

Information and Communication Technologies and Social and Economic Inclusion

Addressing the Social and Economic Implications of Limited E-Literacy and Access to Information and Communication Technologies

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Executive Summary

1. Business, government and personal interactions are increasingly being facilitated, if not driven, by the Internet and associated uses of information and communication technologies (ICTs). To stay competitive and enhance social and economic participation, New Zealand needs a population that is willing and able to use ICT to best effect. In other words, an e-literate population with optimal access to ICT. Given existing inequities, however, it is likely that certain groups and locations will find it difficult to become e-literate or gain good access to ICT, and that a digital divide between information *haves* and *have nots* will develop.
2. There is no comprehensive evidence on the nature of a digital divide in New Zealand and how it is likely to impact on Government's attempts to promote an innovative, inclusive economy and enhance social cohesion. However, based on the limited New Zealand information we do have, and the situation in other countries, New Zealand's information *have-nots* are most likely to be those on low incomes, unemployed people, sole parents, people with disabilities, and those living in less populated locations. Accordingly, Maori and Pacific Peoples are likely to be over-represented amongst information *have-nots*. An increasing division between information *haves* and *have-nots* could not only reduce economic opportunities for individuals but also for particular communities, locations and the economy overall.
3. Being able to access ICT and acquire e-literacy involves four main dimensions, which can also act as barriers: attitude, finance, skills and infrastructure. These encompass recognising the importance of e-literacy, being able to afford access, being able to develop the skills to make optimal use of hardware and software, and having access to sufficient bandwidth to use the Internet to best effect.
4. In recognition of the impact e-commerce and e-government will have on their national well being and competitive advantage, major developed countries have integrated social and economic inclusion into their overall Information Economy/Society strategies. They have prioritised enabling as many people and places as possible to go online and funded initiatives accordingly, usually in partnerships with local government, communities, and the private sector.
5. Because actions to improve access to ICT cover many social and economic policy and delivery areas, it will be important that any strategy to address them is co-ordinated across sectors. Ideally, in order to ensure existing funding is utilised to best effect, as well as focus any future investment, leadership of an access and e-literacy strategy would be led most effectively by a department which already had a core social/economic focus, such as the Department of Labour.
6. A strategy would need to combine a number of elements: research, monitoring, enhanced co-ordination, action research and piloting of initiatives. It would also need to increase leverage from current social policy investments, particularly education, training and employment assistance.
7. Access to ICTs and encouraging e-literacy is a means to an end, not an end in itself. Resolving digital divide issues strengthens Government's ability to address current inequities, develop New Zealand in new economic directions, and enhance social cohesion.

Section I: Introduction

8. New Zealand is experiencing significant changes in business, society and the economy due to the revolution in information and communication technologies (ICT). Changes that may not be as unambiguously positive as earlier technological advances, such as railways and automobiles, were. To realise the greatest benefit from the changes, we need to develop a clearer understanding of what these changes mean, and how ICTs impact on different groups and areas of New Zealand.

9. This paper examines why it is important that as many people and places as possible are positioned to benefit from ICT; who might not be able to do so; what the barriers are likely to be; other countries' strategies for addressing ICT social and economic inclusion; and if government were to take a leadership role to address this situation, what sort of strategy and options might best be employed for New Zealand.

Structure

10. This paper consists of two parts. The first part, following this introduction, is a section containing the problem definition: what access and e-literacy, and the digital divide, mean. The next section looks at why resolving these issues is important for economic growth and social cohesion and achieving other key government goals. Barriers to access and e-literacy are then explored, followed by possible options for addressing these. The paper concludes with options for progressing work in this area. The second part contains appendices with more information on the New Zealand situation *vis a vis* access to ICT, the digital divide in the United States, and other countries' strategies for improving access to ICT and e-literacy.

Background

11. This paper has been prepared in recognition of the importance to New Zealand's growth in new economic directions (facilitated by e-commerce), and improving social and economic inclusion, of as many people as possible developing e-literacy and being able to access ICT.¹ It is possible to identify likely barriers to access to ICT and e-literacy, and certain groups and situations who experience limited access. However, at the moment, there is no comprehensive picture of the New Zealand situation in regard to how widespread lack of access to ICT and poor e-literacy are, or what is being done already to address it.

12. The importance of e-commerce to New Zealand's economy and society has been discussed in earlier papers from the then Ministry of Commerce, particularly *Electronic Commerce: Strategic Importance, Key Issues and Way Forward* (<http://www.med.govt.nz/irdev/elcom/keyissues/>).

13. A recently released Australian study on e-commerce suggested e-commerce could boost employment by 0.5 percent and drive up real wages by 3.5 percent. However, the

¹ The most recent in-depth survey of the American Internet economy recently attributed 1.2 million jobs to the Internet-based economy and a \$301.4 billion dollar economy. *The Internet Economy*. (1999) Center for Research on Electronic Commerce at the Graduate School of Business at the University of Texas at Austin.

same report noted it would also create unemployment, the need for retraining, and require an increase in those with ICT skills.²

14. To exploit fully the opportunities of the information age, and avoid the damaging consequences which structural adjustments to the economy can easily create (long term unemployment and widening regional inequalities), New Zealand needs a population which is aware of the power of ICT, particularly the Internet: willing and able to use them effectively. In other words, a population that is e-literate.

15. Given the value of connectivity, as illustrated by *Metcalf's Law*, linking as many people, communities, organisations and businesses as possible to the Internet creates a value far outweighed by the cost.³ Increasingly those unconnected to the network become significantly disadvantaged in social and economic terms.

² *E-Commerce: Beyond 2000*. An E-Commerce Economic Impacts Study. NOIE. Australia

³ *Metcalf's Law* states that, as a network grows, the value of being connected to it grows exponentially, while the cost per user remains the same or even reduces.

Section II: Problem Definition

What "Access" and "E-Literacy" Mean

Increasingly, familiarity with IT is being regarded as a new literacy, as essential to a country's social and economic development as the established literacies of reading, writing and numeracy. ... the indications are that in the future IT literacy levels will increasingly become determinants of success at an individual and national level Access to ICTs is ... not enough. We must also build the capacity to realise their potential. This means providing everybody with the opportunity to acquire and develop the skills needed to participate in the Information Society.

Irish Information Society

16. Access to ICT and e-literacy has four primary dimensions: attitudinal, financial, skill and infrastructure.

- *Attitudinal:* Perceiving ICT skills and access to the Internet as value-adding and important to future well being; perceiving the Internet as having meaningful and relevant content; being confident and motivated to go online.
- *Financial:* Being able to connect to the Internet from home, work or a community location in a way which enables a person to learn ICT skills and carry out required activities, through affordable access to a PC with connectivity to the Internet.
- *Skills:* Having sufficient skills, or access to tuition to develop and increase skills, to use ICT to an optimal level for personal and economic gain.
- *Infrastructure:* Having sufficient levels of bandwidth available to carry out e-commerce, e-government or educational interactions. Having hardware and software which meets specific needs, such as people with physical or learning disabilities, or language difficulties might have.

17. E-literacy means having the skills, knowledge and attitudes to use ICT to maximum advantage and to keep upskilling. Optimal levels of access and e-literacy means that a person can contribute more effectively to their own well being and be a more effective worker, entrepreneur, consumer and citizen.

18. If overseas evidence of the existence of a digital divide (information *haves* and *have-nots*) can be taken as a proxy for a similar situation existing in New Zealand, it is likely that not all New Zealanders and all locations will have optimal access to and capability to use ICT, for a number of reasons: this assumption is reinforced by the small amount of data available on Internet access in New Zealand (discussed in paragraphs 24-29).

19. Problems that have been identified include:

- an insufficient telecommunications service particularly in areas of lower population density;
- a basic lack of knowledge regarding the benefits of ICT among certain groups;

- a lack of skills to utilise ICT to best effect;
- an inability to afford the costs of access to equipment and the network;
- a lack of community access or low cost, pay per use access sites.

The Digital Divide

20. The term *digital divide* was coined to define the gap between those who have adequate access to ICTs, such as computers and the Internet (information *haves*) and those who have limited or no access, for either socio-economic or geographical reasons, or both (information *have-nots*).

United States Studies

21. A 1998 American study on the *digital divide* was among the first to raise the possibility of a growing information underclass.⁴ It suggested that the technology gap was not simply a reflection of the choices made by individual households but rather that poor neighbourhoods and some rural communities lacked the necessary infrastructure available in affluent and more populated areas. While policy attention is often focused on the disadvantage to an individual, an equally important problem is the growing unattractiveness of underwired locations to business. An inequitable distribution of information technologies can lead to “a concentration of poverty and a de-concentration of opportunity”.⁵

22. Earlier United States Department of Commerce studies on connectivity show that over the last five years the least connected households remain:⁶

- Those on low incomes
- Black, Hispanic, or Native American
- Not employed
- Single parent (especially female headed) households
- Those with little education, and
- Those residing in central cities or especially rural areas.

⁴ Benton Foundation (1998) *Losing Ground Bit by Bit: Low-Income Communities in the Information Age*. United States. <http://www.digitaldividenetwork.org>

⁵ This issue was the focus of PAT 15, a project team on ICT in deprived areas set up by the British Government's Social Exclusion Unit and addressed in their report, *Increasing the Availability and Take-up of ICTs in Deprived Neighbourhoods*.

⁶ *Falling Through the Net: Defining the Digital Divide*. A Report on the Telecommunications and Information Technology Gap in America. July 1999. National Telecommunications and Information Administration, Department of Commerce. <http://www.ntia.doc.gov> Note that while the United States Department of Commerce undertook the studies, leadership on addressing the digital divide has been taken up by the President himself. <http://www.digitaldivide.gov>

23. A child in a low-income White family is *three times* as likely to have Internet access as a child in a comparable Black family. A child in a dual-parent White household is *nearly twice* as likely to have Internet access as a child in a White single-parent household, while a child in a dual-parent Black family is almost *four times* as likely to have access as a child in a single-parent Black household. A high-income household in an urban area is more than *twenty times* as likely to have Internet access as a rural, low-income household.⁷

The Digital Divide in New Zealand

24. While no equivalent data to the United States data on the digital divide is available here, available information suggests that any digital divide in New Zealand is likely to reflect existing disparities. That is, information *have-nots* are likely to be those on low incomes or state support, those with few or no qualifications, those living in less populated or less economically active areas – and their children. It is likely therefore that many Maori and Pacific Island peoples, unemployed people, sole parents, and people in rural areas will be over-represented amongst information *have nots*.

25. This is reinforced by the information available from a recent survey on another topic carried out for Porirua City Council that included a question on access to the Internet.⁸ While 50 percent of European/other residents had access, only 17 percent of Maori/Pacific Island residents had access.⁹ While 76 percent of those earning more than \$50,000 had access, this dropped to 27 percent for those earning between \$25,000 - \$50,000, and to 15 percent for those earning less than \$25,000. This reinforces the overseas data that income and ethnicity are primary factors in relation to access to the Internet. This also results in a geographical divide in relation to access: while 63 percent of residents in one ward had access, this contrasted with 37 percent and 17 percent access respectively in the two other wards.

26. General New Zealand data in relation to telephone, computer and Internet penetration also reinforces assumptions that ICT access and e-literacy are linked to income levels and ethnicity.

27. *Telephone*: Census data shows that low-income families, beneficiaries, Maori and Pacific peoples, particularly in certain geographic locations, have less telephone connectivity than the average of 97 percent penetration. Telephone connectivity is currently vital for accessing the Internet from home.

28. *Computers*: A marked difference along ethnicity and income lines exists in relation to households with computers. Only 23 percent of Maori households and 17 percent of Pacific peoples households have computers (in comparison to over 30% generally). While 57 percent of households with incomes over \$71,600 have computers, this dropped to just

⁷ Further information from the United States study is contained in Appendix I.

⁸ *Public Perceptions and Interpretations of Council Services and Representation*. Porirua City Council. December 1999. National Research Bureau.

⁹ 21% of Porirua residents are Maori and 22% are Pacific Island Peoples. Therefore the future economic and social development of the City may be adversely affected by Maori and Pacific Peoples' reduced access to the Internet.

over 50 percent for households with incomes from \$31,400 to \$48,999, and 16.6 percent for households with incomes below \$20,000.

29. *Internet.* New Zealand research (AC Nielsen) shows that variations in the likelihood of having accessed the Internet in the past four weeks are best explained by age, household income and work status. Internet users are generally younger, in higher income brackets and in work. Just over 15% of people earning under \$30,000 have ever accessed the Internet, despite high use by students, compared to over 30% of those earning between \$30,000 and \$60,000. This compares with nearly 40 percent of those earning between \$40,000-\$80,000, and nearly 60 percent for those earning over \$80,000.

Section III: Why Addressing the Digital Divide Is Important

Economic Growth

30. Previous papers on e-commerce have indicated that if we are to grow our economy at an improved rate, New Zealand must have as many existing businesses as possible becoming proficient in e-commerce. It must also encourage entrepreneurship utilising e-commerce. In addition, the existing working age population (which makes up the large majority of our available workforce for the next 10 years¹⁰) must become proficient at using ICTs. This will enable us to grow the pool of skilled people able to work in the core and peripheral ICT industries and across the wide range of occupations and industries that increasingly are using ICTs.

31. The recent move by Ford to provide their workers with PCs, access to the Internet, and relevant training shows the importance of e-literacy in “old” industries. However, there is no indication that this action will be followed by other industry sectors, particularly the service and agriculture sectors where many low paid workers are employed, or by SMEs which account for 42 percent of all employees.

32. Without good access to ICT and being e-literate certain groups - low skilled or low paid workers, unemployed people, sole parents, and those with disabilities - are in danger of not being able to participate in the new forms of economic activity or the old ones that are increasingly being changed by ICT. Hence the actions of the American, British, Canadian and EU governments in supporting increased access to ICT and e-literacy. It is likely therefore that assisting people to improve their access to and skills with ICT will be an important means for the Government to grow an inclusive, innovative economy for the benefit of all New Zealanders.

33. The issue is not only one which affects adults. While children, being of the “born to IT” generation are more likely to adopt new technologies, their ability to do so is likely to be influenced by their parents’ levels of income and education, and the decile of their school.¹¹

34. Communities and locations with poor Internet availability are likely to be considered less favourable places for economic investments, thereby limiting enterprise development and job creation and restricting the growth of SMEs, currently seen as a key driver of economic growth.¹² The Internet enables small businesses in less populated regions to

¹⁰ The Department of Labour estimates that in a labour force of approximately 1.9 million, only 55,000 young people reach working age each year.

¹¹ Research has shown both that computer facility in children is linked to use of computers at home and that good use of learning technologies in schools can boost the performance of children who come from homes without computers.

¹² However, caution is needed in seeing technology itself as a “magic bullet”. Research on telework and telecentres has revealed that investment in technology without prior investment in developing an entrepreneurial approach to community economic development produces minimal economic or employment returns. For telecommunications to be most effective communities must identify first how they could use ICT and generate markets for goods and services which ICT would enable them to produce. (Berten, Grimes)

aggregate viable customer bases by accessing the global customer base – 275 million people are estimated to be on the Internet currently.

35. Lack of access to the Internet is likely to be a particular constraint for the agriculture and horticulture sectors: rural New Zealand. New Zealand farmers and growers have been early adopters of new technology because the opening of markets has required adoption of best practice and increased efficiencies.¹³ However an Australian survey suggests that there may be a significant problem which militates against farmers using the Internet: the poor quality of the communications infrastructure which limits data transmission in many rural areas.¹⁴ This is already a problem in rural areas in New Zealand because of the tendency of many older electric fences to interfere with data sent over telephone lines. This in turn compromises the ability of farmers to undertake post-secondary study that another Australian report indicates is critical to improving agricultural competitiveness.^{15 16}

36. Lack of access in rural New Zealand is of particular concern given that the Australian research noted above identified the agriculture and horticulture sectors as standing to benefit greatly from a rapid adoption of e-commerce. Enhanced access to up to date information was seen as a potent device for improving profitability across the industry. The value of up to date information lies in the improved decision making it enables a producer to make about when, or whether, to take perishable or fragile products to uncertain markets. It also enables smaller or isolated producers to create markets *virtually* by using the Internet to aggregate potential buyers.

Social Cohesion

37. As use of ICTs becomes increasingly integrated into the normal processes of daily and business life, the negative impact of the *digital divide* on the cohesion of society is likely to become much more acute. With the advent of the Internet the bar for effective participation in society and the economy has risen. Not only do you have to have a telephone, radio and TV, and be able to read, think and write, you also have to have a computer, know how to type and navigate your way around Windows, and pay for access to the Net – particularly if you want to access information and maximise the large amount of knowledge the Internet makes so much more accessible. Moreover, while ICTs make the existence of other divides such as lack of literacy, low or no qualifications or geographical remoteness more acute, paradoxically they also offer increased opportunities to overcome them.

¹³ A 1998 Lincoln University survey revealed that 43 percent of farmers had computers: mostly those with larger farms, those younger and more involved in off-farm businesses.

¹⁴ *Taking the Plunge: Small Business Attitudes to E-Commerce* (1998). Australian Electronic Business Network (AeB.N) and the Department of Communications, Information Technology and the Arts. Canberra. <http://www.ause.net>

¹⁵ *Evaluation of the Rural Communities Access Program* (1997) Rural Division, Department of Primary Industries and Energy and Centre for Rural Social Research, Charles Sturt University. Australia.

¹⁶ The West Australia Government's Telecentre Network won the Premier's Award for Provision of Services to Regional Western Australia for enabling an increase of 30% in post-secondary education enrolments in rural areas.

38. The Government has endorsed e-government, recognising the value of the Internet as a channel for improving service to citizens and making savings that can then be invested in value-added services to target clients. Ensuring that the widest range of people is able to participate in e-government will be important for achieving this as well as Government's goal of restoring trust in government and providing strong social services, particularly in rural areas.

39. The Internet also provides communities - geographical, cultural or self-defined – with enhanced opportunities for self-management: easier ways for members to communicate, share and obtain information, and improve social cohesiveness: all important for regional development. It encourages democratic participation in decision making: in essence requiring less from central government because more people can contribute to their individual and collective well being at a local level.

40. Research has identified that high social capital (networks, norms of reciprocity and trust) in rural communities makes them more effective in addressing internal problems and external constraints.¹⁷ The Internet is a powerful tool for rural dwellers to overcome many of the costs associated with networking and resource mobilisation – time, weather, transport difficulties and distance – and is an important network in its own right for accessing and sharing knowledge. The Internet also has the potential to help rural centres avert declines in population and even attract new residents by increasing access to higher education and business opportunities.

Advancing Other Key Government Goals

41. In addition, increasing access to ICT and e-literacy will also be crucial to the ability of the Government to advance other key goals including:

- Improving New Zealanders' skills
- Strengthening national Identity and upholding the principles of the Treaty of Waitangi
- Closing the Gaps for Maori and Pacific People in Health, Education, Employment and Housing.

Improving New Zealanders' Skills

42. Assisting New Zealanders to become e-literate will enable more New Zealanders to develop the skills to participate in the increasing range of jobs related directly to ICT (both technical and multi-media content), and to participate in e-commerce. Increasingly, traditional jobs are requiring higher levels of computer skills. The widespread provision of Internet based distance learning will enable students, in the compulsory and tertiary sectors as well as those in work, to more easily and cost-effectively access a wider range of subjects.

¹⁷ *Sustaining the Rural Landscape by Building Community Social Capital*. Warner, Hinrichs et al. Community Development Report, Vol. 5, No. 2, Fall 1997. Cornell Community and Rural Development Institute.

43. Our small and aging population, with its relatively low technical skills base compared to some industrialised countries, means that New Zealand needs as many people with the potential to work in the ICT industries to take up opportunities to do so. Increasing the number of e-literate people is a way of increasing the pool of people with the potential to develop technical skills for the information economy.

Closing the Gaps for Maori and Pacific People in Health, Education, Employment and Housing

44. As ICT skills are increasingly important for employability, and the number of transactions over the Internet increases, and more information and knowledge is held and distributed online, an important element of capability for Maori and for Pacific peoples will be their ability to use ICT, especially multi-media applications and the Internet. The Internet and associated software provide Maori and Pacific peoples with the ability to *leapfrog* in their economic and social development: a view held by the UN in relation to developing nations.

45. However, if a large proportion of Maori and Pacific peoples are those without access to ICT, they are likely to be restricted in their ability to develop capability in this regard: as will government in respect to *closing the gaps*. Notwithstanding this there is evidence that Maori are increasingly making good use of the Internet already for whanau, hapu, iwi, pan-tribal and urban Maori self-management and entrepreneurial activity.¹⁸

46. Maori (and Pacific Peoples) have a younger population than non-Maori: the median age of Maori was 21.6 years in 1996 compared with 33.0 years for the population generally. Children aged under 15 years make up 37 percent of the total Maori population compared to only 23 percent of the total New Zealand population. Young people, being in the “born to IT” generation, usually adapt more easily to ICT and use it entrepreneurially. If Maori are disproportionately excluded from access to ICT because of their ethnicity, economic circumstances, locations, attitudes or lack of skills, not only will Maori, individually and collectively, be severely disadvantaged but so will New Zealand as a whole. Maori will increasingly form a greater proportion of New Zealand’s young working age population over the next fifty years.

Strengthening National Identity and Upholding the Principles of the Treaty of Waitangi

47. As well as seeing ourselves *on air*, through television and radio, New Zealanders need to “see” ourselves on the Internet. Indeed increasing numbers of New Zealanders are creating cultural content for this medium because it is so inexpensive to do so. It is interesting to note in a recent quantitative study of Internet use that as Internet use increased viewing of television decreased.¹⁹ This suggests that over time an important feature of national identity will be the images, sounds and texts that individuals and groups

¹⁸.See <http://www.piperpat.co.nz/nz/maori.html>, and <http://www.maoribiz.co.nz/special.htm> for links. Issue 9, December 1999/January 2000 of *Tu Mai* magazine focuses on Maori and IT.

¹⁹ Stanford Institute for the Quantitative Study of Society. <http://www.stanford.edu/group/siqss>

create on the Internet – a self-publishing, highly democratic, participatory and inexpensive media compared to television.²⁰

48. If the Internet is a potent vehicle for reflecting culture, then it is important that all elements of New Zealand society understand how to use it as a form of creative expression: to render themselves visible in this new media. This relates especially to Maori, recognising that there will be particular issues relating to protection of taonga and matauranga (knowledge) Maori for Maori to resolve.

Comment

49. Over time new forms of accessing the Net will decrease the complexity, cost and nature of how access is achieved. However, given the potential for the Internet to amplify existing social and economic disparities, policies to address these disparities need to be developed now in order for New Zealand to be able to maximise its human capital, advance more rapidly towards becoming a knowledge-based economy, and increase social cohesion.

²⁰ *Time*, 27 March 2000 cover story, "Do-It-Yourself.com," analyses the issues in relation to self-publishing of creative content on the Web.

Section IV: Barriers around Access to ICT and E-Literacy

Likely Barriers

50. We have only limited information about the New Zealand situation in relation to access to ICT. However this, combined with the analyses contained in overseas reports on the *digital divide*, suggests that the key barriers to access in New Zealand are likely to be quite diverse, and multiple for some groups. The key barriers can be classified similarly to the dimensions used to define access and e-literacy, such as:

- *Attitudinal*: Lack of awareness or understanding of the potential of the Internet to improve personal and economic well being. This includes the perception or reality of there being little, if any, content relevant for certain groups/communities; Lack of confidence about ability to use new technologies; Language difficulties, either because of the techno-speak that is often used in association with ICT or potential users' limited English language skills;
- *Financial*: Cost of equipment, connectivity and skill development, including lack of community-based access points which would provide cheap or free access and training;
- *Skills*: Insufficient training and education, and professional development, of educators and community advisors to support their advocacy of ICT, and to train people in ICT skills;
- *Infrastructure*: Lack of new product developments which would encourage specific groups to go online;²¹ Inadequate technology infrastructure in many areas, particularly smaller provincial and rural areas;²²

Attitudinal

Lack of Awareness or Understanding of the Potential of the Internet to Improve Personal and Economic Well Being

51. Information from the United States suggests that even where people are able to afford access to ICT, particularly the Internet, they will often choose not to use it because they do not perceive that the content or the functionality is meaningful for them.²³ This is particularly true for ethnic minority communities but can extend also to other groups in society. In not using the Internet, such groups are missing out on access to information, knowledge, products and services that could enhance their well being and increase their ability to make a greater economic contribution.

²¹This could vary from adaptive software for people with disabilities to cultural content of relevance to minority ethnic communities and in their own languages.

²² Currently there is no complete analysis of the level of bandwidth connectivity throughout New Zealand.

²³ See Appendix II, para 10.

52. It is likely that, as in the United States, commercial enterprises in New Zealand will recognise the returns to be made from creating content of interest to these groups. However, as Heppel notes if Internet use is largely passive consumption of entertainment or consumer products, it is unlikely to provide the best value for either the individual concerned or the nation.²⁴

53. A recently released Irish report also indicates that late adopters are not only different to early adopters in key demographic features (gender, income, employment status, location) but also express less interest in accessing and using ICT.²⁵

Lack of Confidence in Using New Technologies

54. Many people who prove well able to use ICT after tuition need support initially to overcome a lack of confidence, particularly if they did not do well in previous learning situations, or it is a long time since they learned anything new. An Irish report on telecentres and telework currently being compiled for the National Telework Advisory Council revealed that before any technical skills were taught to trainees much effort has to go into building confidence and encouraging them to believe they could master the equipment and software.

55. While people are becoming more familiar with ICT terminology, assistance is often needed for them to overcome barriers around the use of jargon, with particular assistance being needed by people from a non-English speaking background, or with limited education.

Financial

56. The price of hardware, software and Internet access has decreased markedly in the last year, and will likely continue to decline.²⁶ However, while some people on low incomes will prioritise expenditure to acquire access to the internet, others will not be able to regardless of how positively they view ICT: there is a large difference between *cheap* and *free* for these groups given trends in earnings inequality.²⁷

57. Some countries have established Community Technology Centres as a way of providing poorer individuals and communities with access to ICT. In New Zealand however currently there is no integrated strategy for ensuring that there are adequate public ICT access points in low income areas, either commercially or community operated,. Officials report that what community access exists has developed organically and is likely to suffer from inadequate funding and technical support.

²⁴ Heppell, a leading British academic on technology and learning cautions countries against only supporting “cybercouch potatoes”, that is, people who only use ICT to be entertained by other peoples/cultures’ content, suggesting that economies will follow suite, that is, be passive rather than pro-active. Instead he advocates encouraging people to become “cyber authors”, in order to create more dynamic, innovative economies.

²⁵ *Early and Late Adopters of New Technology* (1999) Information Society Commission. Ireland

²⁶ However, a recent Standard.com newsletter quoted PC Data as showing that United States prices are trending upward. In January, the average retail price for a Windows-based PC was up for the fourth consecutive month.

²⁷ Inequalities in hourly and weekly earnings increased between 1984 and 1997. Department of Labour

58. It should be noted that while Community Technology Centres provide a means for poorer citizens to access ICT, the costs of providing the equipment, connectivity and training are similar to what are called the “total costs of ownership” of PCs in major business firms. This means that the costs of getting the initial equipment and training are a fraction of the costs of maintaining the equipment, upgrading, and reconfiguring, and training staff, and are often beyond the means of communities or users to provide themselves.²⁸

59. A recent New Zealand study indicates that nearly 100 percent of public libraries will now be connected to the Internet and providing some form of public access.²⁹ However, libraries signalled that they have difficulties in obtaining the resources to provide both hardware and software, find time to train library staff and provide support to users. Given the trend towards staff cuts in libraries the report indicated that these problems seem likely to continue and therefore constrain libraries’ ability to expand their public access to the Internet: notwithstanding their view of its importance as a vehicle for accessing information.

60. As part of their community online strategy the Department of Internal Affairs (DIA) has established CommunityNet Aotearoa. This Website enables community groups to link to an information library, take part in discussion forums, advertise jobs and community events and keep up to date with consultation documents open for public submissions. While no comprehensive data is available it appears that many community organisations see the benefits of being “wired” both to them organisationally and to the communities they serve. However it seems that many community groups are struggling to improve their ICT connectivity, for reasons of cost and lack of skill/technical support.

Skills

Insufficient Training and Professional Development in ICT Skills for Education Professionals and Community Advisors

61. The issue here relates to the inadequate provision of both teachers and tutors who can teach ICT skills in schools and community locations, and of technicians to support increased use of ICT by schools and community organisations.

62. Many community organisations which could be advocates for ICT, and train people in their community, find it extremely difficult to afford to employ or contract technical support staff, and train their own people in technical skills.

63. An important and successful aspect of the Ministry of Education’s *ICT in Learning* strategy is the professional development of current teachers. However, at this stage there is still some way to go before all teachers have the skills in this area to enable students to make optimal use of computers to assist learning. In addition, school principals’ comments to officials would indicate that insufficient attention is being paid to ensuring that

²⁸ *IT and the Next Generation Internet* (1998) White Paper for the United States Presidential Advisory Committee on High Performing Computing and Communications, Kling, Rob.
<http://www.slis.indiana.edu/kling/pubs/NGI.htm>

²⁹ *The Extent of Public Access to the Internet in New Zealand Public Libraries* (1999). National Library of New Zealand.

students in pre-service teacher training are developing a good understanding of and facility with ICT.

64. While this paper focuses on enabling disadvantaged people to improve their e-literacy for a variety of reasons, an important reason for encouraging the widest range of people to develop e-literacy is to increase the overall number of people who train to become IT professionals.

65. This is critical as New Zealand currently faces a skills shortage of IT professionals, which is likely to be exacerbated by their increased emigration due to increasing demand from other countries which offer more attractive remuneration.³⁰

Infrastructure

Inadequacy of Technical Infrastructure in Small Towns and Rural Locations

66. Small towns and rural communities, who stand to gain much from the Internet's ability to diminish the negative impacts of distance, may in fact be unable to benefit fully from this technology because of their lack of suitable infrastructure. Much of the most significant value of ICT to less populated areas is to be found in applications requiring broad bandwidth such as video conferencing, interactive television and multi media tools.³¹ However, many less populated areas do not have the bandwidth to support such optimal e-government or e-commerce services or access information.

67. While narrow bandwidth is sufficient for largely text-based applications such as e-mail, access to applications such as electronic reference material, community bulletin boards, business data transfer, public information service, teleworking, home banking and shopping, would be increased by broad bandwidth.

68. In small population areas, particularly those with significant topographical constraints, there is little incentive for current telecommunication service providers to improve or extend their service, or for new players to enter the market: to provide broad bandwidth connectivity. Recent evidence of this is the decision by Saturn and Telstra to enter the high-speed connectivity market only in large population centres.

69. Rural areas are also less likely to receive the benefits of market driven new technologies or have suppliers improve existing technologies. While satellite connectivity can overcome terrestrial limitations, it is not a cheap option. In addition, unlike service providers who use satellite to send large amounts of information quickly, users send out their information by landline, which is slower and more limited in capacity.

³⁰ The Irish Times (21 March 2000) reports a joint Microsoft/International Data Corporation report as forecasting an IT skills shortage of 1.7 million people for western Europe by 2003. The major strategy to address this is to attract skilled immigrants. The study also suggests that to help remedy this shortage government should support the recruitment and training of non-traditional IT employees such as older workers, women, and the unemployed.

³¹ Bandwidth means the amount of information that can be transmitted through a connection or wire in a fixed amount of time.

70. Infrastructure in rural areas can be a problem in other respects. In addition to broad bandwidth connectivity to the Internet, users need services which are not always consistently available such as:

- Constant and clean electricity supply
- Quality telephone connectivity
- IT support services a relatively short distance away.

Lack of New Product Developments

71. Increasingly the Internet and computers are seen as providing people with disabilities with the means to generate income, manage their own well being, and communicate with others regardless of distance. However, many groups who would benefit from using ICT are constrained in doing so because there is little software or content readily available that meets their needs. Similarly, the economic and social well being of speakers of other languages would be increased by a wider range of content and software in languages other than English.

Section V: Other Countries' Strategies³²

72. In developing their meta-strategies for advancing into the Information Age Australia, Canada, the United Kingdom, the United States and Ireland set as a priority ensuring that the widest possible range of citizens and locations could access the Internet and increase ICT skills. An example of this is the way the Australians, in their *Building the Information Economy* strategy, identified the first of ten priority areas as being the maximising of opportunities for all Australians to benefit from the online economy.³³ This was seen as integral to the success of e-commerce and e-government, to securing a strong democratic, informed and inclusive society; avoiding a social polarisation between the so-called "information rich" and "information poor".³⁴

73. The means the above countries are using to achieve their goals include:

- Supporting the provision of public/community access sites for training and use of ICT;
- Subsidising ICT training and equipment for people on benefits or low incomes;
- Promoting the development of national online content;
- Tax incentives to businesses who supply hardware and training to staff;
- Investments in widening the number of locations with high speed connectivity;
- Improving people's ability to access government online services;
- Partnerships with industry, communities and local government;
- Increasing competition and reducing the costs of services;
- Making spectrum available for new services.

74. The increase in the digital divide revealed by the United States Department of Commerce's latest study on Internet access, prompted the United States government last December to host a cross-sector Digital Divide Summit, led by the President, and to develop a comprehensive strategy to improve access and e-literacy.³⁵

75. Canada's six-dimension national strategy "*Connecting Canada*", initiated to make Canada the most connected country in the world, includes providing all Canadians, including those in rural and remote areas, with access to the Internet, and *Smart Communities*, an integrated approach helping entire communities go online.³⁶

³² See Appendix II, Appendix III, Appendix IV, and Appendix V for more details.

³³ A *Strategic Framework for the Information Economy* <http://www.noie.gov.au>

³⁴ See Appendix III and Appendix V.

³⁵ <http://www.digitaldivide.gov>

³⁶ <http://www.connect.gc.ca>

76. The following quote captures the British view of the importance of widespread access and e-literacy.

“We could have a society divided between information haves and information have-nots. A society with a wired up superclass and an information underclass. An economy geared to the needs of some parts of Britain but not the whole of Britain. But the blessings of new technology give us the means to break down the walls of divisions and the barriers of isolation. ... Anyone left out of the new knowledge revolution will be left behind in the new knowledge economy ... The more individual talent we nurture, the more economic growth and prosperity we will achieve”.

Gordon Brown, British Chancellor of the Exchequer³⁷

77. The British Government has announced a number of initiatives centred around a public education programme to improve people’s ICT skills including establishing 1000 ICT Learning Centres across the United Kingdom; discounting course fees by up to 80 percent for adults signing up to improve their basic computer skills; and funding an extra 50,000 free places for unemployed people, low paid workers, people with disabilities and single parents to attend IT introductory learning courses.³⁸

78. While the Irish are less advanced in their efforts to ensure that all citizens have access to ICT and develop ICT skills, they are developing an integrated strategy targeting libraries, schools, post offices, community and voluntary agencies, and public commercial sites (cafes etc) as places for people to be able to access ICT.³⁹

79. Their focus on addressing this issue is likely to increase given a recent study on IT skills shortage in Western Europe (see footnote 30) which forecasts the Republic having the fourth highest level of IT skill shortage in Western Europe by 2003.

³⁷ <http://www.hm-treasury.gov.uk/speech/cx290200.html>

³⁸ Information on pilot centres is given in Appendix V.

³⁹ <http://208.55.13.183/cgi-local/publications.cgi?f=exec&id=34>

Section VI: Developing a New Zealand Strategy - The Way Forward

An Integrated, Partnership Approach

80. Resolving the digital divide is a subset of wider government goals for developing New Zealand as a highly skilled, innovative economy, promoting regional development, and enhancing social cohesion. Therefore it needs to be addressed in this wider context through consultation and co-operation, at central government level and with local government and communities.

81. The pre-election *Labour On-Line* policy signalled willingness for the Government to take a leadership role in supporting increased access and e-literacy. There are three major approaches that government could favour, which are not mutually exclusive. The first is promotion and information brokerage, helping people and communities understand better the benefits of ICT and the need to become e-literate, and providing information to them on how to do this. The second is to assist with funding services, both directly and indirectly, to enable more people and locations to have access to ICT and develop the skills to use it to best effect. The third is setting an example by using ICT more to deliver government services, such as education and employment assistance, and enabling more people to access the ICTs used in these instances.

82. All these approaches could be done in partnership with communities, iwi and pan-Maori organisations, local government and the private sector. Research suggests that for projects to succeed local people should be involved in the design and delivery, facilities should be based in places where people naturally congregate, and projects should take a longer term view including ensuring ongoing sustainability.^{40 41}

83. Partnerships would increase the likelihood that any investment by government produced the best solutions for local problems, took into account the latest market developments, supported competition and innovation, and enabled government to have its strategic objectives met. This approach would also reflect best practice overseas.

84. Whatever combination of promotion/information brokerage, funding, and partnership approaches was ultimately decided on to improve access and e-literacy in New Zealand, the strategy would need to be integrated with the e-commerce and e-government strategies, and relevant areas of social and economic policy. Therefore, ideally the strategy should be co-ordinated by an agency whose core role is social and economic policy.

85. A strategy would need to combine a number of elements: research, monitoring, enhanced co-ordination, action research and piloting of initiatives. It would also need to

⁴⁰ *Increasing the Availability and Take-up of ICTs in Deprived Neighbourhoods*. A draft report from the United Kingdom Department of Trade and Industry. November 1999.

⁴¹ *Local Connections: Making the Net Work for Neighbourhood Renewal*. Communities Online's response to the Social Exclusion Unit's *Bringing Britain Together* report.

increase leverage from current social policy investments, particularly education, training and employment assistance.

Research

86. There is an immediate need to:

- Obtain robust quantitative and qualitative information on issues in relation to ICT access in New Zealand;
- Assess the applicability of lead knowledge economies' ICT access and e-literacy strategies to New Zealand;
- Identify possible partnership models between central and local government, Maori, community sector and the ICT industries to use ICT most effectively for community/regional economic and social development;
- Evaluate public access to online services to determine current usage, unmet demand and actions needed to increase such access;
- Investigate bandwidth and connectivity issues surrounding rural communities' access to online services;
- Quantify the benefits to be realised by individuals, communities and government of small population centres having broad bandwidth capability for social services such as health, education and access to justice, and to maximise employment and enterprise development;
- Investigate options for improving the uptake of ICT by Maori;
- Investigate options for improving the uptake of ICT by Pacific Island peoples;
- Investigate options for enabling people with disabilities to use adaptive software and hardware.

Improving Existing Government Investments

87. Government already spends considerable funds on improving people's well being and upskilling them. Officials need to identify how best to leverage off investments in education and training, community development, health, and employment assistance in order to improve ICT access and e-literacy and take action to achieve this.

Monitoring

88. Steps need to be taken firstly to ensure existing statistical surveys gather optimal information on the use of ICT by targeted groups and communities to allow regular monitoring of the access/e-literacy situation, and secondly to identify how existing data collection needs to be improved.

Raising Target Group/Location Awareness

89. Effective ways of improving target groups' understanding of the benefits of using ICT need to be explored. In addition attention needs to be given to how best to encourage regional councils and communities to stimulate uptake of the information economy to support local social and economic development.

Trials – Action Research

90. The proposed strategy will require some basis upon which to set overall objectives and outcomes. While the objectives and outcomes of overseas strategies and models can be used to some degree, it will be necessary to inform this with an understanding of the New Zealand situation: what has worked and what is likely to work. There are a number of small initiatives already underway. These need to be quickly evaluated and, if necessary, supplemented by a number of other "action research" pilots. Such action research could be done through a mixed approach. Government departments could work within their own operations to test and evaluate ways of promoting wider access to ICT. Other projects might be funded through joint community/government/private sector initiatives.

Co-Ordinating the Strategy

91. Electronic Commerce, e-Government, the digital divide, globalisation and international trade are all areas of policy interest for government, which are being driven by new information and communication technologies.

92. The interrelationships between commercial, governance, social and economic issues in respect of ICTs are extensive and wide ranging which suggest that the most affective approach to addressing these issues, and getting leverage from a range of investments, will be a co-ordinated one involving a number of agencies.

93. In the particular area of the digital divide government activity and interest is most likely to focus on the areas of community development, education, up-skilling, and improved labour market attachment. It is appropriate that the development of policy in this area should be led by an agency combining the necessary social and economic policy perspectives such as the Department of Labour.

94. The department would be able to work with and co-ordinate digital divide activities within the broader social sector with the support of social policy and delivery agencies such as: the Ministry of Education, Te Puni Kokiri, Department of Internal Affairs, Ministry of Social Policy, Ministry of Pacific Island Affairs, Ministry of Agriculture and Forestry's Rural Affairs Unit, and Department of Work and Income. This would inform the Department of Labour's participation in and contribution to the wider commercial policy development work being done through the established Electronic Commerce Officials Committee chaired by the Ministry of Economic Development.

95. This broad and interactive process should ensure that government policies and any resulting interventions are widely agreed and will provide the most effective responses to any identified problems. In order to get the best return from current and future expenditure government needs to formalise co-ordination of relevant investment across agencies. This would increase leverage to achieve key goals, particularly regional economic development and improving opportunities for Maori.

Conclusion

96. Despite a lack of comprehensive data on the number of people and locations with limited access to ICT, it appears that these are issues which need to be addressed as soon as possible if New Zealand is not to divide into a society and economy of information *haves* and *have-nots*. Such a division would compromise our ability to become an innovative and inclusive economy and society.

97. The barriers to be overcome are likely to combine attitudinal, financial, skill and infrastructure issues, and vary according to location: requiring individual solutions within a well co-ordinated national strategic framework.

98. The issue of social and economic inclusion in relation to ICT is one that other knowledge-based economies have begun to address in partnerships between central and local government, community organisations and the private sector, with government taking a leadership role. While New Zealand can learn a lot from overseas experience, it is important that any action government decides to take reflects the unique circumstances that operate in New Zealand.

99. Local government, communities, and Maori are looking for government to take a leadership role in order that significant progress can be made around these issues, and the private sector harnessed to best effect.

Appendix I: ICT Use in New Zealand

Telephones

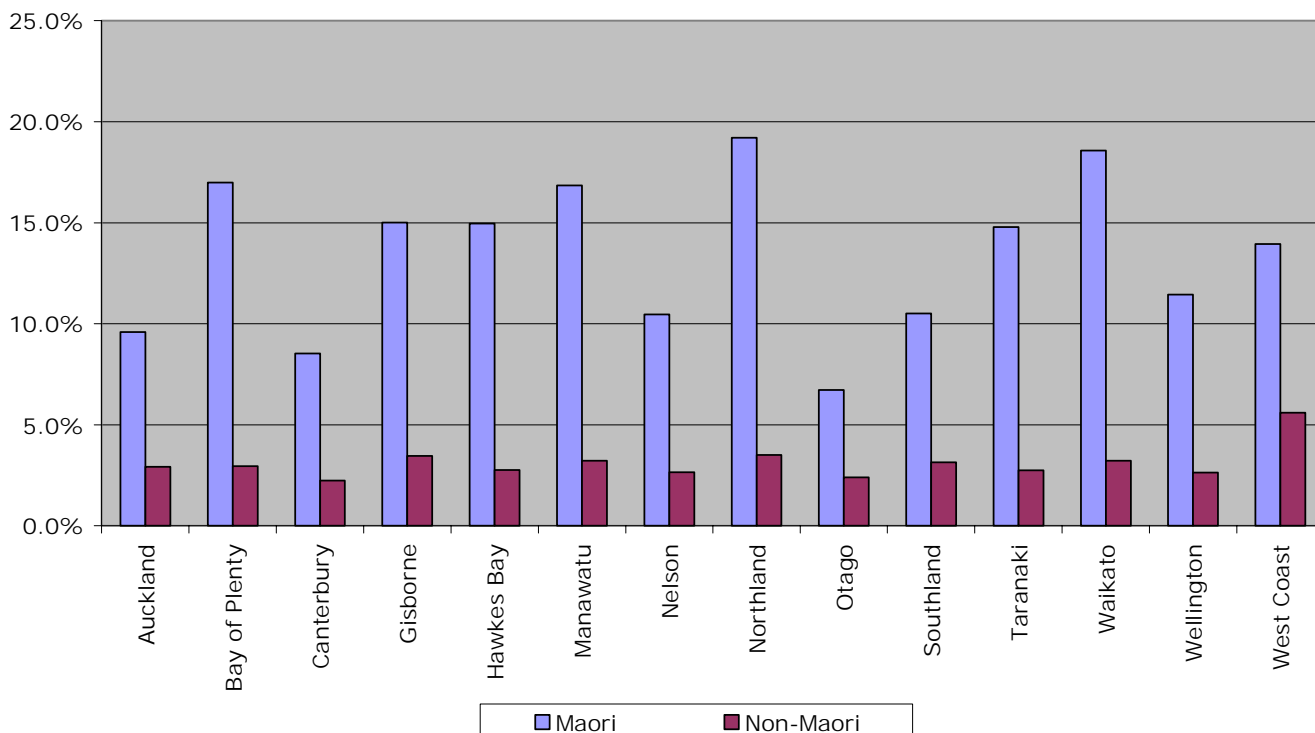
1. While not strictly ICT in the same way that computers and the Internet are (being analogue rather than digital technology), currently most people who access the Internet at home (the most common place for access) do so through a landline telephone connection.

2. While the 1996 Census data on telephones shows telephone penetration rates are 96 percent overall (97 percent in the 1998 HES), telephones are not constant across income levels, ethnicities and locations. Only 86 percent of Maori aged over 15 normally resided in private dwellings with a telephone, as did only 85 percent of Pacific Island peoples.

3. As the graph below shows, between 16-19 percent of Maori in Northland, Waikato, Bay of Plenty and Manawatu regions did not have access to a telephone, (Statistics New Zealand): rising to between 65%-75% for Maori with incomes under \$15,000 (as per second graph). However, competition in provision of telephone services since the mid 1990s has made it easier for those on lower incomes to maintain a telephone compared to the difficulties people had in the earlier part of the decade when the economy was in recession and competition was limited. In addition Statistics New Zealand report that lower income people are using cell phones for incoming calls, but resorting to landlines for outgoing calls.

Maori and Non-Maori Lack of Access to Telephones by Region

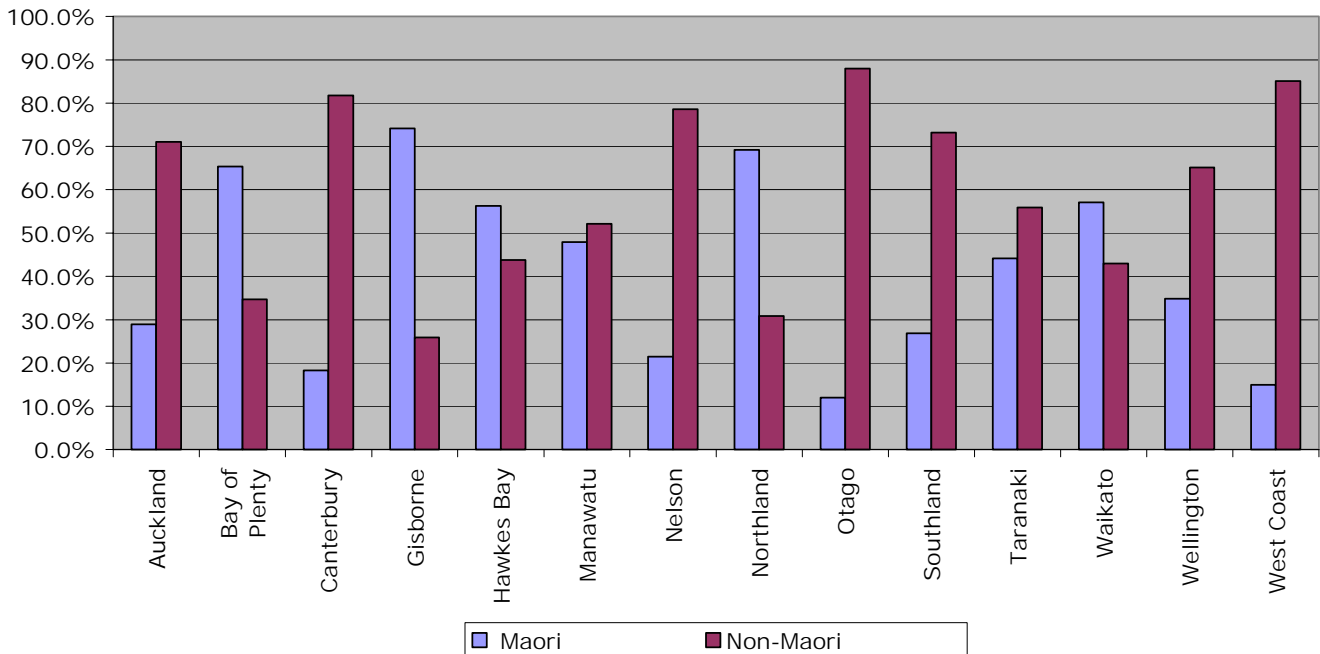
Percentage of Each Group without Phones



Source. Statistics New Zealand 1996 census

Maori and Non-Maori Lack of Access to Telephones by Income

Percentage of All Those with Incomes Below \$15,000 Who Are without Phones



Television

4. In contrast to the differences that emerge around telephone penetration, television penetration is fairly constant between income groups and ethnicities being highest for Pacific Island peoples at 97.2 percent and on average 96 percent.⁴² This may be because television is considered “better value for money” for income-constrained households: telephone use being less frequent and easier to obtain elsewhere when needed.⁴³

5. It may also reflect the fact that Maori and Pacific Island peoples value face to face communication more than voice-only communication. Some within these groups may also value technology more for its entertainment value than for other purposes, being sceptical

⁴² Jorge Reina Schement, Professor of Communications and Information Policy and member of the United States National Latino Telecommunications Taskforce, has suggested that certain information technology gaps persist more than others when they relate to information *services* which require people to make regular decisions to maintain, such as having to pay a monthly bill, rather than information *goods* such as radio and television, which are generally paid off in the short/medium term. He considers that this could explain why poorer households experience less rapid and consistent diffusion of services such as the telephone and Internet than they did with radio and television. http://www.cisp.org/imp/december_99/12_99schement.htm

⁴³ This is similar to the views expressed by medium income earning Hispanics in East Palo Alto (Silicon Valley) in an article about why they didn't buy computers or use the Internet. <http://www.pluggin.org/info/articles/sjmerc798.html>

about how computers and the Internet are going to add value to their lives for the economic sacrifices they would have to make to obtain them.⁴⁴

Computers

6. Nearly 30 percent of New Zealand households had computers as at the 1998 HES survey. However, there was a marked difference between households along ethnicity and income lines. Only 23 percent of Maori households and 17 percent of Pacific Island peoples households had computers. While 57 percent of households with incomes over \$71,600 had computers, this dropped to just over 50 percent for households with incomes from \$31,400 to \$48,999, and 16.6 percent for households with incomes below \$20,000. It should be noted that almost 50 percent of Maori are in households in the bottom two income quintiles compared with only 37 percent of Europeans (1996 census).

7. A 1998 survey by Lincoln University revealed that nearly 43 percent of farmers have computers, compared to 6 percent in 1986 and 24.4 percent in 1993. However under 30 percent of them had an Internet connection. While a further 40 percent indicated that they would connect in the next two years, this may not be possible because of inadequacies in technical infrastructure.

8. Farmers with computers tended to have larger farms, are younger, and more involved in off-farm businesses. They also had managers with higher levels of formal education. The main reasons for not owning a computer included “*no use to me*”, “*too expensive*”, “*not economic*” and “*couldn't learn how to use*”. These reasons are likely to be similar to those held by other groups. New Zealand has a large proportion of its exports still based in the primary sector. As we seek to improve the productivity of our agricultural sector and increase the skill base of all age groups (farmers' children included), the existence and potential perpetuation of these attitudes is a cause for concern.

Internet

9. A December 1998 study on Internet and Computer usage in New Zealand found that around 30 percent of people had accessed the Internet in the month preceding the study.⁴⁵ However, informed sources estimate that overall around 55 percent of New Zealanders now access the Internet.

10. The study showed that overall variation in the likelihood of having accessed the Internet in the past four weeks was best explained by age, household income and work status.⁴⁶ Users were generally younger, in higher income brackets and in work. Just over

⁴⁴ A 1998 Department of Labour study on long term trends in hourly earnings revealed that since 1984 there has been a gradual increase in earnings inequalities which is likely to make it difficult for lower income people to afford new items of expenditure, such as ICT.

⁴⁵ AC Nielsen for New Zealand Ministry of Women's Affairs and Australian Office on Status of Women, available on request.

⁴⁶ A recent Stanford Institute for the Quantitative Study of Society (SIQSS) showed that 21 % of differences in Internet access can be explained by demographic factors with education and age being the most important factors facilitating or inhibiting Internet access. This study showed that ethnicity accounted for less than 5 % of changes in rates of access. By contrast, a college education boosts rates of Internet access by

15% of people earning under \$30,000 had ever accessed the Internet compared to over 30% of those earning between \$30,000 and \$60,000. This compares with nearly 40 percent of those earning between \$40,000-\$80,000, and nearly 60 percent for those earning over \$80,000.

11. Males were more likely than females to have ever accessed the Internet. While home was the most common place for accessing the Internet, females were more likely than males to gain access through school/tech/university while males are more likely than females to gain access at work.⁴⁷

12. The sample size was insufficient to factor in ethnicity. However an AGB McNair survey (undated but likely to be 1998 also) found that 81 percent of Internet users were European, 6 percent Maori (cf 15% of pop), 3 percent Pacific Island peoples (cf 6% of pop) and 10 percent other ethnicities (cf 5% of pop). The same survey found the largest occupational group of users is students, followed by trade/technical professionals and managers.

13. An Australian Bureau of Statistics survey found that over half of all Internet households were “coupled with children” and only 13 percent were “single parent”.

14. The same survey found that nearly 55 percent of full time employed people accessed the Internet, 46 percent part time employed, 41 percent of unemployed adults and 17 percent of adults not in labour force.

New Zealand Connectivity and Community Access

15. New Zealand has a high level of connectivity to the Internet ranking fifth in the top ten OECD countries by hosts per 1000 people.⁴⁸ By February 2000 there were 48,230 registered domain names in the .nz domain. If we assume one domain name per organisation, this gives the approximate number of organisations connected to the Internet. Commercial domain name registration is growing at an increasing rate.

16. While overshadowed by the numbers of commercial domains, growth in the registration of non-commercial domains has increased by 76 percent in the twelve months to February 2000.

17. Organisations with Internet registered domain names do not necessarily have Web sites on the Internet.⁴⁹ It is estimated that as at February 2000 there were 25,342 Web

well over 40 percentage points compared to the least educated group.
http://www.stanford.edu/group/siqss/Press_Release/internetStudy.html

⁴⁷ A recent study by CIRCIT at RMIT indicated that a more pressing problem for women, than access in itself, was that of girls/women viewing technology as something which wasn't feminine and therefore not something they should be involved in studying or using. This will affect both women's ability to earn higher wages and become entrepreneurs, and our ability to encourage female students to study technology subjects to meet the growing demand for workers in these areas.

⁴⁸ The data in paragraphs 15-17 is taken from the Ministry of Economic Development's publication *Statistics on Information Technology in New Zealand 2000* (<http://www.med.govt.nz/pbt/infotech/itstats2000/>) which is compiled from a number of sources.

⁴⁹ Internet services include the two “biggies”, the World Wide Web (www) and e-mail as well as many other less popular services such as chat groups and news groups.

sites in New Zealand of which 87 percent have been set up by commercial organisations. Overall there has been an increase of 75 percent in Web sites over the year from February 1999. Some commercial web sites are registering as dot com, such as 7am.com, the international news service run from the Kaipara Harbour.

Maori

18. Of approximately 45 Iwi, only six have sites. However, many Maori organisations are likely to be under dot co or dot ac rather than dot iwi and there are an increasing number of Maori sites. While it is not possible to say exactly what use Maori are making of the Internet, anecdotal evidence provided to officials suggests that more Maori are seeing the economic and social advances that the Internet enables them to make and taking steps to increase their understanding of and expertise in ICT. This may not automatically translate into wider access for all Maori.

19. Te Kohanga Reo has completed a project to electronically link their centres through the Internet. While Te Kohanga Reo is an early childhood education provider they have a vision of themselves as a force for Maori development. Therefore, if funding permitted, they would view positively the opportunity to provide community access for Maori to utilise ICT.

Pacific Island Peoples

20. There is no data on Pacific peoples use of ICT, especially the Internet. However, at a meeting with officials to discuss the knowledge economy, Pacific Island people community representatives made the point that their families in the Pacific are more connected than families in cities like Auckland because of international agencies' willingness to fund ICT development in the Pacific. They see the Internet and computers as offering significant opportunities for their people to improve their education and employment options and to keep in touch with family more cost-effectively.

Schools

21. Increasingly schools are investing in ICT, including access to the Internet, which creates the possibility of schools providing access to the wider population. Data in the just released "ICT in Schools" survey is likely to show almost universal school access to the Internet and an increasing number of schools with ICT strategies and plans due to the funding made available to schools last year and conditional on the development of plans.⁵⁰

22. However, it should be noted that this does not mean that all computers in classrooms are connected to the Internet. Only 16 percent of schools have their own domain names. At this stage it is not possible to identify how low decile schools rate in terms of ICT relative to higher decile schools, and the degree to which schools provide access to the wider community.

⁵⁰ *ICT in Schools 1999* (March 2000). ITAG <http://www.med.govt.nz/pbt/infotech/ictschools1999/>

Libraries

23. A 1999 study by the National Library revealed that nearly 90 percent of public libraries were connected to the Internet at October 1998 and providing some form of public access.⁵¹ Almost all libraries surveyed indicated plans to expand so now this may be close to 100 percent. Motivation for encouraging public access is coming both from librarians and from the public. Key drivers for librarians are trying to improve equity of access and requests from library users.

24. Anecdotal information from the above survey indicated that a wide range of people used the Internet ranging from those trying it out before making a home purchase decision, students, people who could not afford their own connectivity, to tourists e-mailing home. Most common uses were surfing for information, medical research, technical information from specific sites, and international news.

25. Barriers to libraries' increasing access include limited:

- Financial resources and staff availability
- Commitment or support from local authorities
- Training for staff on using the Internet
- Physical space
- Funds to cover the cost of telecommunications.

26. Operational problems that constrain expansion of access centred on resources. Libraries indicated that they had difficulties in obtaining the resources to provide hardware and software, find time to train library staff and provide user support. The report indicated that these problems seem likely to continue and constrain libraries' ability to expand public access to the Internet: notwithstanding their view of its importance as a way accessing information.

Community Organisations

27. While no comprehensive data is available it appears that many community organisations see the benefits both to them organisationally and to the communities they serve, of being "wired". However it seems that many are struggling to improve their ICT connectivity, for reasons of cost and lack of skill/technical support. It is likely that the resource constraints experienced by libraries are similar to those experienced by community organisations attempting to provide public access – limited financial resources to support training staff, providing hardware and software, and coaching new users.

28. As part of their community online strategy the Department of Internal Affairs (DIA) are sponsoring a Flaxroots Technology conference in April this year for which there is a lot of

⁵¹ *The Extent of Public Access to the Internet in New Zealand's Public Libraries* (1999). National Library of New Zealand.

interest from community groups. This conference is likely to increase communities' interest in connectivity.⁵²

29. Community groups' use of the Internet still appears limited. In the central North Island a DIA field worker reports that of 370 community sector applicant groups to COGS committees covering Hauraki, Western Waikato, Hamilton City and South Waikato, only 84 organisations have e-mail. In his view the *digital divide* encompasses individuals, groups and communities across rural and urban locations, Maori and Pacific Island peoples. Out of the 141 grant applications received by the Waitakere COGS Committee, only 45 of the groups had an e-mail address and approximately half of these were the e-mail addresses of individuals in the groups, rather than a "dot org" address.

30. To illustrate the limited ability of not-for-profit organisations to exploit the value of the Internet, the National Collective of Women's Refuges has only six out of fifty refuges connected by e-mail.

⁵² <http://www.community.net.nz/flaxroots-technology>

Appendix II: Further Information on the Digital Divide in the United States

1. The information below is taken from *Falling through the Net: Defining the Digital Divide*. A complete copy of the report can be accessed online through <http://www.ntia.doc.gov>. There are also summary sheets on particular groups' situations.
2. While Black and Hispanic households are twice as likely to own computers today as they were in 1994, the gap between White and Black households with regard to computers grew nearly 40 percent between 1994-1998. The gap in regard to the Internet has grown even more. The gap between White and Black households connected to the Internet increased by over 53 percent and by 56 percent between White and Hispanic households.
3. A child in a low-income White family is *three times* as likely to have Internet access as a child in a comparable Black family. A child in a dual-parent White household is *nearly twice* as likely to have Internet access as a child in a White single-parent household, while a child in a dual-parent Black family is almost *four times* as likely to have access as a child in a single-parent Black household. A high-income household in an urban area is more than *twenty times* as likely to have Internet access as a rural, low-income household.
4. *Cost* and "*don't want to*" are the major reasons people give for not accessing the Internet. Cost was also the biggest reason people gave for dropping off the Internet. While education and income are the leading elements creating the digital divide, these factors vary along racial and ethnic lines, meaning that minority groups will continue to face a greater digital divide over time.
5. While the study was of the view that eventually falling prices may allow a greater number of people - regardless of race - to purchase computers and connect to the Internet, waiting for prices to fall is seen as a long-term solution to the racial divide. In the short-term, community access centres (such as schools, public libraries, and community centres) are seen as necessary to help to narrow the racial connectivity divide.
6. An earlier, separate study is illuminating in respect of the growth of the digital divide. A study by Owen Graduate School of Management, University of Vanderbilt, based on early 1997 data, found that nearly twice as many African/American as Whites (27.2% vs. 16.7%) stated that they planned to purchase a home computer in the next six months.⁵³ Despite this avowed intention however, the later NTIA Digital divide study found that White households continued to own computers at a rate roughly twice that of Black households.
7. The NTIA study also showed that groups that are less likely to have Internet access at home or at work (ethnic minorities, those with lower incomes and educational qualifications, and those who are unemployed) tend to access the Internet at public facilities, such as schools and libraries, for online activities that can result in their economic advancement. This includes taking educational courses, engaging in schools research or conducting job searches. The unemployed are more than *three times more likely to use*

⁵³ *The Evolution of the Digital Divide: Examining the Relationship of Race to Internet Access and Usage over Time*. Draft (1999). Hoffman and Novak. Owen Graduate School of Management. Vanderbilt University. <http://www.2000.ogsm.vanderbilt.edu>

the Internet outside of home for job searching than the national average even though they have to rely on public access points. Nearly 54 percent of those in the study who were unemployed using the Internet at home were searching for jobs online.⁵⁴

8. Certain areas of the country, usually those with a low population density, are less likely to have high rates of access. Despite issues around connectivity, this study showed that people in rural areas were taking courses at higher rates compared to those in central city and urban areas.

9. However, cost is not the only factor in relation to families without a computer. Amongst Black families earning \$15,000-\$35,000, only 19 percent owned computers compared to more than 33 percent of Whites.

10. In an op-ed piece for the New York Times, in response to the Digital divide report, Henry Louis Gates Jr made the point that few African Americans have been compelled to sign on to a medium (the Internet) that offered little to interest them. He makes the point that Blacks only began to respond to the new medium of the recorded music industry when mainstream record companies introduced so-called race records aimed at a nascent African-American market. New content made the new medium attractive.

11. Gates Jr sees the Internet as the 21st century's talking drum, the very kind of grass-roots communication tool that has been such a powerful source of education and culture for Black people since slavery. In his view, unless Black Americans master new ICT they will face a form of cybersegregation as devastating as the Jim Crow segregation was to their ancestors – a situation that Blacks themselves, as well as governments, have to address (which is being done by partnerships between Black groups and the ICT industry such as that between the Urban League and AT&T).⁵⁵

⁵⁴ In their May 1999 White Paper for clients interested in investing in the Internet recruiting industry, Thomas Weisel Partners, a leading Boston based e-commerce focused merchant bank, stated that they “believe the rise of e*cruiters will drive profound market share shifts that will forever alter the competitive landscape across the \$300+ billion of global labor market activity... every labor category and employment type will be affected.”

⁵⁵ *One Internet, Two Nations.* Henry Louis Gates Jr. <http://www.nytimes.com/yr/mo/day/oped/31gate.html>

Appendix III: Australian Information Economy Social Inclusion Programmes

1. In 1999 the Australian Commonwealth Government ran a series of initiatives to increase Australian's understanding of the online economy.⁵⁶ The aim was to:

- Help Australians succeed online
- Build Australia's online communities
- Involve Australians in the nation's online future.

2. Each month of *Online Australia 1999* had a theme based on the key areas identified in the Government's Strategic Framework for the Information Economy. As can be seen from the list below most of the months focused on social and economic inclusion including:

- April: Regional and Rural Development
- May: Small and Medium Business
- June: Government Online
- July: Health and Education Online
- August: Employment Skills
- September: Culture and Communities.

3. Longer term elements of the strategic framework are contained in the bullet points below.

Online Communities Strategy

4. Elements below, from the online communities strategy, are taken mainly from the Victorian State government's programme and include:

- Skills.net - an Internet access and training programme operated by the Victorian State government that provides free or affordable access and training to the Internet to those Victorians who would not otherwise have such access. Skills.net centres (in a variety of locations) have been designed to meet peoples' information and communication needs, provide workshops, develop web sites and raise community awareness of multi media technologies and benefits they can bring.⁵⁷ BHP sponsors a free travelling Internet classroom to reach people in regional and isolated areas of

⁵⁶ <http://www.onlineaustralia.net.au>

⁵⁷ Skills.net set a goal of having reached 40,000 Victorians by June 2001. As at 14 March 2000 they had over 7,000 members. <http://www.Skills.Net.au>

Victoria.⁵⁸ The State's Internet Service Provider hosts the web pages of 2500 community organisation.

- Vicnet. Community network site; Community managers develop electronic community networks;
- Vicnet (phase 2): provides Vicnet with additional bandwidth, server access, web and electronic tools to support these communities of interest;
- National Gallery multi media project: digitisation of collections, online databases
- Libraries online: public Internet access at all public libraries;
- Digital media library: online Cinemedia's collection;
- Catch the Net: Booklets and associated information explaining steps to gain access to Internet; and its relevance to people;
- Screen Culture and Cultural Assets: Building a showcase of the digital age and moving image, and improving access to cultural institutions through new electronic interfaces;
- Production of content: Accord for production of local online content with ABC and SBS.

Online Government

5. The strategies at federal and state level to increase the provision of government services online include:

- Project to get all Government services online by 2001 - 24 hours a day, 7 days a week;
- Business licensing/registration information service;
- Cinemedia online services: online access to Australian film, video and multi media;
- Business Channel: access to information about business;
- Better Health Channel: health information and services guide;
- Land Channel: access to all government information about land use;
- Tourism Channel: marketing Victoria;
- Education Channel: online resource for teachers, parents and students;
- Transport Channel: convenient source of information on transport;

⁵⁸ As at February 2000 the Roadshow had visited over 800 towns and seen nearly 25,000 people.

- www.vic.gov.au: easy way into government;
- VicOne: broad band network linking all Victorian government sites; and
- Rural and regional IT strategy: support for regional and rural communities to develop participation in online world.

Various State Initiatives

6. The items below illustrate the variety of approaches that have been taken to encourage optimal use of ICT both in relation to the delivery of public services and the use of the Internet by individuals to improve their well being.

7. *Online Libraries Victoria*: 43 library services representing 265 permanent libraries, 32 mobile libraries, 650 library service points. Electronic services include Internet and email access, multi media personal computers and printing facilities, CD-ROM, office software, internet classes. A small service charge applies to some services.

8. *Telehealth Tasmania Network*: The Department of Health and Human Services provides video conferencing technology to improve access to health care services for rural and isolated communities. Enables interaction between clients, primary health care workers, care providers and specialists to take place without significant travel. e.g. Clarence Community Health Centre.

9. *Tasmanian Communities Online Project*: The State Library established 60 Online Access centres throughout rural and regional Tasmania in order to provide equitable access to IT for people in remote areas.

10. *Women's Justice Network*: A network of state funded legal advice services is connected to 18 community organisations through video conferencing to provide legal information, advice and referral to women in South-West Queensland.

11. *Online WA Communities*: The WA Department of Commerce and Trade has constructed a major web service including a range of geographic portals such as Avon on Line, and virtual portals such as the TripleR Network made up of 4000 non metropolitan women.

12. *Unicode Multilingual Web Page Development*: The Maribyrnong Library has created multilingual web pages in community languages. Presently in four languages with others planned.

13. *Sustainable Communities*: The University of Ballarat in the Western Victoria region has set up an Integrated community based project to establish IT infrastructure, public access, training and support, education and health services, business and government services aimed at developing an enterprising culture in communities.

14. *North East Telecentre*: The NETC is a community based regional Network Portal providing a community technology interface, training and technical support, public and private access, and content development. Focus on regional economic and community development.

15. *Farmlink*: The Department of Primary Industries has set up a segmented database/email information service for 5000 primary producer subscribers. Provides marketing and industry information to assist in management decisions.

Appendix IV: Canada Information Economy Strategy

1. *CAP–Community Access Programme*: To help Canadians take advantage of emerging opportunities in new global knowledge based economies, Industry Canada is helping establish sites for public access in 5000 rural and remote communities and up to 5000 urban communities by March 2001. By the end of 1999 over 4000 rural and remote communities had been connected. A strong focus on the Internet as an enabler of economic and social development, information, business opportunities and skills development. Each access point has skilled/knowledgeable advisors to support users. Linked to Canada's Youth Employment Strategy to help 1000 young Canadians gain skills and work experience related to IT.
2. *VolNet*: Administered by Industry Canada to offer Internet connectivity (including computer equipment and skills development and support) to 10,0000 voluntary organisations by March 2001, VolNet is a joint undertaking by the federal government and the private and voluntary sectors guided by a National Advisory Committee of private and voluntary sector representatives and federal officials. Industry Canada has created a network of VolNet delivery agencies to provide services to eligible charitable and not-for-profit organisations. These agencies provide ongoing assistance in integrating new technologies into voluntary organisations' day to day work. NB: VolNet has just been recommended by the Irish Information Society Commission as a model for providing structured support to the community and voluntary sector.
3. *Smart Communities*: A Smart Community demonstration project will be established in each province, the North, and an Aboriginal (native) community by 2000 in order to help communities understand how to harness the power of ICT for community and economic development. Again, the driver is to show communities how to prosper in the global, knowledge based economy.
4. *Canadian digital collection*: Young people (15-30) are given entrepreneurial and technical based experience to create Web sites featuring Canada's information resources. Funding is provided under the Youth Employment Strategy. Firms, organisations and institutions are awarded contracts to hire young people to digitise their texts.
5. *Aboriginal Digital Collection*: provides a financial contribution to Aboriginal organisations and businesses selected through a competitive process, to hire Aboriginal youth to design web sites. The funding is part of the Youth Employment Scheme. The work experience is seen as giving these young people the opportunity to develop the work skills they need to compete in a knowledge-based economy and develop Aboriginal multi-media companies.
6. *Student Connection Programme*: University and college students are hired and trained as student business advisors to SMEs across Canada with hands-on, customised Internet training ranging from "getting connected" and using e-mail to advanced e-commerce and Internet banking.

Appendix V: United Kingdom

1. The United Kingdom has a comprehensive e-commerce strategy that incorporates funding and activities to enhance social and economic inclusion. These include:

- Establishing 1000 ICT Learning Centres across the United Kingdom;
- Discounts of up to 80 percent of course fees for adults signing up to improve their basic computer literacy;
- Start up funding for Individual Learning Accounts to enable people to access ICT training;
- Employees being able to borrow computers from their companies as a tax free benefit;
- An extra 50,000 free places for unemployed people, the low paid, people with disabilities and single parents to attend IT introductory learning courses;
- Access to Learning Direct, the new computer based University for Industry, from ICT Learning centres;
- Opportunities for low income people to lease computers and software similar to the process for loaning books from libraries, and be provided with connectivity and advanced online and offline learner support.

ICT Learning Centres

2. The United Kingdom government is of the view that many people, particularly in disadvantaged communities, do not have opportunities to use ICT to assist with lifelong learning to improve their skills, opportunities and quality of life. That such people are unaware of the range of opportunities available to them through ICT and how to make the most of them, and have low or no ICT skills.

3. Accordingly the Government, through the Department for Employment and Education has made £252m available to establish around 700 ICT Learning Centres across England. These Centres will be located in communities providing a local place for people to meet, learn and achieve.

4. They will provide hands-on learning for those with little or no ICT skills or access to ICT, for example helping people to:

- use the Internet to access information
- send email and use other ICT applications
- explore the opportunities information technology can offer such as further learning and updating skills.

5. Six early "pioneer" projects were established in October 1999 to test a number of issues and inform development of the programme. As can be seen from the lists below the centres reflect the diversity of locations needed to reach all sorts of learners.

- **Big Top Learning Gateway** - A mobile centre touring with a funfair and visiting 31 locations around the West Midlands.
- **Greater Manchester Bangladesh Association and Community Centre** - A community-based organisation, which deals with a large cross-section of the community, and offers ICT training.
- **Community Development Foundation** - Five small community-based projects (located in Brent, Hove, Newcastle, Plymouth and Shipley).
- **Sheffield CITINET** - Three different community based projects providing training and access to ICT.
- **Norfolk Family Learning Programme** - a project based in a health centre on a housing estate.
- **WEA East Midlands** - A learning centre set up in the Mansfield Unemployment Worker's Centre.

6. In addition 13 pathfinder projects were announced in 31 January to further test issues before the main rollout of the programme in September 2000. These are: ⁵⁹

- **The Learning Pub and The Grove Project - Stafford** - Opportunities to learn in pubs will attract new users of ICT. The Grove Project will create a "community classroom" to tempt techno-phobic parents to return to learning.
- **Burnley Football Club Adult Learning Centre - Burnley** - State-of-the-art technology is being brought into play at Burnley to encourage adult men to try their hand at ICTs. Professional mentors replace the coach, supporting older workers and the unemployed to improve their skills.
- **Walthamstow Age Concern - London** - This project will reach out to the over 50s - using laptops to bring ICT to their community and encouraging private sector support to inspire a new wave of "silver surfers".
- **Stourbridge College Centre - Stourbridge** - A mobile learning centre will bring new technology to some of those who could most benefit from on-the-spot training - such as small business men and women who cannot take time out to learn away from the shop.
- **The People's Learning Centre - Birmingham** - Local people and businesses have joined together to engage a whole community in ICT - innovations include a free computer to all who complete their training and participate in community activity, a homework club and a "cyberhood watch programme" using CCTV.

⁵⁹ <http://www.dfes.gov.uk/ict-learning-centres/int.htm>

- **Knowledge Base Ltd - Scarborough** - Four new centres and a mobile unit will provide easy access to ICT in North Yorkshire. Laptops will be used to set up access points in a wide range of locations, including pubs and leisure centres.
- **The Learning Freeway - Romford** - The project will offer a lifeline to those who feel that they cannot "get into" ICT, particularly older men. A local house on a housing estate will provide ICT training "next door" and TV and other media will make the learning exciting and appealing to a wide group.
- **NACRO Services - Sussex** - A mobile centre will visit ex-offenders and their families in the region, providing basic skills training and encouraging learners to make the step from the mobile to their local college.
- **New College - Nottingham** - A mobile centre will use satellite technology to bring new learning opportunities to isolated groups such as lone parents who cannot get to college and those who cannot physically get out and about to other learning centres.
- **Hugh Baird College - Merseyside** - The college is working with Tesco to prepare unemployed people for re-entering the labour market. ICT training will be supported by job search and careers guidance.
- **Input Output Centres - London** - Libraries in Ealing, Brent and Hammersmith & Fulham will offer training on the web to adults seeking new skills. Innovations include 24hr on-line mentoring and on-line testing and accreditation.
- **Head to Head Training - London** - This centre will offer training tailor-made to a number of disadvantaged groups - including training aimed at older men, trying to get back into the labour market, and women only groups. Using games and videos the centre is designed to capture the imagination and make ICT training entertaining and appealing.
- **Education, Employment and Training Access Centre - Leicester** - Leicester College will offer user-friendly courses in non-traditional ways, ensuring that the content of the courses keep new learners interested and wanting to learn more.