married/cohabiting

single

divorced

separated

widowed

4. Do you have children?

Yes

No

5. If so, how many?

girls

boys

6. If you have children under 20, what are their ages?

Section 2: Your Education and Skills

1. Which of the following best describes your educational background?

I completed primary education

I completed secondary education (Intermediate/Junior Certificate level)

I completed secondary education (Leaving Certificate level)

I completed third level education (Please give details of which course(s) and to what level (national certificate, diploma, degree etc.)

2. Are you currently involved in further education?

Yes

No

If so, please give details.

3. Please tick any of the following skills which you have

   Computer skills (word-processing, using the Internet etc.)

   Language skills (competency in speaking Irish, foreign languages etc.)

   Practical skills (craftwork, gardening, driving, mechanics etc.)

   People skills (involvement in community or voluntary groups such as *Neighbourhood Watch*, drama groups, choirs etc.)

   Caring skills (child-rearing, care for the elderly)

   Other skills (please give details)

Section 3: Your Employment Record

1. Are you currently in full-time, paid employment?

   Yes

   No

   If so, please give details of your job and responsibilities.

2. If you are not currently in full-time, paid employment, which of the following statements best describes you?

   Work part-time

   Full-time parent/home-maker

   Retired (please give details of your job before retirement)

   Involved in voluntary groups (please give details)

Section 4: You and Technology

1. Tick any of the following statements which reflect how you feel about technology

A. Value of Technology

   Technology is generally of great benefit to the world

   Technology is generally of no benefit to the world

   Technology has no effect on the world

   Technology is a great danger to the world

3

B. My Interest in Technology

I am very interested in technological developments (e.g. in science, medicine, communication)

I have some interest in technological developments

I have no interest in technological developments

Technological developments do not influence my life

C. Technology and Human Interaction

Technology is replacing the need for human contact

Technology is putting more people in touch with each other than ever before

Technology could be useful if developed differently

Technology could be useful if more accessible

Section 5: You and the *EIAT* project

1. Have you been involved in the *EIAT* project

   not at all

   a little

   a lot

2. If you have not been involved in the *EIAT* project at all, is this due to

   Lack of interest

   Lack of time

   Lack of knowledge about the project and ways to get involved

3. If you have been involved in the *EIAT* project, please give details of your involvement (e.g. classes you have attended, new skills learned etc.)

Section 6: The Effect of the *EIAT* project on the people and community of Ennis

1. Tick any of the following which describes your feelings in this area

A. Changes in Ennis

Ennis has not been changed by the *EIAT* project.

Ennis has been changed by the *EIAT* project a little.

Ennis has been changed by the *EIAT* project a lot.

The *EIAT* project is a great opportunity for Ennis.

Winning the competition received so much hype that the project itself has been an anticlimax.

B. Results of the project

The results of the *EIAT* project so far are disappointing.

The results of the *EIAT* project so far are fairly positive.

The results of the *EIAT* project so far are very positive.

C. The project and the people of Ennis

The involvement of the people of Ennis in the *EIAT* project has been minimal.

The involvement of the people of Ennis in the *EIAT* project has been good.

The involvement of the people of Ennis in the *EIAT* project has been very good.

2. If you have any other comments about the *EIAT* project, its effect (or not) on you or the people of Ennis, please write them below

If you are interested in taking part in a short interview where these and other questions could be discussed, please email the following address. We will contact you with details of the interviews.

Thanks again for your time.