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# **A Summary of International Reports, Research and Case Studies of Digital Literacy**

Including implications for New Zealand of adopting  
a globally-recognised digital literacy standard

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## Acknowledgements

*Knowledge Weavers NZ* would like to thank the New Zealand Computer Society for their support in undertaking this research and their willingness to provide information when requested. In particular we would like to acknowledge the help and guidance received from Paul Matthews, CEO.

We would also like to thank Tony Hooper, School of Information Management, Victoria University for his review of the report and information on South Africa programmes. Additionally we'd like to thank the Microsoft NZ Management for their information on Microsoft's programmes in NZ.





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# 1: Executive Summary

“Digital Literacy is now an essential life skill and the right of every NZ citizen. ”

“Addressing ICT competence within the workforce would potentially bring about a productivity gain of up to \$1.7 billion per annum for New Zealand.”

## 1.1 Introduction

The European Union Expert Group has stated that digital literacy is an essential life skill and that *“the inability to access or use ICT has effectively become a barrier to social integration and personal development”* (DG Information Society and Media Group, 2008, p. 4).

Addressing digital literacy through government-sponsored initiatives not only improves productivity at a national, organisational and business level, but it can bring social and personal benefits to all citizens.

This review looks at international research and case studies of digital literacy to identify and predict outcomes when applied in the New Zealand context. It has summarised research from academics and leaders in the area of digital literacy, ICT and productivity. It has also reviewed a number of case studies related to ICT skills programmes around the world, including initiatives in Europe, Middle East, Africa, South America and Asia. These studies represent national-level programmes, within government agencies or large organisations as well as grass-roots, community-driven initiatives. While there are numerous studies available, only an indicative selection have been outlined in this report as they emphasise key aspects of successful initiatives echoed throughout all the studies.

The findings focus primarily around the success outlined in numerous studies around the world, primarily focusing on both workplace productivity (and the consequent benefit to a country) and e-Inclusion – significantly improving the quality of life of individuals and communities in need.

## 1.2 Key Findings

A number of key findings were identified from the research and are generally summarised in each section. However the Key Findings for New Zealand are:

**1. Digital Literacy is now an essential life skill and the right of every NZ citizen.**

While the NZ government has recognised this within its Digital Strategy for NZ, the reported initiatives in the action plan are mainly focused on the education sector. As more and more government services and other opportunities become available online, a number of NZ citizens will be unable to use these efficiently because they lack basic ICT competence. An example is older or marginalised citizens who would gain social and personal benefits from using ICT. The EU has recognised the importance of universal ICT competence at a national level and encouraged member states to develop policy and programmes to specifically address e-inclusion.

**2. Addressing ICT competence within the workforce would potentially bring about a productivity gain of up to \$1.7 billion per annum for New Zealand.**

Digital Literacy improves productivity at a national level, organisational level and individual level. Based on the results of implementations overseas, an average of between 1-3 hours a week per worker has been suggested, dependent on the individuals initial skill and the type of work. If this potential productivity gain was applied to NZ's current workforce, a conservative estimate (in time saved) at an individual level would be \$1,820.00 per annum, equalling a national productivity gain of \$1.7 billion per annum, as well as reduced workload for support staff.

**3. Adopting an agreed international non-proprietary standard for ICT skills greatly benefits both employers and employees.**

A widely accepted digital literacy standard overcomes discrepancies with the individual's assessment of their own skills and the employer's expectations. This allows ICT skill sets to meet international expectations, improving reputation of those organisations that operate internationally. In particular, as some countries have found, improving ICT competency within the SME sector based on an international standard delivers significant economic benefit to the country as a whole.

**4. To achieve positive results, programmes that address ICT competence in transitioning workers need to be encouraged at a national level.**

This is particularly important as more and more of the production-based work moves offshore. Providing ICT skills to these workers as they transition from their current job can bring benefits both to the employer and the national economy as well as to the individual themselves.

**5. ICT competence can bring significant benefit to marginalised groups, allowing these groups to participate more fully in society.**

ICT competence improves employment opportunities, overcomes isolation, builds confidence and leads to further learning. However, these programmes should be designed to meet the marginalised groups learning style and support needs. Programmes are most effectively delivered through a partnership with the support organisation or the marginalised group itself.

## 1.3 Recommendations

Based on the findings and analysis of successful programmes overseas, the following would enable New Zealand to gain the benefits achieved by other countries and organisations discussed in this report.

### 1. **Government** should take a leadership role in driving digital literacy initiatives including:

- Enhancing the initial statements within the Digital Strategy (or other equivalent policy documents) with further actions focused on addressing digital literacy for all NZ citizens;
- Adopt an international standard for ICT competency that is non-proprietary. ICDL/ECDL is recommended because:
  - It has the widest adoption and recognition both internationally and within New Zealand.
  - It has a proven international track record.
  - The *ECDL foundation*, internationally provides ongoing development and support for the standard.
  - It has an established independent and non-profit-based support and monitoring body in place through NZCS.
- Strongly promoting the ICDL digital literacy standard throughout the public sector;
- Set specific targets supported by policy (i.e. targets to address digital literacy) as recommended by the EU i2010 Action Plan, (Millard, Shahin, Pedersen, Huuijboom, & van der Broek, 2008);
- Emphasise benefits of a digital literacy programme to public and private sector employers;
- Encourage and support programmes that address ICT competence in transitioning workers, both within larger government agencies, corporates and State-owned enterprises;
- Encourage and improve ICT competence within the SME sector.

[continued overleaf...]



2. **NZCS**, as the coordinator of ICDL in New Zealand, should take a leadership role and, alongside other education-based not-for-profit organisations, significantly improve the promotion and delivery of ICDL-based targeted digital literacy programmes:

- We believe NZCS is the only truly independent significant nationwide body for the ICT profession and as a non-profit charitable organisation is the correct organisation to promote ICDL, and has an appropriate structure to drive forward a significant digital literacy programme;
- NZCS should:
  - Significantly lift the profile of the ICDL certification programme, helping to establish it as the nationally accepted digital literacy standard;
  - Coordinate a top-level taskforce with Government, business representatives, education providers, community organisations and other stakeholders to raise the awareness of the importance of digital literacy in New Zealand, and help communication and collaboration between different digital literacy programmes;
  - Emphasise benefits of the ICDL programme to public and private sector employers;
  - Work with Corporates and SMEs to assist in both upskilling and recognising the existing computing skills of their staff;
  - Develop a national programme and guidance to address e-inclusion. This should include specific initiatives to identify specific needs of marginalised or disadvantaged groups, including ongoing support;
  - Call on their membership, partners and kindred organisations to assist in rolling out the digital literacy programme;
  - Work with established community and support groups such as the 2020 Trust, SeniorNet, Aotearoa People's Network and Community Partnership Fund;
  - Determine which *communities in need* are currently not sufficiently supported and provide guidance, support, and no-cost or low-cost material to significantly improve their digital literacy level.

### **3. New Zealand businesses should:**

- Gain an understanding that as well as increasing workplace productivity, developing staff ICT competency through an on-going training programme will improve user satisfaction with IT systems and job satisfaction for IT personnel, delivering a significant overall benefit to the organisation;
- Adopt ICDL/ECDL as a recognised minimum standard for those working on computers in their everyday life;
- Make training and certification in ICDL available in the workplace, and promote the update of a programme to upskill staff, with a particular focus on transitioning staff;



## 2: Introduction

“This report investigates key impacts on workplace productivity, use of e-government (and other online) services, e-inclusion and marginalised groups.”

## 2.1 Introduction

The topic of digital literacy or its converse (digital illiteracy) is of much interest with the increasing prevalence of computers into both our personal and work life.

For those fortunate enough to have been involved with and/or used technology as it has evolved over the past few decades, digital literacy and confidence in using the technology is not an issue; we can quickly transfer from an analogue to a digital process as they become available.

However, a large portion of the world's population is not so fortunate, whether they be in developed or developing nations. For them, learning to use the new technologies is more difficult and as their governments or employers require more and more ICT capability from them, they may become marginalised.

The European Union (EU) has recognised this and through the i2010 Action Plan has provided guidance to their member states in developing programmes to increase digital literacy both in the workplace and with the community in general.

New Zealand has taken some steps through its Digital Strategy, in particular with the Capability enabler. However the main actions appear to be in the education environment with some activity in community networks, but this has yet to develop the momentum of the EU e-inclusion programmes.

This report provides a review of recent reports, case studies and research on the topic of digital literacy. Three key implications of poor (or lack of) digital literacy are discussed. It identifies key impacts of a lack of digital literacy on workplace productivity, use of e-government (and other online) services, e-inclusion and marginalised groups. It looks at three international programmes to address ICT skills within the general population, being the International Computer Drivers Licence (ICDL/ECDL), Microsoft's digital literacy programme and Internet and Computing Core Certification (IC<sup>3</sup>). It provides some case studies where these programmes have been successfully implemented.

## 2.2 Research approach

This report is based on a "desktop review" of the topic of digital literacy and ICT skills. It has looked at relevant literature available through the following sources:

- Online resources for reports and case study materials relating to digital literacy, with a focus on the larger ICDL/EDCL programme (e.g. [www.ecdl.com](http://www.ecdl.com))
- EU resources for information related to EU countries and specific EU initiatives related to digital literacy
- Academic resources, such as library databases (such as Proquest, Emerald) for articles on digital literacy
- NZ government websites for relevant material in relations to e-government in NZ ([www.e-govt.nz](http://www.e-govt.nz))

The research has been analysed to gain an understanding of potential opportunities to enhance digital literacy and basic Computing and Information and Communications Technology (ICT) skills of NZ citizens and workforce. A full bibliography of the research is provided at the end of this report.

## 2.3 Exclusions

This review did not undertake any surveys or interviews either with participants and candidates of digital literacy programmes, employers or training agencies. Whilst, this review, focused primarily on programmes overseas, Cullen & Hernon (2004) extensive report on NZ citizens use of government websites provided an excellent survey on usage in NZ. However in the five years since they undertook their research, usage patterns may have changed as more services have gone online and more citizens have had access to the internet.

## 2.4 Structure of the report

This report is structured as follows:

- Some definitions for digital literacy and associated concepts are provided based on the literature.
- The topic of ICT skills, productivity and employment is discussed. This is initially covered from a country perspective then from an organisational perspective. The need for a standard approach to assessing ICT skills is introduced and supported by case studies where companies and organisations have adopted a standard training and assessment tool such as ICDL.
- The next section explores the topic of e-inclusion and marginalised groups. It identifies the advantages of providing ICT skills to older and disadvantaged citizens based on the experiences of the European Union (EU where there has been a significant push through their i2010 e-government action plan to address this (*Millard et al., 2008*).
- The report then provides an overview of the internationally available ICT end-user qualifications and courses that have been developed to provide non-IT professionals with basic and advanced skills in using computers, the internet and common office applications.
- Based on the preceding sections and knowledge of the New Zealand environment, implications for the NZ context are then drawn.
- The report ends with conclusions based on this material and recommendations for addressing the digital literacy concerns highlighted within NZ.

## 2.5 Concepts

There are several key concepts used throughout this report. A definition for each of these is provided below.

### 2.5.1 Digital Literacy

The EU Digital Literacy High-level Expert Group suggests that “Digital Literacy is increasingly becoming an essential life skill and the inability to access or use ICT has effectively become a barrier to social integration and personal development.” That is they agree that developing ICT competency as one of the eight essential competences that every European should have to prosper in a knowledge-based society and economy. (*DG Information Society and Media Group, 2008, p. 4*).



This group provides the following definition for digital literacy “Digital literacy is the skills required to achieve digital competence, the confident and critical use of ICT for work, leisure, learning and communication”. Further “It is underpinned by basic skills in ICT and the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet.” (DG Information Society and Media Group, 2008, p. 4; Hilding-Hamann, 2009). So digital literacy includes not only the ability to use a computer for creating and retrieving files, but also the ability to interact effectively on the internet.

*Hilding-Hamann (2009)* suggests there are three components to this skill set;

- Instrumental skills – the ability to operate hardware and software.
- Informational skills – the ability to search for relevant information using digital hardware and software.
- Strategic skills - using the information for own purpose and position.

Based on the above definition, any programmes to address digital literacy must go beyond teaching the basic ICT skills of how to use the technology and include the context of where and when to apply the skills and knowledge and information so that the individual has the confidence to operate safely and securely in the online environment.

### **2.5.2 E-inclusion**

According to the European Commission Ministerial Declaration on e-inclusion; it includes “both inclusive ICT and the use of ICT to achieve wider inclusion objectives” thus e-inclusion initiatives aim “at reducing gaps in ICT usage and promoting the use of ICT to overcome exclusion, and improve economic performance, employment opportunities, quality of life, social participation and cohesion” (*European Commission, 2006*).

Based on this definition, e-inclusion is concerned with addressing the needs of marginalized groups (digitally excluded) through the use of ICT and associated ICT skills. Through this, e-inclusion aims to provide these marginalised groups with advantages that they may not have without access to the new “digital environment”. These advantages may be economic but they could equally be social or political.

### **2.5.3 ICT skills and competencies**

The ICT skills referred to in this report are based around those skills that an individual would need to use ICT effectively to complete the tasks they wish to undertake. These would include:

- Basic skills for personal and business communications (e-mail and internet usage)
- Skills related to using the computer (logging on, locating files, opening applications and uploading and saving files)
- Skills related to using basic word processing, spreadsheet and other common applications
- Advanced skills within applications (which may allow the user to undertake more complex tasks).
- As well as basic skills there is a set of knowledge around how computers and the internet operate, which is critical to allow the individual to be able to use the technology in a confident and secure manner.

When referring to *ICT skills* within the report, either basic or advanced, it is this group of skills and competencies that is being considered.



### **3: ICT skills, productivity and employment**

“Staff were more confident in using ICT and reported an average of 38 minutes day in time saved, with an estimated Return on Investment (ROI) of 162%. More importantly was the improved morale and productivity of the staff trained.”

### 3.1 ICT and the Productivity Paradox

For the last two decades there has been much debate as to whether, and indeed how, investment in ICT improves both national and organisational level productivity.

Since first raised by Eric Brynjolfsson (1993), the reason for the “Productivity Paradox of ICT” has been subject to much academic research. What Brynjolfsson reported was that although investment in ICT had increased significantly, the expected increase in productivity had not occurred. In the 15 years since his paper, research has looked at the causes of this failure and recommendations to improve it (Atkinson, 2007; Brynjolfsson & Hitt, 1998; Pilat, 2004). While researchers now agree that ICT does contribute to productivity, the direct link between investment and productivity gain is not clear cut.

Further as Pilat (2004, p.44) suggests measuring productivity gains from ICT are complex and the actual benefits may take longer to emerge than the initial studies considered. Investment beyond the initial ICT purchase is generally required to realise the full benefits of the technology and in particular investments in worker ICT skills and training pay off (Aral, Brynjolfsson, & Van Alstyne, 2006; Brynjolfsson & Brown, 2005; Brynjolfsson & Hitt, 1998)

At a global level, not all countries and regions are the same in their access to and use of ICT. The table below is based on the UNPAN e-government Readiness Report and shows percentages of population in each region who use ICT.

Region	% of worlds population	% of worlds ICT users	% of population who use ICT
Africa	14.0	1.7	1.8
Asia	56.4	34.5	8.9
Europe	11.4	28.7	36.8
Middle East	4.1	2.3	8.3
North America	5.1	23.8	68.0
Latin America/ Caribbean	8.5	7.3	12.5
Oceania	0.5	1.8	49.2

Table 1 – world population use of ICT -Source UNPAN e-Government Readiness Report, 2006

As the table shows, Northern America has the greatest number of users in relation to population, followed by Oceania. Europe has almost half of the US in terms of use, which may in fact reflect the number of countries within Europe with developing economies and less access to the relevant skills and technologies within their populations.

### 3.1.1 The US versus Europe

Productivity attributed to ICT improved in the US during the decade from 1995 leaving Europe behind. Atkinson (2007, p. 3) suggests a number of reasons why this is so. He suggests it is the pervasive use of ICT in all aspects of the economy including its use for internal operations inside organisations, transactions between organisations and most importantly between individuals (acting as both consumers and citizens) and organisations. In fact he states “ICT was responsible for two-thirds of total factor growth in U.S. productivity between 1995 and 2002 and for virtually all of the growth in U.S. labor productivity” (Atkinson, 2007, p. 3).

On the other hand although some European nations are leaders in specific ICT areas and had excelled in business to business applications of technology, Europe as a whole has not achieved the same productivity boost as the US. One reason, suggested by Atkinson (2007, p. 2) is that the labour participation rate in EU is lower than the US, due in part to its older population. 17.4% of the EU-15 nations’ population are 65 years or older compared to 12.4% of the US and this group are the lowest users of ICT. This gap, he suggests will continue to grow as will the percentage of the population in that age group, making productivity improvements critical for Europe.

As stated earlier, ICT productivity improvements on a national level are not simply achieved by investing in infrastructure and applications. ICT skills both within the workforce and in the consumer/citizen population have to be lifted to realize the benefits. The EU recognized this with its i2010 Action Plan.

Several factors need to be addressed at a national level to ensure productivity gains are achieved from ICT investment. These, according to Atkinson (2007) and supported by the initiatives of the EU include:

- Country-level policies that provide standards and guidelines to business to improve inter-organisational ICT,
- Providing tax incentives and tariff reductions to encourage ICT investment,
- Governments’ ongoing use of ICT and online services,
- Investment in the national ICT infrastructure including an ICT workforce, and
- Investment in universal digital literacy initiatives.

### 3.1.2 Country-level case studies

The following case studies show some of the countries that have adopted a national-level approach to digital literacy programmes aimed at upskilling their workforce with ICT competency. In Europe and Arabia, in particular, case studies are available where ICDL/ECDL has been used to support a national approach. Some of these are detailed below, further details and studies are available from [www.ecdl.org](http://www.ecdl.org).

#### 3.1.2.1 Italian Study

This report looked at ICT skills within the Italian working population and found that approximately 50% of the population (in 2003) were using computers in the workplace. Approximately 22% of these were classified as heavy users the remaining 78% being moderate users. The study also looked at the impact of lack of skills, for example, time spent trying to solve problems or seeking or giving help to others. They estimated this as being an overage of 2.86 hours per used per week. They then identified the impact of completing basic training (ECDL basic course) on completing basic computer tasks and on user confidence.

They found that for those with little basic knowledge the ECDL training gave strong improvement of their basic competency levels, while for those who already had some knowledge it had the effect of broadening their competence. They also found that improvement achieved differed according to the application, with spreadsheet training showing the highest level of improvement. This may indicate that staff had higher levels of existing knowledge in word processing and browsers.



Chart 1. Improvement in using applications source (Italian Informatics Association, 2004)



### 3.1.2.2 Ireland Study

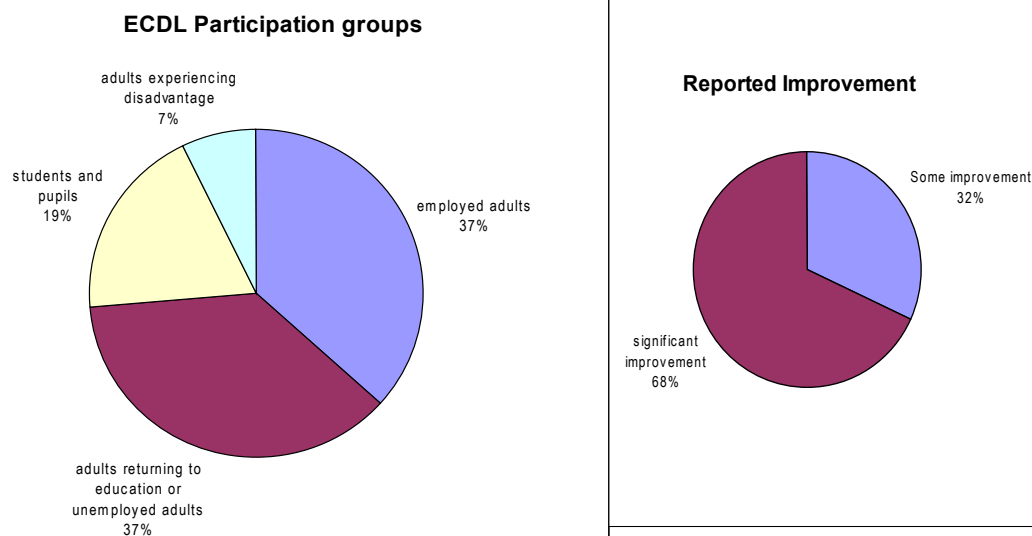
The ECDL Foundation was set up in Dublin in 1997 with a grant from the Irish government. In 2003 the foundation in conjunction with ICS Skills undertook a study of the impact of the ECDL in the Irish economy. The study found that the impact of the ECDL in Ireland could be seen in the following areas:

- building the IT certification industry
- increasing IT skills
- developing the IT training and testing services sector
- developing the IT training products sector

The study found that within the certification industry more than 1,800 organisations were involved in the ECDL programme, either as test centres or developing products related to ECDL. These “Test Centres include organisations involved in public education and training, organisations in the private and corporate sectors and training organisations in the community and non-profit sectors” (ECDL Foundation, 2003, p. 4). As a result, ECDL had provided Ireland with an industry creating jobs for a number of people whilst simultaneously improving IT skills.

Of those surveyed who were undertaking the training 37% were employed and the rest were either retraining (unemployed), students or “disadvantaged” groups.

By 2003, a total of 250,000 (6% of the population) had undergone training, and of these 77% had completed full certification and 68% reported a significant improvement in skills as shown in the charts below:



The ECDL in Ireland Impact  
2003, p. 5).

Chart 2 reported improvement in Ireland training, source: [www.ecdl.org](http://www.ecdl.org)

While there were significant benefits to Irish companies in adopting the ECDL programme, there were also found to be benefits to the country as a whole.

In particular the report notes that of those non-working groups who undertook ECDL:

- 83% of adults experiencing disadvantage achieved significant improvement in their IT skills through certification
- 76% of Irish adults returning to education or unemployed experienced a significant improvement in their IT skills (ECDL Foundation, 2003, p. 7)

The Ireland study is of particular interest because its population size and other demographics are similar to NZ. What has made ECDL a success in Ireland was the initial and ongoing support from both public agencies and private sector.

### ***3.1.2.3 Egypt and the Arab Nations***

As well as Europe, there has been a significant push to improve digital literacy at a government level within Egypt and the Arab Nations. This has, in part, been driven by the work of the UNESCO Cairo Office working in conjunction with the government organisations to gain acceptance for a standard approach to training and qualification of basic ICT skills. They have used the ICDL certification programme as a basis for this.

While beginning in 2001 with a network of only ten centres in three Arab countries (Egypt, Jordan and the United Arab Emirates) the programme in 2008 was “offered through a network of about 500 centres and is supported by approximately 200 quality assurance officers in eight Arab countries: Egypt, Sudan, Libya, Syria, Jordan, Lebanon, Yemen and Palestine” (UNESCO Cairo Office & ECDL Foundation, 2008, p. 30). The programme syllabus has been translated to Arabic to promote participation from monolingual speakers (Raddawi & Rifai, 2006).

As an example the Jordan Ministry of Education has required all employees to undertake the ICDL programme. Important to the programme’s initial success is the adoption and promotion by individual government agencies and its incorporation in university and school syllabus. Once this has been achieved, the programme (or standard) is often adopted by the private sector as well as being used to support digital literacy initiatives to disadvantaged or marginalised groups.

Table 2 shows where and how digital literacy programmes have been adopted within the Arab Nations:

Country	Government Departments	Schools & universities	Marginalised or disadvantaged
<b>Egypt</b>	Min. Com. & IT Min. Education Min. Higher Education Min. Admin. Dev. (i.e. all government staff)	All universities	Visually impaired Women
<b>Jordan</b>	Min. ICT Min. Education All govt employees	schools	Visually impaired
<b>UAE</b>	Civil Service Dept All govt staff Dept Health Min. Education Min Police	Dubai education zone Society of engineers schools	e-citizen programme Al-wathba Prison Visually impaired IRADA (special needs)
<b>Kuwait</b>	Central Agency for Information Technology (CAIT) (for all civil service staff)	All schools	Job seekers through CAIT program
<b>Saudi Arabia</b>	Min Civil Services Technical & Vocational Training Corporation Commission for Health National Information Centre (NIC)	Al Baha Uni King Fahad Uni Taibah Uni King Saud Uni Princess Nourah Schools	Visually impaired
<b>Oman</b>	Min. National Economy Min. Education Min Manpower IT Authority (for all civil service staff)	All public schools & teachers	

Table 2 Arab Nations Digital Literacy Uptake – Source [www.ecdl.org](http://www.ecdl.org) – case studies

Some examples of programmes include:

- United Arab Emirates - E-citizen programme - aims to prepare the public to use e-Services and other online services in their daily lives. It is being implemented in Abu Dhabi in collaboration with the UAE Academy and Abu Dhabi Chamber of Commerce and Industry, (IDCL GCC Foundation, 2009)
- Oman – Digital literacy programme launched in 2007 by IT Authority (ITA) to train 18 teachers, who would then go on to train others through-out the public sector. The aim of the programme was to lift IT skills within public sector organisations in Oman (Times of Oman, 2007)
- Kuwait – CAIT digital literacy programme “will offer 100,000 employees and job seekers in the government sector an equal opportunity to acquire computer skills essential in today’s workplace (Al-Sharida, 2007)

#### **3.1.2.4 Africa**

The African Nations lack the cohesive, regional approach achieved in Europe through the EU or Arabia by the UNESCO/ECDL partnership. A review of digital literacy implementation in Southern and Central Africa however shows some excellent initiatives:

- South Africa - has adopted the International Computer Driving Licence (ICDL) standard as a benchmark for digital literacy amongst all Members of Parliament and government employees.
- Senegal –developing a national programme through the Ministry of Technical and Vocational Training.
- Zambia – through curriculum in schools.
- Ghana – a partnership between Skills Matrix Ltd and the Kofi Annan Centre of Excellence was the basis for promoting skills in both government departments and private enterprises.
- Nigeria - National Information Technology Development Agency adopted the ICDL as a standard qualification and drove it through the public sector.

While the central and southern African countries have not yet achieved the spread as in Europe and Arabia, they are starting to adopt standardised ICT skills training within the public sector. South Africa in particular is beginning to drive this into programmes for disadvantaged and marginalised groups.

### **3.1.3 Summary**

Where governments and government departments have taken a leadership role the benefits have been great.

#### **3.1.3.1 National approach to standardisation**

For those countries adopting a standardised approach to digital literacy, a pattern of adoption can be identified:

- National programmes appear to be initially driven by the education or ICT agencies in partnerships formed with the not-for-profit sector.
- The first step appears to be to establish programmes within the government agencies and universities. Often all public sector staff are provided training to ensure a standard level of literacy across the adopting agency. Training centres are set up within agencies to promote the standard.
- This may then lead to the private sector companies adopting the standards for their employees.
- Once this is in place the sponsoring agency and their not-for-profit partner are able to focus on the disadvantaged and marginalised groups.

#### **3.1.3.2 Productivity gains**

- The Italian study indicated productivity gains of between 1-3 hours/week for staff who were trained. This depended on the initial level of skill and role of the staff member. Other studies report similar findings.

## 3.2 Organisational Level

While, no doubt, countries achieve productivity benefits from driving digital literacy through national initiatives, these benefits need to be clearly articulated from an organisational or commercial enterprise perspective in order to gain board-level and senior management support. Implementing a digital skills development programme within an organisation requires an investment of both money and resource and it also takes staff away from their operational roles.

The Ireland Impact study noted above found that “the most common benefits of an employee ECDL programme” include:

- establishing a benchmark of IT skills
- raising general familiarity and confidence with computers
- facilitating a work management system and internal company communication
- raising performance efficiency in the workplace

*(ECDL Foundation, 2003).*

Benefits for organisations of improved digital literacy are discussed in the sections below and they include:

- ability to innovate and improve productivity
- providing a standard or benchmark for assessing ICT skills
- efficient use of ICT support
- enabling older workers

### 3.2.1 Ability to innovate and improve productivity

There is no doubt the implementation of ICT into the workplace has resulted in changes to the way work is done. ICT is prevalent in most organisations today including government, services and manufacturing. As a result, workers using ICT can probably be grouped into different categories based on how they use the technologies to access and process information: production workers, service workers and professional workers (such as consultants, managers and members of professions).

However almost every industry in the “industrialised” world has implemented some level of ICT and requires workers to have some level of competence to complete their jobs (Pilat, 2004, p. 45). While in production, manufacturing sectors the productivity gains from increased ICT competence can and have been measured, it is less easy to do so with information-intensive “knowledge” work (Aral et al., 2006).

Current direction in ICT development is no longer implementing systems to replace routine work, but rather to design and build systems that “re-engineer” the actual business process. ICT’s role is to innovate the organisation.



For most workers this has meant retraining in the way they perform their duties. Investing in the technology alone does not necessarily bring about productivity gains. Pilat (2004, pp. 49, 52) states that “that these impacts occur primarily, or only, when ICT investment is accompanied by other changes and investments. For example, many empirical studies suggest that ICT primarily affects firms where skills have been improved and organisational changes have been introduced.”

Pilat also suggests that “real innovation can be achieved where users often help make investment in technologies, such as ICT, more valuable through their own experimentation and invention.” What Pilat is referring to here is the ability of the knowledgeable and experienced worker to add value to the way the technology is deployed through how they use it to perform their tasks. To achieve this, the worker must have both knowledge of how the technology works and the confidence to apply it. The worker must have knowledge of ICT beyond the simple procedural instructions for completing the initial task. That is the worker needs a basic level of ICT literacy (OECD, 2003).

### **3.2.2 Standards for ICT skills in the workplace**

In the studies described in the previous section, many government departments adopted a standard ICT training programme to provide a basic level of digital literacy across all staff. By adopting a non-proprietary programme with a standard curriculum employers were able to assume staff gaining the qualification had a basic level of ICT competence. The certification scheme provides confirmation of staff skills as they move positions and between employers. Without an agreed standard certification it is difficult for employers to confirm ICT competence of their new staff, unless external tests are used.

*Gibbs & Mckinnon (2009)* state that when employing business graduates onto new positions, employers make the assumption that they will have the ICT competencies required for the role. However, they often find that familiarity with computers doesn’t necessarily translate into ICT competencies required for the workplace.

The employers also suggested that the graduates’ assessment of their own skills often is higher than what it actually is. Additionally categorising skills as *basic*, *intermediate* or *advanced* may differ between the employer and potential employee. There is no agreed standard as to what is included at each level. An external standard for assessment is useful.

Most external agencies will rate skills against a proprietary application such as Microsoft Word v7, which is useful if that’s the product and version the organisation uses. However this needs to be supported by a more general assessment of the understanding of the concepts of word processing. External non-proprietary standards provide this broader interpretation.

### **3.2.3 Efficient use of ICT support**

From a support perspective, improving staff ICT competencies can have a significant effect. A large percentage of calls dealt with by the ICT support desk can be described as training-related. Further there is a hidden cost, where staff seek help from colleagues to solve basic problems when using applications. There is no doubt that as users become more knowledgeable and confident they are able to solve these simple problems themselves.

In the Italian study (section 3.1.2.1) researchers found that another result of training was the reduction in time spent in solving common problems. Overall an estimate of 118 minutes per user per week were spent on ICT related problems, this reduced by 21.5 minutes.

The highest percent of reductions were in time spent helping others, waiting for help and word processing problems. The first two areas indicate that given the confidence from training, users were more likely to get on and solve their own problems (*Italian Informatics Association, 2004*)

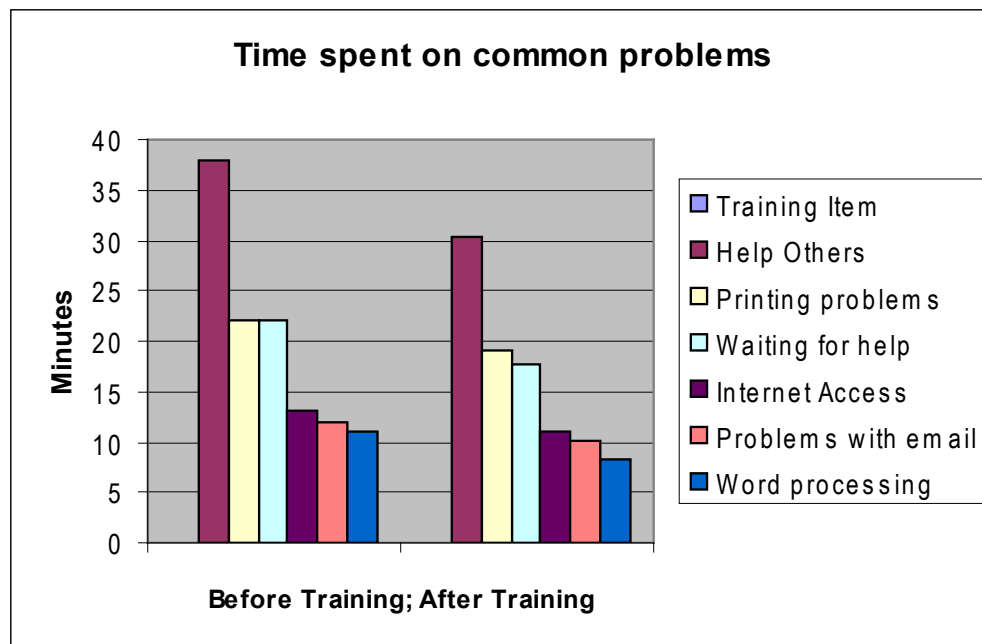


Chart 3. Improvement in time spent in resolving common ICT problems  
Source (*Italian Informatics Association, 2004*)

The costs associated with maintaining an ICT support function are high whether internal or outsourced, and ICT staff must be continually trained and updated in multiple systems and applications. Added to that, the ICT environment becomes more complex as more systems and infrastructure are added.

Not only does training reduce repeat calls to the help desk and demands on other staff time, but ICT support staff find it more satisfying solving complex technical issues. Glandon, Glandon & Boyd (2008) suggest that improving user ICT competency through an on-going training programme will improve end user satisfaction with IT support, job satisfaction for IT personnel, as well as benefit the organization.”

### 3.2.4 Older or marginalised workers

It is often assumed that while the younger generation, who have grown up with computers, have no problems with using them in the workplace, older workers have difficulty transitioning to this new environment.

Additionally, as people age they are slower to learn in general. With the increased prevalence of ICT within the work environment, older workers are more likely to become “marginalised” and encouraged to leave the workforce earlier than would warrant. With this loss goes a loss of expertise base on years of knowledge and experience within specific industries.

De Koning & Gelderblom (2006) undertook a study of older workers within two industries; printing and wholesale trade. They found that older workers in these trades tend to use ICT less and in a less complex applications and as a result tended to have more problems in its use. However they may compensate this by their broader knowledge of the task and their experience within the industry.

They also dispute the fact that learning ability of humans stays intact until a fairly high age (de Koning & Gelderblom, 2006, p. 469), and suggest that the learning ability may be related to education levels rather than age. Added to that, older workers tend to be more stable (i.e. lower job turnover) therefore from an employer's point of view, investment in training older workers has a better pay off as they tend to stay with the company longer.

As shown in the case studies in the next section, there are significant advantages to organisations in undertaking programmes to develop ICT competencies within older workers.

### **3.2.5 Public Sector Case Studies**

#### **3.2.5.1 Irish defence force**

A recent study on the adoption of ECDL in the Irish Defence Force shows significant advantages since the Defence Forces in coordination with the Irish State Department began delivering the ECDL programme in early 1997.

The programme was established to provide both soldiers and administration staff with essential skills and qualifications. Approximately 10,500 personnel have completed the qualifications. Essential to its success was establishing Test centre's within each brigade and developing 50 Office Information trainers in coaching roles.

Also important is the resulting drop in support calls to the IT helpdesk with "the vast majority of the remaining calls now usually involve an appropriate level of complexity for the people managing technical and networking issues".

Army senior management see ongoing benefits for soldiers who complete the course "The ECDL establishes a verifiable standard for everyone who uses a computer in either a professional or personal capacity," Captain Miriam McCann, Directorate of Communications and Information Services told an official Irish Defence Forces publication. "It certifies competence, states the skills attained, and prepares the individual for participation in the Information Society." (*ECDL Foundation, 2009c*).

#### **3.2.5.2 National Health Service, Wales**

A survey conducted by Informing Health Care of NHS staff who had completed basic ICT competency training (*ECDL*) found that staff reported an "increase in confidence in undertaking computer tasks, and also towards other general life skills, and staff with clinical contact reported a perceived improvement in the quality of care they gave".

The report was based on a survey of 1617 staff across 22 health care providers. The improvement in productivity came from two aspects resulting from the training; better access to information and more time available for patients (i.e. able to complete computer-related tasks more efficiently) (*Informing Health Care, 2009*).

#### **3.2.5.3 Manchester Health Authority**

Manchester Health Authority established a project to train staff with basic ICDL literacy.

The phase 1 report indicated that following training all staff were more confident in using ICT and reported **an average of 38 minutes day in time saved**. Considering the costs involved in the study and an average salary of £15,000, the authority estimated a Return on Investment (ROI) of 162%. More importantly was the improved morale and productivity of the staff trained. (*ECDL Foundation, 2007b*)

## 3.2.6 Private Sector Case Studies

### 3.2.6.1 *Toyota Tsusho Africa*

Toyota Tsusho Africa (Pty) Ltd is a wholly owned subsidiary of Toyota Tsusho Corporation, has distributors in seven countries in Africa and employs 1300 staff. These staff come from a variety of educational backgrounds, with differing levels of literacy and ICT skills. In 2008, Toyota Tsusho established the ICDL Start Certificate as a prerequisite for all staff using systems.

Initially 400 staff were trained and their feedback was positive, reporting that the skills gave them benefits beyond their immediate job. The company's ICDL co-ordinator reported "It was amazing to see the improvement in productivity and confidence of the staff who have completed the ICDL," (*ECDL Foundation, 2009b*)

### 3.2.6.2 *Emirates Airlines*

Emirates Airlines established an ICT skills training program (ICDL) for two reasons, to boost competency within their workforce and to provide their air cabin crew staff "with essential skills to diversify their competence and enhance their job prospects when they exit".

Due to the nature of the job, air crew often find it stressful both on their health and personal lives resulting in high staff turnover. The airlines recognized this and provided the in-house training as a mechanism for staff to re-skill (*Reem, 2009*).

### 3.2.6.3 *Hallmark consumer services*

Hallmark Consumer Services provide direct mail and order fulfilment for mail order and internet-shopping sites. Its clients vary from start-up businesses to major global companies. In 2004 there was a shift in their work from bulk orders to more individual orders as a result of the increase in on-line consumer shopping. They realized that in this environment a faster turn around of order fulfilment was required and to achieve this, they would need to better utilise ICT.

A new warehouse system was designed and built. However "the warehouse staff were loyal and long-serving but with few educational qualifications and little or no experience with IT equipment, either at home or work." They deployed ECDL as the standard training for staff, using an external trainer, in a train the trainer approach. However the trainer did not take account of the low initial skills of the staff and as a result the course was not designed to address this. Staff became de-motivated. However two staff did complete the training and they went on to train others.

It took some time but eventually most staff acquired the skills needed and productivity increased. Hallmark has cut pick time per item from 35 seconds to 25, saving around £3,000 a year, and is on the way to achieving a target of 20 seconds. "Members of the warehouse pick-and-pack team have broken the barrier of using IT hardware and software. This has not only encouraged others in the warehouse to use IT but has also enabled the company to develop other IT applications for them."

Staff now confidently use Excel and other applications and Hallmark has been able to extend its services and gain new clients. Most importantly they have been able to retain staff in the new environment (*Pollitt, 2009*).

### 3.2.6.4 *Malaysia standard certification for Small and medium enterprises (SMEs).*

In May 2006, the Malaysian government established an agency Small and Medium Industries Development Corporation (SMIDEC) to promote the development of SMEs in the manufacturing sector.

One of the key supports offered by SMIDEC is a human capital development programme which provides training in ICT skills, and management. As part of this programme SMIDEC has developed a project to assist local SMEs in Sarawak province to obtain ICDL core certification for all their employees. The main objectives of the project were:

- To certify Small and Medium Enterprises to a global ICT competency standard
- To engage in good practice adopted by other countries in Europe and the Middle East
- To eliminate time wasted on the computer by increasing usage productively
- To increase the competitive level of local SMEs to a global commercial level
- To validate the skills of every employee who had trained on an ICT programme
- To increase the ICT literacy of all SMEs staff toward Malaysia's vision of an Industrialised Nation by 2020

Because of the success of the initial project MMIDEC plans to extend it to other provinces.

### **3.2.7 Summary**

From an organisation perspective, adopting a digital literacy programme brings significant benefits:

#### **3.2.7.1 Productivity**

- According to Manchester Health Authority average time saved per staff was 2-3 hours per week (based on 38 minutes per day)
- Productivity gains are not just for those staff alone who receive training, but also significantly their colleagues and ICT support staff who are freed to focus on more complex applications.
- Improved staff morale (as staff feel both more confident in using the technology and valued because of the employers investment in them) adds to productivity.

#### **3.2.7.2 Recruitment**

- A standardised (and non-proprietary) approach to assessing ICT skills ensures that prospective employers, recruitment agencies and candidates have the same assessment levels around ICT competencies.

#### **3.2.7.3 Small to Medium enterprises**

- SMEs often lack the knowledge and resource to invest in ICT competence programmes, yet they form a large part of many nations economy. Malaysia has seen the economic benefits of developing an ICT competence programme for their SMEs. Other nations may benefit from this type of initiative.

#### **3.2.7.4 Transitioning employees**

- As the Irish Defence Force and Emirates Airlines found, employers can provide benefits to transitioning employees by providing them with basic ICT competency. This allows employees to consider new work options, but also ensures that employees can retain knowledgeable and loyal employees as the work process becomes more digital.

#### **3.2.7.5 Partnership with not-for-profit training and standards body**

- One of the key factors behind the successful implementation of the digital literacy programmes with the organisations in the case studies above has been the partnership with the training and standards body (ie NZCS is New Zealand's case). This body provides the course materials, trains the trainers and issues the certification. It also provides ongoing monitoring and guidance to the in-house programme.





## 4: E-inclusion

"One [blind] girl stated 'ICDL eliminated the difference between us and the sighted'. Her new competency has not only given her employment but significantly enhanced her life."

## 4.1 Introduction

As much as digital literacy is critical for a nation's workforce, it is also important for participation within today's digital society. In today's digital economy, not only do people need to be able to use ICT effectively to interact with government but it can also add value to their personal and commercial lives.

According to Atkinson (2007, p. 10) "To succeed in today's economy, people need basic familiarity and understanding of a computer and Web skills." He further adds "Governments need to do more in partnership with the for-profit and non-profit sectors to spur digital literacy and take-up". Atkinson echoes other commentators on emphasizing governments' leadership role in promoting digital literacy to all groups of society.

The Riga Declaration urged EU Member States to develop initiatives to address ICT skills gaps to allow all citizens to benefit from ICT in their daily lives. The declaration noted that "57% of individuals living in the EU did not regularly use the Internet in 2005; only 10% of persons over 65 used Internet, against 68% of those aged 16-24; only 24% of persons with low education used the Internet, against 73% of those with high education; only 32% of unemployed persons used the Internet against 54% of employed persons" (*European Commission, 2006, p. 1*).

Based on this declaration the EU developed its i2010 Action Plan which specified five objectives:

1. No citizen left behind (inclusive eGovernment)
2. Making efficiency and effectiveness a reality (high user satisfaction, transparency, accountability and administrative burden reduction)
3. High-impact key services for citizens and businesses (e.g. eProcurement)
4. Putting key enablers in place (e.g. eIDM, interoperability and open standards)
5. Strengthening participation and democratic decision-making in Europe (e.g. online public debate and participation). (*Millard et al., 2008, p. 11*)

E-inclusion relates to the first objective and encouraged Member States to develop specific programs aimed at marginalized groups. This suggests a shift from an agency approach to a user-centric approach when planning and delivering e-government services.

The EU recognized that increasing the ICT competency in these groups not only allowed them to participate in online government services, but also gave them access to other advantages such as employment opportunities. There were benefits to the government as well as the individual in developing and delivering ICT skills development initiatives to these groups. The following groups have been identified:

- Low education
- Older Citizens
- Physical impairment
- Disadvantaged Citizens

## 4.2 Low Education

Specific EU nations have higher education levels than other “developing” nations. However, given movement of populations within these countries and influx to wealthy nations of economic migrants, many of the developed nations have groups of citizens with low education levels.

As shown in the table below, use of ICT is dependant on education levels and those with lower levels are less likely to use this technology:

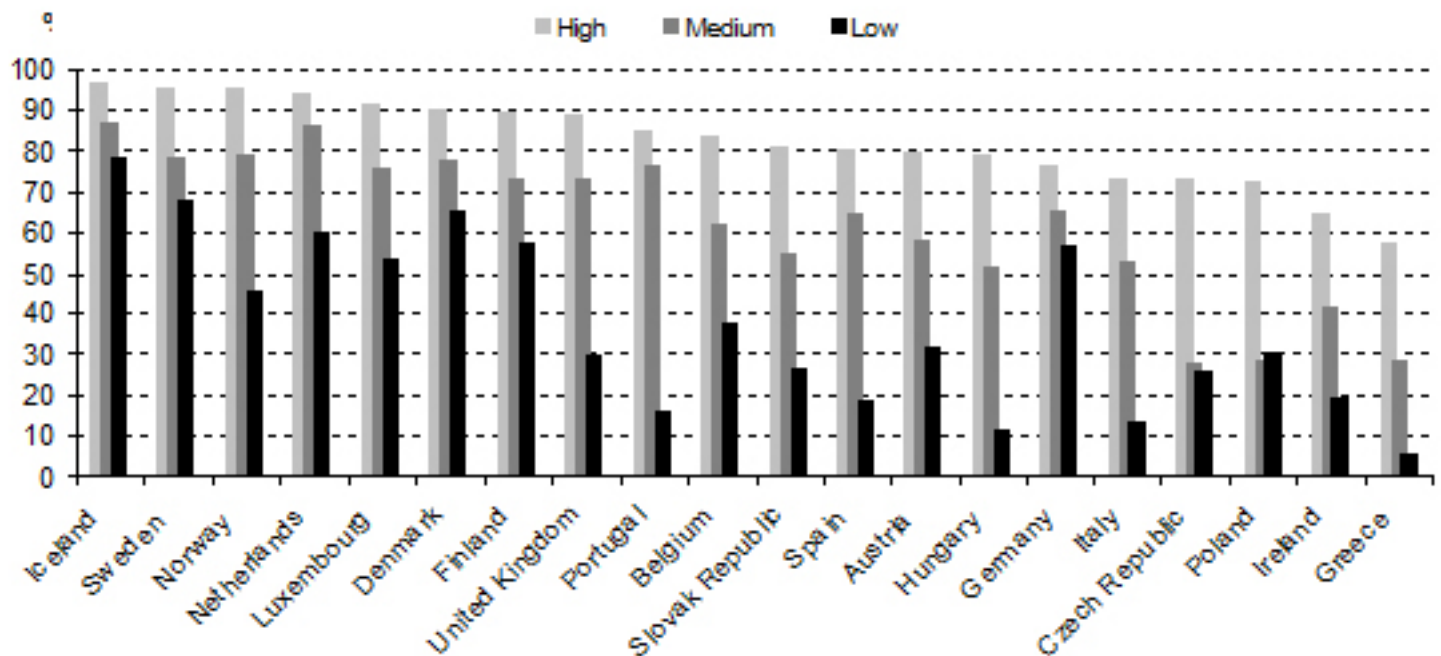


Chart 4, EU Internet usage based on education levels: Source OECD

As the table shows, the differential between the high and low education groups in their ICT use varies between countries. In Iceland and Germany the gap between high and low educated groups is low (less than 20%) whereas in other countries; Portugal, Hungary, Italy for example it is greater than 55%. This is due most like to both access to the technology and ability to use it (ICT competency). Even in the UK where many programmes have been established to provide access to ICT, the gap remains greater than 55%.

Increasing ICT competency in low educated group has a two-fold effect; not only does it increase their employability (many jobs now require a basic level of ICT competency) but it also allows them to access other e-learning opportunities and therefore further develop themselves.

### 4.2.1 Case studies

#### 4.2.1.1 South African Prisons

The Department of Correctional Services (DCS), in South Africa adopted the ICDL programme to up-skill the ex-offenders and empower them with employment opportunities. In the initial project some 50 inmates received training and a number moved into employment using these skills on their release. The programme has now been rolled out across a further 10 centres.

DCS found the benefits extended beyond inmates gaining employable skills, it improved self esteem and changed the candidates' outlook on life.

#### **4.2.1.2 Chile Unlimited Youth Project**

Unlimited Youth project is an ICT training and certification programme for poor and unemployed youth in Chile. Candidates receive a 50 hours ICDL training course and a test to become ICDL certified.

The programme is sponsored in part by Microsoft Chile and ICDL Chile, but also involves a number of other public and private organisations. These organisations also assist with job placements for the trained youth. The aim of the project is to train and place 100,000 of Chile's poor and unemployed youth. (*ECDL Foundation, 2007a*).

### **4.3 Older Citizens**

The EU has recognised the aging populations within the developed Member States. Older citizens fall into two groups, those nearing or in early retirement and those significantly older citizens. Each group will have different needs and are not strictly categorized by age but by other factors. Both groups will vary in terms of the education levels and wish to use ICT. In both groups there is a wealth of knowledge and experience that could provide a valuable contribution to society.

The first group may have reasonably good health and still wish to have active participation in workforce; they may be looking for opportunities to fill leisure time. They are able to attend classes and utilise their skills to for information gathering, participating in community activities and purchasing online services.

The second group may have age-related health issues and may become less mobile. They may be less inclined to learn to use the new technologies because of a lack of confidence and familiarity. However, there is value to this group as ICT provides them access to services from home and may assist with overcoming the isolation associated with being home-bound.

There are a number of advantages both to governments and citizens in developing ICT competence among older citizens. These include:

- Access to online services (shopping, travel and e-government)
- Ability to connect with friends and family who are physically distant
- Ability to participate in online social networks to overcome isolation
- Access to information and e-learning opportunities
- Ability for contribute back to society through community participation and knowledge sharing online,

E-inclusion initiatives for older citizens have found that training needs to be delivered in such a way that it builds the confidence in these groups and provides for on-going support. In the second group, this is often best achieved in the home on a one on one basis.

### 4.3.1 Case studies

#### 4.3.1.1 *IST eInclusion@EU project*

This programme was set up by the Information Policy group of the EU:

- to provide initiating a Europe-wide dialogue among those working for an accessible and inclusive Information Society
- establish a knowledge base that will provide a resource on key eInclusion and eAccessibility policies and practice

Although not specifically a programme to increase computer literacy of older citizens, this project and its final report, identify a number of key areas to address in regard to Europe's aging population. These include:

- Providing opportunities for older workers to participate in the labour market, emphasising the importance of ICT competence as an enabler to continued employability.
- Providing pathways into retirement and reduced working hours through use of ICTs. As well as allowing these older workers to continue to contribute their expertise back to the workplace, through being connected through ICT.
- Ensuring government online services are "age-friendly" and that the older citizens have the confidence and competence to use them.
- Leveraging online services to enable vulnerable people (including elderly) to live independently, for example remote health monitoring services.

This report provides guidance to member states in developing and implementing programmes to both develop ICT competence in older age groups and improve services to this group through use of ICT (*Information Society Technologies, 2007*).

#### 4.3.1.2 *SeniorNet NZ*

This program offers NZ Citizens who are over 55 with ICT training through 88 learning centres through NZ.

This program is partially sponsored by Telecom NZ. As well as training, the organisation has also sponsored research into the ICT training requirements of this age group (*The Federation of New Zealand SeniorNet Societies Inc, 2009*).

## 4.4 Physical Impairment

Individuals may lack access to ICT because of physical impairment, such as blindness. These groups can easily become marginalised unless training is catered for them, and there is a cost associated with this.

On the other hand, ICT can be a great leveller and provide members of these groups with an opportunity for active participation both in employment and the wider community. There are many examples of successful digital literacy initiatives aimed at these groups.

### 4.4.1 Case study

#### 4.4.1.1 *Southend Transition Computer Recycling Programme*

This programme is aimed at the unemployed and disabled and was developed in partnership with Seetec a local IT Training, support and recruitment company. The programme lasts 26 weeks, of which the first 13 weeks are spent by the beneficiaries studying for the internationally recognised ECDL, providing them with the knowledge to handle generic office applications such as word processing, spreadsheets, databases, presentations, and using communications tools such as the internet and email.

The following 13 weeks are spent in intermediate employment where they can consolidate these skills. Participants report that the programme not only gives them skills but gives them confidence for ongoing employment.

#### 4.4.1.2 *Croatian library for blind.*

With the project 'ECDL as a window to the World', ECDL education and certification ICT skills were provided to blind citizens.

With digitalized books and other printed materials, provided either over the internet or on CD's, visually impaired were able to access information and training. Visually impaired citizens were able to achieve ECDL certification at a reduced cost and achieve skills for employment. The project was sponsored by the Croatian Ministry of Health and Social Services (*ECDL Foundation, 2009a*).

#### 4.4.1.3 *Saudi Centre for Rehabilitation and Training of Blind Girls*

Jordan has adopted a number of initiatives to provide ICT skills to blind citizens including this project with blind girls. The teachers have build up significant experience working with visually impaired.

In this particular case study, twenty-one girls in the Saudi Centre excelled in passing all ICDL modules with scores above 95% with an average time of 50 minutes to complete the test.

Completing the training has made a significant difference to the lives of these girls. One girl, Heyam, stated after receiving the ICDL Certificate "*ICDL eliminated the difference between us and the sighted; we now both have the ICDL Certificate*". She has now gone on to employment within the centre and finds one advantage is her ability to send and receive emails to friends and colleagues. In other words her new competency has not only given her employment but enhanced her life.



## 4.5 Disadvantaged Citizens

Citizens may be disadvantaged because of poverty, citizenship (e.g. refugee populations), gender and employment status. Many of these disadvantages are linked for example refugees may not be able to work and may also suffer from poverty and lack of education. For refugee populations language may be a barrier as well. Providing digital literacy training to these groups is key to their participation in society and addressing this has been a key driver of the EU i2010 Action Plan. If not addressed the gaps between this group and the advantaged groups will become wider (*Harfouche & Kalika, 2009*)

Supporting the training is access to computer technologies themselves, as this group is least able to afford the investment in ICT.

### 4.5.1 Case study

#### 4.5.1.1 Austria's Road to Employability - Caritas

This programme is aimed at "at risk" women. "Many are immigrants who also face a language barrier and cultural separation. Many others have little formal education, come from broken homes or violence, and have children but not the means to care for them (*West, 2008, p. 2*)."

Key to the programme is to enable the women to feel successful, where they have failed or been excluded in other areas of their life. So the training needs to be slowed down to enable the women to achieve, while dealing with the other issues on their lives.

"Elizabeth, the project coordinator, emphasizes the need for a slow approach... She emphasizes "fun and playfulness" in order to reduce fear. 'They are afraid of breaking the hardware' Elizabeth explains." (*West, 2008, p. 3*)

One strategy the programme has adopted is to use other women as trainers as it allows the women to feel more relaxed. Once they have achieved their basic ICDL literacy they often feel confident to undertake further training. They also feel more "included" in society and establish better connections with their families.

#### 4.5.1.2 UK Online project

UK has established about 6,000 online centres to provide free or low-cost access to computers and the Internet, combined with help and advice on how to use them. UK online centres claims to have 2m users learning each year, 73% of whom have one or more disadvantage, such as a low level of education or low income (*Ernest-Jones & Witchalls, 2008, p. 10*).

While the project is publicly funded, it is not managed by a government agency. 50% of the centres are either attached to libraries, with 2 fulltime staff partially supported by volunteers. There are close links to local community or voluntary organisations which support a specific target group. These links are important in pulling in the target groups. Regional coordinators and an online portal are key to keeping the organisation running and everyone in the dispersed network able to communicate.

## 4.6 Summary

### 4.6.1 Benefits of e-inclusion initiatives

From an e-inclusion perspective; digital literacy initiatives can provide several advantages. These include:

- Allowing disadvantaged groups to become more connected to the digital society and better able to participate in the society.
- Enabling disadvantaged groups access to employment and learning opportunities that they would not otherwise have
- Providing the elderly and disabled access to online services and overcoming some of the isolation caused by their disabilities
- Benefiting society as a whole by alleviating the social and economic burdens as these groups are able to become more self-sufficient and able to contribute back into their community.

### 4.6.2 Delivering e-inclusion initiatives

From a review of e-inclusion initiatives, there are some important considerations that enable these to be more successful (*Ernest-Jones & Witchalls, 2008, pp. 3 - 4*).

- Training programmes need to be adapted to the target group. Some are better delivered within a classroom environment and others may work better if delivered through volunteers within the individual's home environment.
- Courses need to be tailored to the skill levels of the target group and their situation.
- Benefits of ICT competence need to be “sold” to the target group and their funders
- The initiatives are often better delivered through established not-for-profit or community groups, in partnership with a central agency. Funding can be a combination of public and private sector.



## 5: International Standard Qualifications

"ICDL/ECDL is the largest programme in the world, available in 148 countries world-wide and has achieved over 9 million participants."

There are three major international programmes aimed at providing a digital literacy qualification within the general user public. Each programme has a basic level qualification as well as advanced levels of achievement.

## 5.1 ICDL/ECDL

ICDL (or ECDL in Europe) is the primary international digital literacy standard, with over 2 million more participants than all other recognised programmes combined.

European or International Computer Drivers Licence (ICDL/ECDL) was the result of research undertaken by a task force comprising the Council of European Professional Informatics Societies ([CEPIS](#)), supported by the European Commission to examine how to raise the levels of digital literacy throughout Europe.

It was launched as the European Computer Driving License (ECDL) in Sweden in August 1996 (*ECDL Foundation, 2008*). In 1999, as growth and adoption of the standard had increased in Europe, the international (ICDL) version was introduced to bring the certification to other countries such as Africa, South America and the Arab states.

The certification now has worldwide adoption, mainly sponsored through national computer societies and international organisations. It has a particularly strong presence in countries such as Egypt and the Arab states where ICDL has been adopted as a national standard. It has even been translated into Arabic to allow Arabic-only speakers ability to gain the qualification (*Raddawi & Rifai, 2006*)

The ICDL/ECDL programme is the largest programme in the world, available in 148 countries world-wide and has achieved over 9 million participants. A range of modules are available from foundation level through to advanced and specialised.

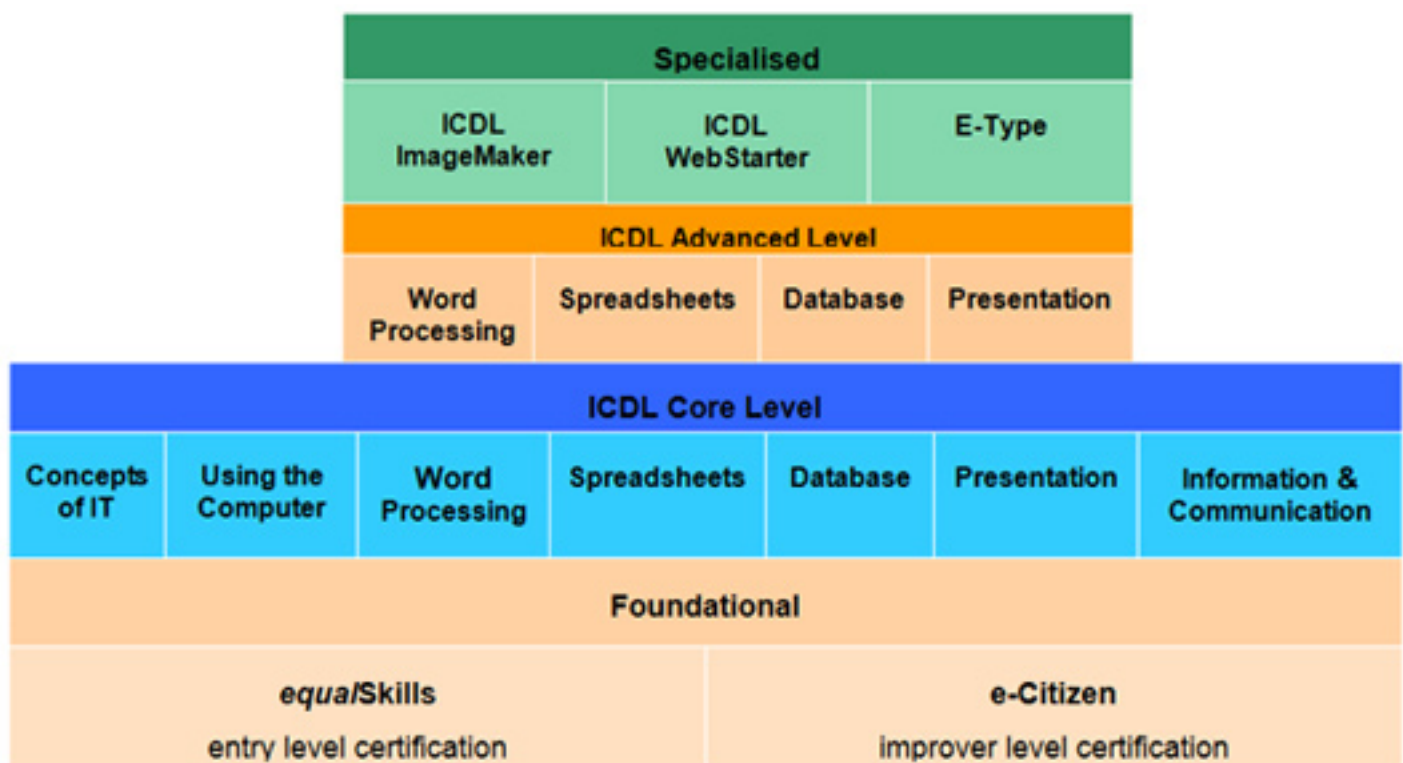


Diagram 1 ICDL/ECDL digital literacy programme

The advantages of ICDL/ECDL are:

- Wide international distribution and acceptance of the qualification.
- Availability of course content and modules through a number of distributors
- It's available at foundation, basic, advanced and specialised levels.
- Its available both as classroom and on-line training
- The support of the *ECDL foundation* which ensures its ongoing development and currency of course content
- Its non-proprietary nature, it is not bound to any particular vendor products and is available for most platforms.
- Certification test centres are monitored and approved against the international standard

## 5.2 Internet and Computing Core Certification – IC<sup>3</sup>

Offered by Certiport, based in the US, IC<sup>3</sup> is aimed at students and those entering the workforce. It is provided through online courseware comprising three modules.

- Living online – covers networks, internet, electronic communications and collaboration software as well as the impact of computers and internet on society
- Key applications – covers word processing, spreadsheets and presentations
- Computer fundamentals – covers computer software, hardware, peripherals (digital cameras etc) and how they work together. Most common operating systems are covered including Windows, Macintosh and Linux. It also covers dealing with common problems and issues such as changing settings, (*Certiport, 2009*)

Students are able to take exams with certificates issued by Certiport through exam centres.

## 5.3 Microsoft Programmes

As well as supporting ICDL/ECDL in many countries, Microsoft offers a basic Digital literacy programme via their website (*Microsoft, 2009b*).

Their curriculum consists of five modules:

- Computer basics
- Internet and World-wide web
- Productivity programs
- Computer security and privacy
- Digital lifestyles.

Course material and certification are completed online, therefore there is no independent assessment.

Microsoft also offers business information professional certifications which consists of two credentials:

- Microsoft Certified Application Specialist (MCAS)
- Microsoft Office Specialist (MOS)

“Both credentials feature Web-based pretests, application-specific certification exams, and a series of Microsoft Press step-by-step books that help you demonstrate expertise in accomplishing essential job tasks across multiple applications”. (*Microsoft, 2009a*)

These qualifications would be considered more advanced than basic ICT competency.





## 6: New Zealand Context

"An annual productivity gain of \$1.7 billion (\$17b over 10 years) is significant and it is based on the assumption that 70% of the workforce could achieve productivity improvement."

## 6.1 Government Direction

New Zealand's Digital Strategy is governed by the Energy and Communications Branch of the Ministry of Economic Development. Although not currently active, Version 2 was released in 2008, (*Ministry of Economic Development, 2008*), with the purpose to:

- provide a national vision, supported by outcomes and goals for New Zealand's digital development;
- highlight opportunities and challenges in the digital world;
- provide a call to action for all stakeholders to rise to the challenges and opportunities presented by the digital world;
- clearly articulate the government's role in digital development; and
- outline the key actions through which government will fulfill its role in supporting digital development

This is to be achieved through a number of enablers; connection, confidence, capability and content. To date there has been much focus on building connectivity through broadband initiatives and other initiatives within public sector and community groups to build digital content.

For this report, the key focus area is covered by the capability enabler; to provide all New Zealanders with the skills to participate in the digital world. This area has the following goals:

- Ensure universal digital literacy.
- Adapt and build on existing models to create grassroots/flaxroots whole-of-community digital capability.
- Strengthen the workforce for the local ICT industry.
- Promote digital careers.
- Provide guidance on industry and community training needs.
- Understand the changing nature of ICT skill shortages.
- Attract and retain highly skilled ICT practitioners in a globally competitive market.
- Equip decision-makers to make smart decisions about ICT investment and use."

*(Ministry of Economic Development, 2008)*

Most of the initiatives outlined on the website are focused on promoting ICT skills within the educational environment. There is, however some mention of community programmes delivered through Aotearoa People's Network and Community Partnership Fund.

"This Strategy contains a **commitment to rollout a national network of digital hubs**, building on the successful start made by the Aotearoa People's Network, which provides computers, training, mentoring and internet access in public libraries. These hubs are a key part of the Strategy's commitment **to digital literacy** – giving New Zealanders the skills and confidence to use digital technologies. For some communities, a marae, a computer clubhouse in a school or a scheme that puts computers in homes may be the best starting point for providing inclusive access to the digital world." (*Ministry of Economic Development, 2008*)

## 6.2 Implications for NZ

This section explores the implications of the studies outlined in this document if they were to be applied in a New Zealand context.

### 6.2.1 Productivity potential

One thing very clear from all studies and research is that the implementation of a digital literacy programme within a workplace significantly improves the productivity of the workforce.

Whilst it is difficult to quantify the likely productivity improvement if a programme such as ICDL was adopted en masse in New Zealand, this section contains a very conservative estimation of the productivity benefit for New Zealand.

The Statistics NZ website reports 1,360,000 FTE employed within NZ as at June 2009 with an average hourly rate of \$23.29 (Statistics NZ, 2009). Of these employees, a percentage, conservatively 70%, would increase productivity given basic ICT training as per the case studies mentioned in this document.

Given that skills range within the group would vary, an estimated improvement of 20 minutes a day or 1.7 hours a week is suggested, taking a conservative view from the studies outlined.

The table below shows the potential productivity gain for NZ, if all employees who used ICT within their work were able to achieve a productivity gain of 20 minutes per day:

Employed Population	1,360,000
Population benefiting from ICT competency	952,000
Average hours gained per employee per year (47 weeks)	78
Average \$ saved per employee	\$1,820.00
<b>Annual potential productivity gain for NZ</b>	<b>\$1,733,856,656</b>

Table 3 Potential Productivity gains based on NZ working population

**An annual productivity gain of \$1.7 billion** (\$17b over 10 years) is significant and it is based on the assumption that 70% of the workforce could achieve productivity improvement. In saying this, there are some factors to be aware of; some workers currently use ICT effectively. For some roles, ICT plays a minor or limited part.

On the other hand, the potential to use more ICT within the NZ work has not been fully tapped. Some other countries (e.g. Malaysia) have seen the potential of improving productivity within their SMEs through nationally funded and driven ICT competency programmes.

The New Zealand SME sector provides a large percentage of the economy and the self-employed may not be fully included in the employment statistics above. Another area of productivity gains in the farming sector, where ICT now forms a key part of managing New Zealand farms. Focusing on the ICT skills within this group would also provide significant gains.

## 6.2.2 Older Citizens

Like Europe, NZ has an aging population. It is agreed that this group will need to actively participate in the workforce beyond the current retirement age of 65. The case studies provided in this report indicate that ICT competency will enable citizens to contribute effectively both to the economy and to the community into their “retirement”.

Further digital literacy will assist with overcoming some of the issues of isolation and need for increased medical observation for both the aged and long-term unwell. The chart below shows the NZ population by age groups to 2025.

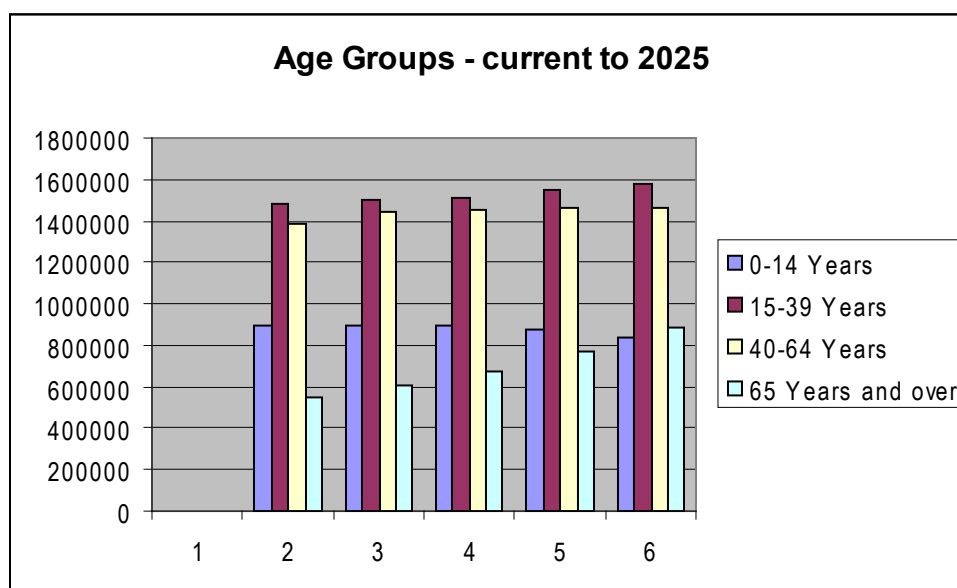


Chart 5. New Zealand Population by age group – source Statistics NZ.

The chart shows that while the 65+ age group will almost double (550,000 to 900,000) in the next 16 years, the two “working” age groups increase less significantly. Providing the 65+ age group with ICT skills will not only allow them to participate more effectively within the digital environment but also enable them to continue working longer.

It must be acknowledged that the SeniorNet programme does offer ICT competency to this age group, and could continue to do so in the future. Another avenue would be for the government to encourage and support the private sector and its State-owned enterprises (SOE) to provide ICT competency training to transitioning workforce, in particular older workers who currently perform mainly manual jobs.

There are other disadvantaged and marginalised groups within NZ including those of low education and long-term unemployed who would benefit from ICT competency training. The government has provided these in the past through programmes such as TOPs.

### **6.2.3 E-Inclusion**

There is significant evidence that a nationally-adopted standard, made available to the disadvantaged and communities in need, substantially improves the participation and inclusion rate of these communities.

In the New Zealand context, and based on the example of success of international programmes, the adoption of a standard such as ICDL and making training and courseware available at no or low cost, will significantly lift the rate of e-Inclusion amongst communities in need with significant benefits for New Zealand as a whole.

### **6.2.4 E-government services**

Since the initial release of its e-government strategy in 2000, the New Zealand Government has been increasing offering services online to its citizens. These have progressed from the simple presentation of information to full online service provisions. Citizens can now re-license their motor vehicle, submit tax returns and pay their taxes as well as complete land title searches and get weather information.

Cullen & Hernon (2004) undertook research of how NZ citizens use e-government services. Their study included participants from a wide range of socioeconomic backgrounds. They found that most of the people surveyed used government websites to search for information only and made little use of the online services themselves. This was in part due to a lack of awareness of the services available as well as a lack of skill and confidence in their use. They also suggest there was a preference for face-to-face and telephone channels, with the websites being used to find out whom to contact.

## **6.3 International Programmes within NZ**

### **6.3.1 ICDL**

The ICDL programme has been available in New Zealand since 1998, through a subsidiary of the New Zealand Computer Society.

In 2009 NZCS established their Digital Literacy Division and brought ICDL inhouse. The Digital Literacy Division now oversees a network of around 100 Testing Centres, including both larger organisations and govt departments, for internal purposes, and schools, polytechnics, and training providers for the public. Just under 20,000 individuals have registered with the programme.

The Digital Literacy Division provides guidance and oversight of the test centres as well as promoting digital literacy within NZ public and private sectors.

### **6.3.2 Internet and Computing Core Certification – IC<sup>3</sup>**

According to the IC<sup>3</sup> website there are currently just 5 exam centres based in NZ, four of which are high schools and appear mainly to cater for their own student population. IC<sup>3</sup> appears to have its strongest presence in the US.

### **6.3.3 Microsoft Programmes**

While Microsoft applications training is available in NZ through a number of training providers, they are proprietary in nature. Their digital literacy programme is also available although its delivery mode is predominantly online. Microsoft Corporation, does however work with other standards providers to sponsor programmes with marginalised groups through their Corporate Responsibility Office.





## 7: Conclusions

"An average of 1-3 hours a week gain per person has been suggested. If applied to NZ's current workforce, a conservative estimate (in time saved) would be \$1,820.00 per annum per person."

A number of conclusions can be drawn from the case studies and research contained in this report:

## **7.1 Digital Literacy is an essential life skill**

As stated by the EU expert group digital literacy is now an essential life skill and all citizens require a basic level of competency to participate effectively in the new digitised world. The New Zealand Government has recognised this with its Digital Strategy, within the Capability enabler. While there is an action entitled “ensure universal digital literacy” its main focus is within the education sector and some limited mention of community partnership (*Ministry of Economic Development, 2008*).

As more and more government services and other opportunities become available online, individuals require basic ICT competencies to benefit from them. As the world becomes more “digitised” individuals will need these skills to be able to work and participate in the economy.

The NZ government has provided significant online services through its e-government programme. However, take up of these services has mostly focused on information seeking services. Majority of citizens are not fully availing themselves of the full variety of government online services. This may be due to a lack of awareness as well as a lack of confidence in using the technology.

## **7.2 Productivity improvement at a national, organisational and individual level**

As the case studies indicate there is a significant productivity improvement following basic ICT training. An average of between 1-3 hours a week has been suggested, this is based on the individual’s initial skill and naturally the type of work. If this potential productivity gain was applied to NZ current workforce, a conservative estimate (in time saved) at an individual level would be \$1,820.00 per annum. Based on the June 2009 employment FTEs this could equate to a **productivity gain of \$1.7 billion per annum**.

This gain is not only improved worker productivity, but also reduced workload for support staff. The more routine ICT problems can be resolved by the workers themselves, freeing support staff to focus on more complex problems.

## **7.3 Adopting an agreed international non-proprietary standard for ICT skills greatly benefits assists both employers and employees.**

A widely accepted digital literacy standard overcomes discrepancies with the individual’s assessment of their own skills and the employer’s expectations. This allows ICT skill sets to meet international expectations, improving reputation of those organisations that operate internationally. In particular as some countries have found, improving ICT competency within the SME sector based on an international standard delivers significant economic benefit to the country as a whole.

Working through the international body and its local representative, provides monitoring and support to those delivering the training. It assures that the programme continues to meet international certification standards.

## **7.4 National approach to ICT competence within SME sector**

SMEs often lack the knowledge and resource to invest in ICT competence programmes, yet they form a large part of many nations economy. Malaysia has seen the economic benefits of developing an ICT competence programme for their SMEs. Other nations may benefit from this type of initiative.

## **7.5 ICT competence in transitioning workers encouraged at a national level**

This is particularly important as more and more of the production based work moves offshore. Providing ICT skills to these workers as they transition from their current job can bring benefits both to the employer and the national economy as well as to the individual themselves.

Work is changing and more and more jobs will require basic ICT skills. There are significant advantages to organisations in adopting a digital literacy programme in-house, as they retain the benefits of the workers technical knowledge as they transition into new ICT-based working arrangements.

The workers, because they understand the process involved in delivering the job are able to contribute to the new technology-based process as they gain ICT competence. As more and more NZ production jobs move offshore and as NZ workforce ages, there are less opportunities for older and manual workers to participate in the workforce.

## **7.6 Clarity around ICT skill assessment**

Individuals tend to over-assess their ICT capability when applying for employment. Where there is no agreed standard around particular skill sets, there may be a mismatch between the candidate's actual ability and the employer's expectation. External testing is costly and not always completed.

National support or guidance for an ICT competency standard would be of advantage both to job seekers and employers. The approach followed by the EU, Gulf States and Africa provides an excellent guide; where a non-proprietary programme is established in partnership with a not-for profit organisation and the certification programme is initially adopted within government departments and State-owned Enterprises.

## **7.7 E-inclusion programmes**

ICT competence can bring significant benefit to marginalised groups, it allows them to participate more fully in society. ICT competence can improve employment opportunities, overcome isolation, build confidence and lead to further learning. EU has placed a strong emphasis on e-inclusion initiatives in the i2010 Action Plan. They recommend government leadership and policy formation to drive these.

E-inclusion programmes need to be designed to address the specific requirements of the disadvantaged group. In the case of older or disabled citizens, these may be best delivered on a one-on-one basis and within the home environment. Other groups may benefit from a community network (whanau) approach.

Programmes need to be designed to work at the learner's pace and to provide the ongoing support to build confidence in using the technology. Often it is the not-for-profit or volunteer body that understands the best approach for its "consumer" group.

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