FROM RURAL ROADS TO THE INFORMATION EXPRESSWAY:

FACILITATING COMPUTER AND ICT COMPETENCIES FOR RURAL ONTARIANS

by

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Abstract

Ontario's economy is in transition. The manufacturing and primary industries are on a trend of decline while service-based industries - especially those requiring the use of information and communications technology (ICT) - are surging. The digital economy is continuing to grow and is expanding employment opportunities worldwide. Tele-work is providing opportunities to improve organizational efficiency. ICT competencies are essential for accessing these opportunities. Ontario citizens from rural regions have been disadvantaged by limited access to broadband internet. The government has invested in connecting all its citizens; however, the rural digital divide persists due to low competencies. E-learning adult training programs are a good option because they overcome geographic barriers and target populations experiencing digital divides. This study seeks to define the components of an effective e-learning ICT competencies training program and how it can be implemented to overcome the rural digital divide and improve economic outcomes for all Ontarians.

Keywords: information and communications technology (ICT) competencies, e-learning, adult training, essential skills, digital competency divide, asynchronous learning, synchronous learning, student-centred learning

Executive Summary

ICT competencies – Essential Skills

2008-2009's economic downturn has exposed the vulnerability of Ontario's economy. The manufacturing sector, in particular, lost over fifty-three thousand jobs from March 2009 to March 2010. This is not a short-term fluctuation; it has been on a long-term decline having lost close to ten per cent of its proportion of Ontario's GDP from 1987 to 2009. The manufacturing sector demonstrates the most dramatic decline but other goods producing industries (i.e. forestry, mining, agriculture, construction and transportation and warehousing) have also experienced decline; whereas, service providing industries (e.g. health care, education, professional and scientific and financial services) have experienced a long-term trend of growth in their proportion of GDP. This translates into more occupational opportunities in the traditional labour market in service providing industries. These industries also require higher levels of Information and Communications Technology (ICT) competencies - essential skill as defined by HRSDC – Canada. This transition disproportionately affects people in the rural areas of Ontario as goods producing industries comprise a larger proportion of its economy than urban areas.

The digital economy is emerging as one of the most important indicators of a nation's prosperity into the future. High levels of ICT competencies are an essential prerequisite to flourish in the digital economy. Overall, Canada has a population willing to engage in the digital economy and good infrastructure but lags behind on creating a receptive market environment, political and regulatory environment, business and government readiness. Supporting ICT competency facilitation in Ontario addresses some of these deficiencies inhibiting capitalization on digital economy opportunities.

HRSDC defines ICT competencies as essential. Primary, secondary and tertiary education recognizes the increasing importance of these competencies by offering education in general ICT competencies. Adult training in Ontario is also recognizing its importance by implementing some internal ICT curriculum and providing referrals to an external partner that provides more robust ICT curriculum. Reading, writing and numeracy dominate the adult training regime and ICT competencies are under-emphasized. To equip the at-risk populations (e.g. unemployed and/or rural) for success in the modern economy, adult training services must adapt to the evolving importance of ICT competencies. E-learning reduces the barriers for people inhibited from accessing traditional classroom learning.

Study Design: ICT Competency E-Learning Program Evaluation

I am interested in the performance of Ontario's adult training service e-learning capabilities and ICT curriculum in comparison to other programs. I chose to analyze the current external ICT competency training partner used by adult training e-learning services (Goodwill Community Foundation – Learnfree.org) and a recommended training partner of the European/International Computers Driver's License ECDL/ICDL (Jenison's Impetus Plus). ECDL/ICDL is the most used and recognized ICT competency accreditor in the world. I use a case study approach to analyze e-learning programs on important inputs for an effective training program and available outputs. Programs are analyzed on six domains: Outputs, Curriculum, Content, Support, Administration and External Context. Each of these domains have a variety of criteria and sub-criteria used to administer a systematic and empirical assessment of service provision. The purpose of this study is to inform potential policy alternatives to improve ICT competencies for people accessing Adult Training in Ontario, specifically considering the unique learning barriers of the unemployed and people living in rural areas.

Results: ICT Competency E-Learning Program Evaluation

Overall, Ontario's Adult Training E-learning programs and Jenison were the top performers on the E-Learning Program evaluation. They differ on their strengths and weakness according to domain. Ontario's internal ICT curriculum was the largest inhibitor to their overall score, but this is counterbalanced by their high-quality e-learning content and support services. Jenison had the most comprehensive curriculum available and it is designed for beginner, intermediate and some advanced level learners. They were also the top performer on the Outputs domain driven by their direct training for and referral to ECDL/ICDL accreditation testing. They also have the most consistent and adequate funding due to the user fees they charge. The Goodwill Community Foundation (GCF) was the worst performer on all domains except curriculum primarily because of the limited comprehensiveness of their asynchronous courses, difficulty accessing synchronous courses, limited support service capacity and inadequate and inconsistent funding to service their high demand. Because of this, GCF is an ineffective training partner in comparison to Jenison according to the evaluation framework.

Policy Analysis: More Robust and Effective ICT Programs

I analyze two alternatives plus the status quo to determine if improving ICT competency training is worthwhile. The policy alternatives are to implement more robust and effective curriculum as an internal program or use an external partner to deliver more robust and effective curriculum alongside the status quo. I determine the value of each policy alternative using seven policy criteria: effectiveness improving ICT competency training overall, effectiveness improving ICT competency training for the rural and/or unemployed people, fiscal cost, horizontal (urban geographic) equity, vertical equity, political and public acceptability and implementation complexity. Policy analysis indicates using an external partner is the best alternative because it addresses the deficiencies of the status quo for improving the ICT competencies of all rural and unemployed people accessing adult training services. It also entails a much lower fiscal cost than

implementing more robust curriculum internally. There are concerns with the Political and Public Acceptability and implementation complexity of this alternative, which is discussed in the report.

Recommendations

I recommend that the Ministry of Training, Colleges and Universities – the public body responsible for delivering adult training in Ontario – subscribes to an ECDL/ICDL training partner similar to Jenison's Impetus Plus program and provides better and more consistent referrals to appropriate candidates for ICT competencies upgrading. This would involve:

- discontinuing referrals to GCF ICT competency training,
- paying the licensing fee to the selected training partner,
- assessing the prerequisite competencies for using the e-learning environment,
- adapting the existing internal curriculum to be an orientation to the e-learning environment that trains candidates in the prerequisite competencies, and
- developing an effective communications strategy for achieving a referral system that allows all appropriate candidates exposure and access to effective and robust ICT competency training services.

I also recommend - for consideration - monitoring aggregate performance on ICT competencies for the population by different geographic locations and demographic characteristics using standardized tests similar to the International Adult Literacy Survey for reading, writing and numeracy. ECDL/ICDL testing uses respected testing modules to assess ICT competencies around the world. A partnership between ICDL – Canada and Statistics Canada would capitalize on the existing capabilities to monitor ICT competencies in Canada. I recommend this for consideration because there are significant implementation concerns regarding the privacy and security concerns of ICDL/ECDL clients, the representativeness of the people accessing the services and the willingness of these partners to combine efforts.

Dedication

To Mom and Dad, I am nothing without your love and support.

To Becky, thank you for the inspiration.

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I would like to acknowledge all the people who contributed to this report. Many thanks to my Supervisor – Judith Sixsmith (Professor – Simon Fraser University); your insight, patience and candour created a comfortable and productive atmosphere, which encouraged perseverance through this enduring process.

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I am indebted to the administrators and practitioners in the Literacy and Basic Skills, Essential Skills, Adult Training and E-Learning communities in Ontario, who provided in depth information about their services. Lynne Wallace (Executive Director, College Sectors Committee), Alan Cherwinski (Projects Manager, AlphaPlus), Heather Robinet (Project Manager, Learning Hub), Courtney McGee (Facilitator, Learning Hub), Laura Hamilton (Consultant, Literacy Basic Skills – Western Region Ontario) and Joanne Cameron (Case Manager, VPI – Owen Sound), your commitment to your work and openness enable a valid assessment of adult training e-learning services. Thank you all so much for taking the time to speak with me.

Many thanks to Bryn Jones (CEO, ICDL – Canada); your expert insight into the importance of ICT competencies and internationally recognized accreditation was crucial. The information you provided for this study is fulsome, scarce and innovative.

Thanks also to Julie Taylor (Account Manager – Jenison E-Learning) for your quick, concise and knowledgeable responses to my many service delivery questions. Your diligence demonstrates Jenison's commitment to high-quality service delivery.

I would like to thank everyone who provided accurate referrals to the people aforementioned. Thank you to Kim Biletchi (Service Delivery Coordinator – Employment and Training Services, Ontario's Ministry of Training, Colleges and Universities), Gemma Mendez-Smith (Executive Director, Four County Labour Market Planning Board), Alison Matthews (Communications Manager, ECDL Foundation - Dublin) and Shirley Quinn (Program Development Executive, ECDL Foundation – Dublin).

I would also like to thank my friends and family for obliging me their ears and thoughts.

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Glossary

ICT competencies	ICT (information and communications technologies) are the tools required to compute and access the internet. ICT competencies are the competencies - as defined by E-Skills UK's ICT curriculum – required to effectively use ICT.
E-learning	A form of education where the learner completes courses and other educational activities using ICT with online or external software.
Adult Training	The educational services provided by a public body for people over 18 years of age that are not in the formal primary, secondary or tertiary education systems.
Essential Skills	The skills needed to be successful at work, learning and other life tasks. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.
Digital Competency Divide	ICT competency deficiencies for certain populations, which inhibits economic and social opportunities.
Asynchronous learning	A distance learning style where the learner can participate in learning activities at any time from any place with a computer and the required software but does not have real-time access to a learning facilitator.
Synchronous learning	An e-learning style where the learner interacts directly with a learning facilitator, and often peers, in an on-line e-learning environment.
Learning community	A network of facilitators and fellow students in a learning environment, often used for support and inducing higher levels of engagement.
Student-centred learning	A learning style where the learner defines their goals and common barriers to inform an individualized learning pathway best suited for individual learners' success.

1: ICT competencies – Essential Skills

Ontario's economy is changing. The goods producing industries (i.e. manufacturing, forestry, agriculture, mining, construction, transportation and warehousing) are declining while service providing industries (e.g. health care, education, financial, professional and scientific, etc.) are growing (Statistics Canada, 1987 – 2008). This productivity shift has cascaded through the labour market. A prototypical worker must possess new skills to remain versatile. Information and communications technologies (ICT) competencies have become an essential prerequisite for many flourishing occupation types; ninety-six percent of jobs in Ontario recommend some level of ICT competency (OSP, 2009). Reading, writing and numeracy remain the necessary base competencies but new skills have emerged as essential.

2008-2009's economic downturn, at its height, reduced Ontario's economy by two-hundred and five thousand jobs (Statistics Canada, July 2009). The Good Producing industries have fallen 5.7 per cent from February 2008 to February 2009 while the entire economy grew by 0.5 per cent (Statistics Canada, February 2010). This is a significant decrease when also considering construction – an industry included in the Goods Producing category) grew by 1.5 per cent due to increased government infrastructure investment (Revenue Canada, 2009). Goods producing industries are vulnerable and the competencies required in these industries lack transferability. This is a significant problem as the competencies of many Ontarians are incongruent with those required for emerging employment and commerce opportunities. This limits Ontario's economic capacity and resiliency for the future.

The ability to use computers and the internet for work, commerce and eliciting essential services are becoming crucial to make and save money. The digital economy is one of the most important indicators of a nation's future prosperity. Overall, Canada ranks tenth in the world on

the National Readiness Index (NRI), which uses a variety of indicators to assess nations' readiness for the digital economy. When breaking this rank down into different criteria, Canada demonstrates good infrastructure (ranked fourth), a willing population (ranked ninth) but performs poorly on market environment (ranked fifteenth), political and regulatory environment (ranked seventeenth), business readiness (ranked nineteenth) and government readiness (ranked twentieth) (INSEAD, 2009). Canadian governments and businesses have room for improvement to compete in the digital economy.

The transitioning traditional labour market and the emerging significance of the digital economy suggest computer and internet-use are essential tools in the modern economy; tools that require specific competencies for effective and efficient usage. These competencies are becoming essential for integration in the domains of social life and employment in a similar way to reading, writing and numeracy. The problems identified for populations with low aggregate literacy rates have received significant governmental attention. The problems caused by a lack of computer and internet competencies leading to a "digital divide" are under-explored

Barriers to access or competencies for computer and internet usage perpetuate digital divides (Hudson, 1994). Many people living in rural areas in Canada are beginning to gain access to the internet (Digital Ontario, 2009). Current government investment primarily addresses accessibility leaving adults recently connected to gain the necessary competencies by trial and error. Public-funded adult-training services are prime candidates to deliver computer and internet training to people who require computer and internet competency upgrading. Developing, implementing and administering robust computer and internet curriculum entails significant incremental costs for the Ontario government. The value of the benefits can be estimated using computer and internet competency score, employment and income outcomes data. The International Adult Literacy Survey (IALS) conducts standardized literacy tests and compiles the results for nations and regions around the world periodically. Multitudes of studies identify the

value of literacy. There is no comparable test for computer and internet competencies. Researchers currently use types of usage and amount of exposure proxies to estimate these competencies (Statistics Canada, 2000) (Statistics Canada, 2003). These proxies are an inaccurate representation because usage does not fully capture aptitude for the computer and internet and self-reported competencies are inaccurate due to incentives to report euphemistic results. Any research on computer and internet competencies is limited due to the quality of the existing data.

Ontario's transitioning economy (Statistics Canada, 1987-2008), the under-utilization of the digital economy (INSEAD, 2009), under-emphasis on computer and internet training, the digital divide experienced by rural (GSS, 2000) (Looker, 2009) and unemployed people (GSS, 2000) (ILO, 2001) and the lack of valid and overarching empirical data on computer and internet competencies are all significant problems inhibiting Ontario from evolving into a more versatile and resilient economy. These are public policy problems because accessing training opportunities to improve essential competencies yield a high private and social rate of return. Left to the market, too few people access education and training opportunities because of a myopic view of investment in education. Demand is lower than the socially optimal level because people undervalue education and training due to the up-front financial and opportunity costs for distant future benefits (Boadway et. al., 1994). In addition, there are many positive externalities associated with literacy: reduces criminal recidivism, produces higher rates of self-rated health, reduces the likelihood of living in poverty and improves the likelihood of meaningful social and political engagement (OLC, 2009). Public investment reduces the barriers (i.e. knowledge of services, financial cost and opportunity cost) to increase access and utilization.

Computer and internet competencies are essential skills (HRSDC, 2010) currently underrepresented in the public adult training and education services in Ontario. Primary education includes a mandatory Science and Technology course, which introduces students to key

computing and internet concepts (MoE, 2007a). Secondary education includes an optional Computer Studies program for grades ten and eleven (MoE, 2007b). Tertiary education offers a variety of advanced computing science programs to attain high-level competencies. Adult training services are best equipped to address the computer and internet training needs of the identified populations. These services do offer some computer and internet training (Learning Hub, 2010) (E-Channel, 2010) (AlphaPlus, 2010) but are limited in comparison to the essential competencies defined by E-Skills UK's Curriculum benchmark (E-Skills UK, 2009). Considering the growing importance of computer and internet competencies for attaining and sustaining economic resiliency, versatility and competitiveness nationally and internationally, Ontario's adult training services have limited computer and internet curricula and insufficient programs to address the digital divide.

2: Context of the Problem

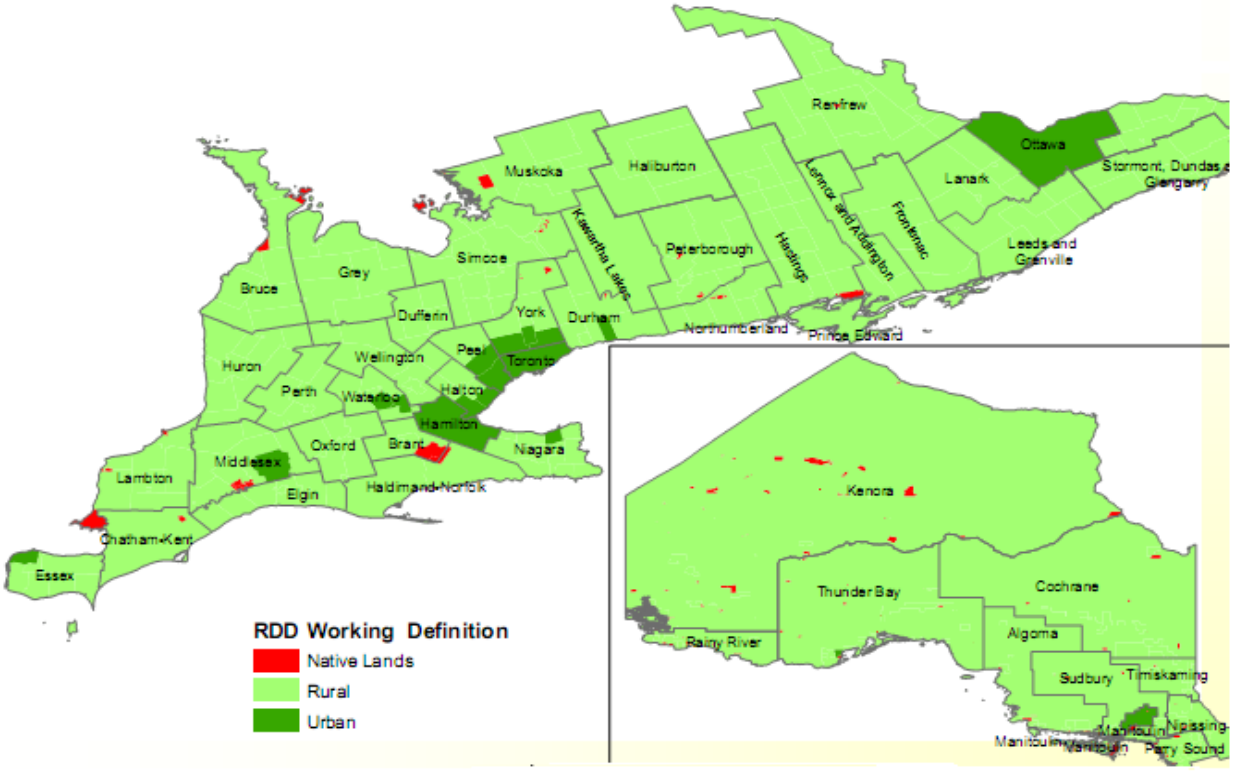
In this chapter, I provide the context necessary to conceptualize the policy problem. Specifically, I:

- delineate the jurisdiction's boundaries,
- illustrate traditional labour market trends in Ontario,
- describe the importance of the digital economy,
- describe the emergence of tele-work,
- define ICT competencies,
- illustrate their importance in the Ontarian and global economy,
- illustrate the rural and unemployed digital competency divides,
- explain ICT competencies adult training services in Ontario, and
- the status quo for addressing rural and unemployed digital competency divides.

2.1 Jurisdiction Boundaries

The policy problem targets Ontario and its rural areas. I define rural areas as all areas of Ontario outside of Census Metropolitan Areas (CMA). CMAs are any region where at least fifty per cent of the population does not live in a community over one hundred thousand people (OMAFRA, 2007). Thus, people living in rural areas are anybody living outside of the CMA boundaries of the City of Hamilton, Ottawa, London, Windsor, Thunder Bay, Greater Sudbury, Oshawa, Barrie, Kingston, Guelph, Brantford, Peterborough and Thunder Bay and the Regions of Greater Toronto, St. Catharines-Niagara, and Waterloo. This definition is congruent with Ontario's Ministry of Agriculture, Food and Rural Affairs' (OMAFRA)'s and Statistic's Canada's definition. Figure 1 delineates the rural from urban areas as considered by this study.

Figure 1: Urban/Rural Distinction Map



Source: OMAFRA - *Profile of Rural Ontario* - Data from 2006 Canadian Census

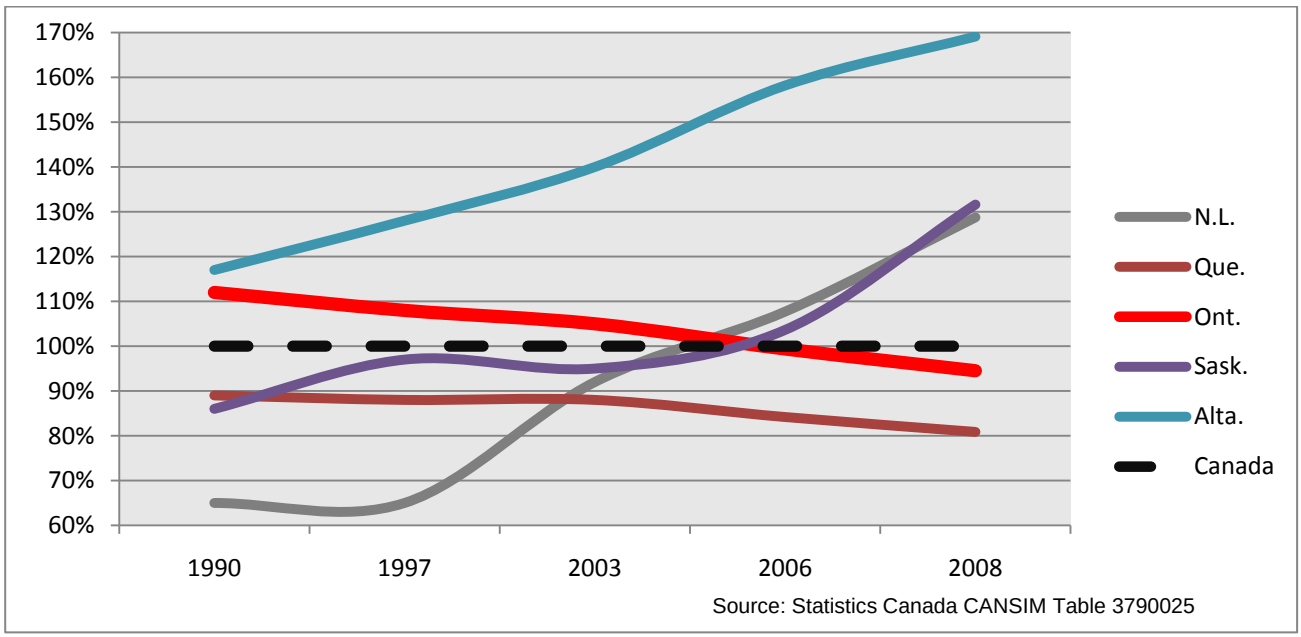
I acknowledge this is an approximate distinction that does not encompass all the factors affecting the urban – rural divide. I use this definition because most of the data collected by statistical agencies in Ontario and Canada uses this distinction. A more robust definition would limit data availability for describing rural areas of Ontario.

2.2 Ontario's Per Capita Production

Ontario was once the economic powerhouse of Canada. As Canada's demographically largest province, it consistently contributes the largest proportion to total national GDP. Recently it has fallen from a position above the national average for GDP per capita in 1990 to approximately five percentage points below in 2008 (Statistics Canada, 2008). Ontario remains the largest contributor to the Canadian economy but its productivity has been in steady decline. It

now ranks below Alberta, Saskatchewan, Newfoundland, North-West Territories and the Yukon and has become a have-not province concerning inter-provincial monetary transfers. Figure 2 illustrates the changes in productivity by province from 1990 to 2008, measured by GDP per capita.

Figure 2: GDP Per Capita as Percentage of National Average for Select Provinces



2.3 Unemployment

Unemployment in Ontario has fluctuated significantly over the past thirty years. In February 2008, unemployment hit a thirty-three year low at 6.5 per cent. Since then, it has steadily risen to reach an eleven-year high in June 2009 of 9.2 per cent and declined to 9.1 per cent in March 2010 (Statistics Canada, March 2010).

2.4 Traditional Market Trends

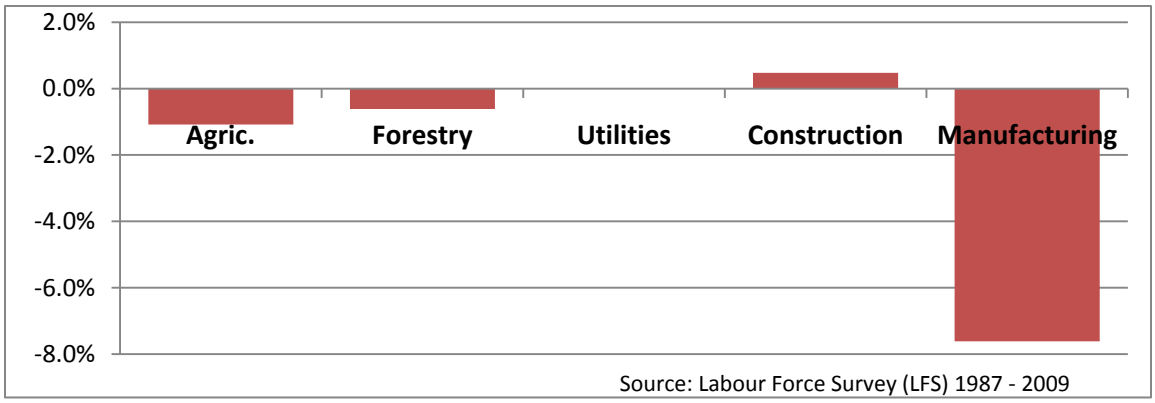
Ontario's labour market is dynamic. Some of the older industries flourish (e.g. health care and other support services) or suffer (e.g. manufacturing) depending on the evolving needs

of the population (Lipschitz et. al., 2006), technological innovations (Freeman and Soete, 1997) and policy development with economic implications (Williams, 2001). Consequently, new industries have emerged and some old industries have declined or disappeared, there has been a marked evolution of the labour market in Ontario since 1987 (Statistics Canada, February 2008).

2.4.1 Transitioning Industrial Productivity

All Goods Producing industries have declined from thirty-two per cent to twenty-two per cent of the total economy. All Service Providing industries have increased from sixty-eight per cent to seventy-eight per cent of the total economy (Statistics Canada, February 2008). These two categories of industry represent Ontario's entire economy. From 1987 to 2008, the manufacturing sector declined from twenty-one per cent to twelve per cent of Ontario's total GDP. Agriculture lost the second most but only approximately one per cent of their share of the economy (Statistics Canada, 1987-2008). Figure 3 illustrates the magnitude of the decline for specific industries within the Good Producing Industries category.

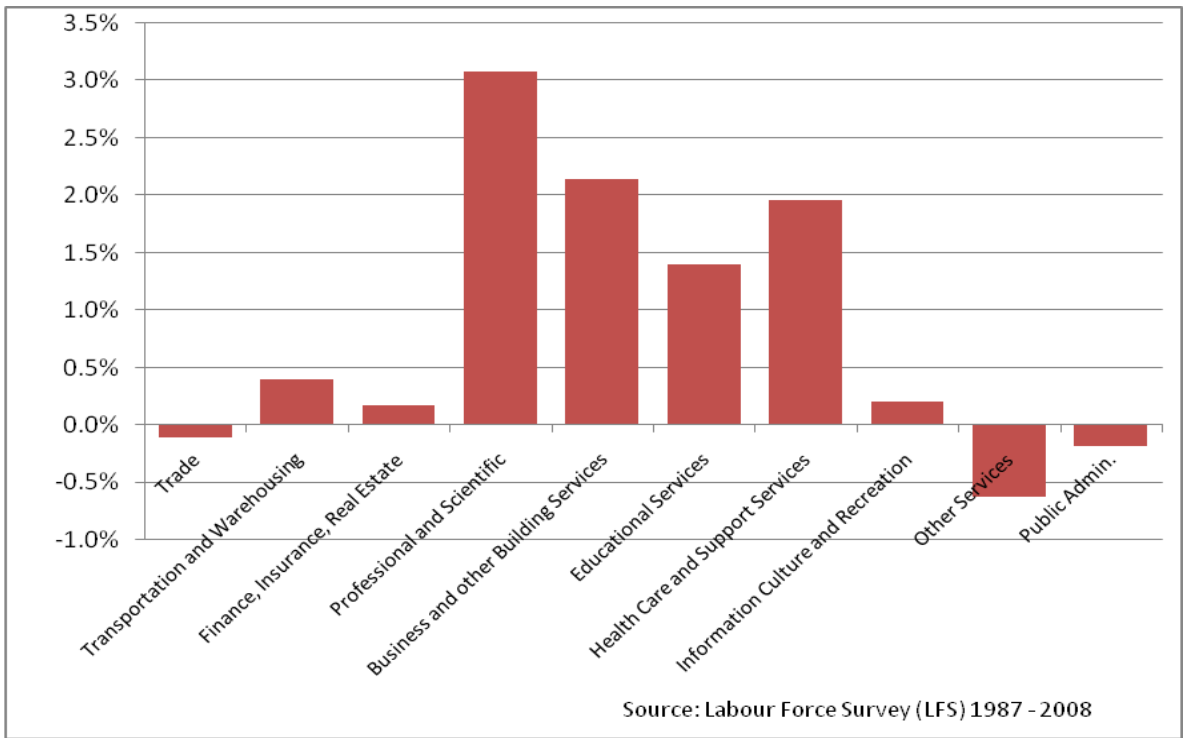
Figure 3: Goods Producing Industries as Proportion of Total Economy from 1987 – 2009



All Service-Providing industries have made gains in their proportion of the economy with the exception of Finance, Insurance, Real Estate; and Public Administration. Finance, Insurance and Real Estate had made steady gains up until the economic downturn: between 2008 and 2009,

they declined by 0.5% in their share of the economy (Statistics Canada, 2008 – 2009). Figure 4 illustrates the percent change between 1987 and 2008 for specific Service Providing industries.

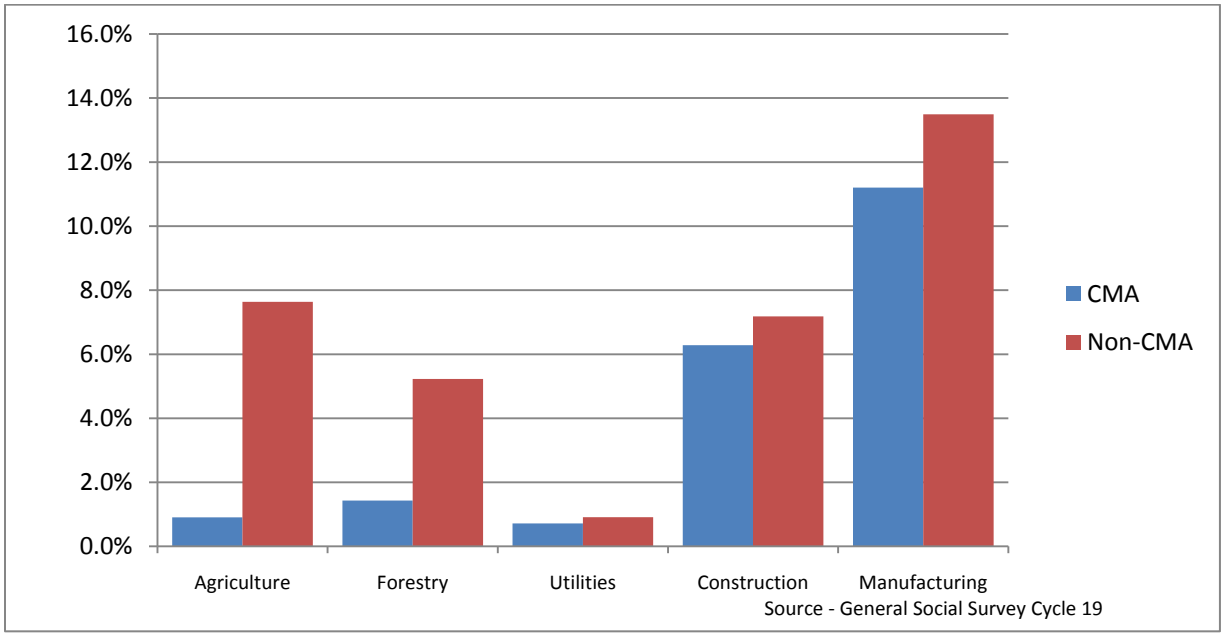
Figure 4: Service Providing Industries as Proportion of Total Economy from 1987-2008



2.4.2 Urban – Rural Industrial Production Divide

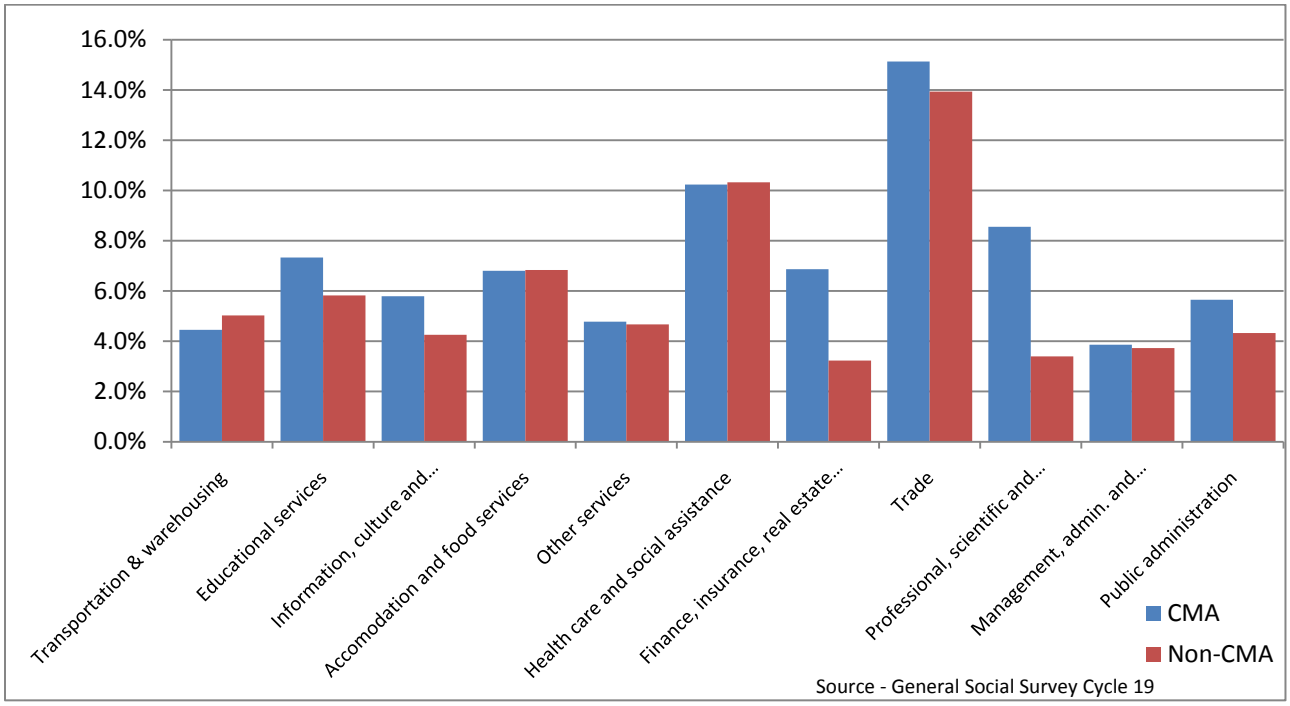
This data indicates an evolving economy, which disproportionately affects Ontario's rural areas. In 2005, thirty-four per cent of employment was in Goods Producing industries in rural areas, whereas, only twenty per cent in urban areas (Statistics Canada, 2005). Fourteen per cent of employment opportunities were in manufacturing in rural areas and only eleven per cent, in urban areas (Statistics Canada, 2005). Rural areas are sensitive populations for unemployment. Figure 5 demonstrates the urban – rural divide on occupational opportunities for sectors within the Good Producing industrial category.

Figure 5: Urban – Rural Divide for Goods Producing Industries' Proportion of Total GDP



The growing industries are disproportionately located in urban areas. All Service-Providing industries comprise eighty per cent of employment in urban areas compared to sixty-six per cent in rural areas. The health sector is a growing industry that constitutes a relatively equal proportion of employment between rural and urban regions. The professional and scientific industry has experienced the largest growth and has the greatest regional disparity of all sectors (Statistics Canada, 2005). Figure 6 demonstrates the urban – rural divide on occupational opportunities for sectors within the Service Providing Industries category.

Figure 6: Urban – Rural Divide for Service Producing Industries' Proportion of Total GDP



Some sectors within Ontario's economy are declining but others are emerging as important areas for economic growth. The good producing industries have experienced the greatest long-term decline. The economic downturn has created short-term changes in size of the economy; however, a long-term trend of industrial evolution is apparent.

2.5 Rural Economic Development in Ontario

The economic and labour market trends illustrate an apparent problem with the viability of Ontario's rural areas - a problem that has been emerging over the previous two decades (Statistics Canada, 87-08). The Ontario government established a number of government agencies, non-governmental organizations and special interest groups to advocate and execute initiatives addressing the urban rural divides. Understanding these historical initiatives reveals political appetite for this issue and refines future efforts according to successes and failures of the past.

2.5.1 Policy History

Organizations such as the Ontario Rural Council (TORC) and the Association of Municipalities of Ontario (AMO) have been advocating for a targeted and consolidated strategy for rural economic development since the early 1980s (TORC, 2009). The Ontario Government used a piece-meal approach where the ministries responsible for the problems occurring in rural areas; for instance, education, health and economic development, would address them primarily as a province-wide problem. In 1990 the Ministry of Municipal Affairs and Housing Act was legislated which delegated responsibility to this ministry for "municipal affairs, including: community planning, community development, and improvement of the built environment and land development..." (Ontario Legislative Assemble, 1990, Clause 4(1)). This legislation did not explicitly establish a consolidated and targeted rural development strategy but it did define the responsibilities of this ministry to include municipalities' community development. Between 1990 and 2004, the Ministry of Municipal Affairs and Housing (OMMAH) worked on a number of initiatives that had beneficial impacts for rural Ontario. They:

- developed an Ontario Tourism Strategy,
- strengthened the agricultural sector by providing aid to cattle farmers affected by BSE,
- established commitment to developing rural infrastructure via the Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF),
- established the Apprenticeship Training Tax Credit to encourage tradesman to hire more apprentices, and
- released discussion papers on the proposed growth plan for the Greater Golden Horseshoe Area.

These initiatives all had beneficial consequences for Ontario's rural areas but were not all targeted directly at rural development and were not part of a consolidated effort to achieve long-term economic sustainability for these regions.

In 2004, OMMAH developed a consolidated and targeted strategy for sustainable rural community development. They published the *Building Strong Communities* document which was the first government document outlining a diverse plan for developing and maintaining strong rural communities. This report was a declaration of commitment to rural development as it established objectives and broad strategies for achieving them. Specifically, it affirmed a commitment to targeted rural development, established a consolidated effort for its achievement and identified the broad categories of initiatives. OMMAH pledged to facilitate, support, fund, and/or develop initiatives involving the following areas of rural development:

- the local economy,
- local leadership,
- a skilled rural workforce,
- modernized infrastructure, and
- quality primary and secondary education (OMMAH, 2004).

However, it failed to establish specific targets indicating success, a timeline for making progress or the deliberative process for determining viable and effective initiatives. Considering the reports' limitations, its importance is the acknowledgment of special needs for rural communities. Initiatives would be developed using a tailored approach for rural communities. This was precedent setting for rural affairs in Ontario.

2.5.2 Current Initiatives

The Ministry of Agriculture and Food Safety became accountable for rural affairs in 2004; signified by its name change to Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) (Ontario Legislative Assembly, 2006). OMAFRA was tasked with implementing a primarily performative report to improve the economic vitality of rural regions in Ontario. The *Building Stronger Communities* (BSC) document provided direction to these efforts. OMAFRA was to facilitate, fund, and develop initiatives congruent with the objectives and strategies of the

BSC. They have supported initiatives since 2005 specific to its individual municipalities in accordance with the BSC, including:

- establishing downtown revitalization projects to support the local economy,
- funding the tourism industry via subsidies and targeted infrastructure development,
- attracting employers from the manufacturing and primary goods industries via advertising and investment for infrastructural development,
- establishing and implementing the Business Retention and Expansion (BR+E) program in over one-hundred municipalities,
- establishing the First Impressions Program which describes and advertises the initial impression tourists and new inhabitants have for municipalities,
- expanding Employment Ontario – an initiative to facilitate quick entry for new and re-entry for displaced workers into the work force - centres from approximately four hundred to twelve hundred in all regions in Ontario,
- establishing the Youth Entrepreneurship Program to facilitate entrepreneurialism,
- expanding the number of pre-apprenticeship placements and established the Apprenticeship Training Tax Credit Rewards program to attract improve the accessibility of trade apprenticeship, and
- developing a number of manufacturing and primary goods-related industry specific skills training program. (OMAFRA, 2007)

To date, OMAFRA has not published a progress report for 2008 or 2009.

Competency development is one of the pillars of OMAFRA's strategy. Training initiatives develop the required competencies of current employment opportunities; these industries have stagnated or declined in total proportion of Ontario's economy since 1987 (STATISTICS CANADA, 87-09). There has been little attention to developing the skills and competencies required for the surging sectors in Ontario. In addition, there is an over-emphasis on industry-specific skills and competency training during a time of tumultuous transition. Initiatives to develop competencies for the emerging labour opportunities may produce a more

versatile labour pool. In particular, ICT competencies are required for growing and emerging occupational opportunities.

2.6 Importance of ICT competencies

> "Information and communications technologies (ICT) are increasingly moving to the core of national competitiveness strategies around the world, thanks to its revolutionary power as a critical enabler of growth, development, and modernization. Recent economic history has shown that, as developed countries approach the technological frontier, ICT is crucial for them to continue innovating in their processes and products and to maintain their competitive advantage. Equally importantly, ICT has proven instrumental for enabling developing middle-income economies to leapfrog to higher stages of development and fostering economic and social transformation." (Schwab, 2009. pg. v)

Computer and high-speed access and efficient usage are of paramount importance for facilitating success in this rapidly changing social and economic climate (Digital Ontario, 2008). The essential pre-requisites for success are access to high-functioning technology and competency for its usage. ICT competencies have emerged as essential skills for many occupations. Virtually all occupations in Ontario require some ICT competencies (OSP, 2009).

Lawrence Snyder is a leading researcher in the field of ICT competencies in North America. He chaired the National Research Council's (NRC) initiative to establish a comprehensive and effective ICT competency program in 2000. This initiative culminated with the publication of *Being Fluent with Information Technology (FITness)(*NRC, 2000). In this report, Snyder argues for the importance of ICT competencies as a preface to FITness program development. He states that ICTs are the most important tools for efficiently informing large numbers of citizens to facilitate a knowledgeable and engaged populace; preparing the workforce for emerging opportunities and maintaining the competitiveness of industries within the global economy; and enabling the pursuit of personally relevant goals outside of work and societal engagement (NRC, 2000). Many Canadian researchers have also described the importance of ICT competencies for attaining and maintaining competitiveness in the global economy

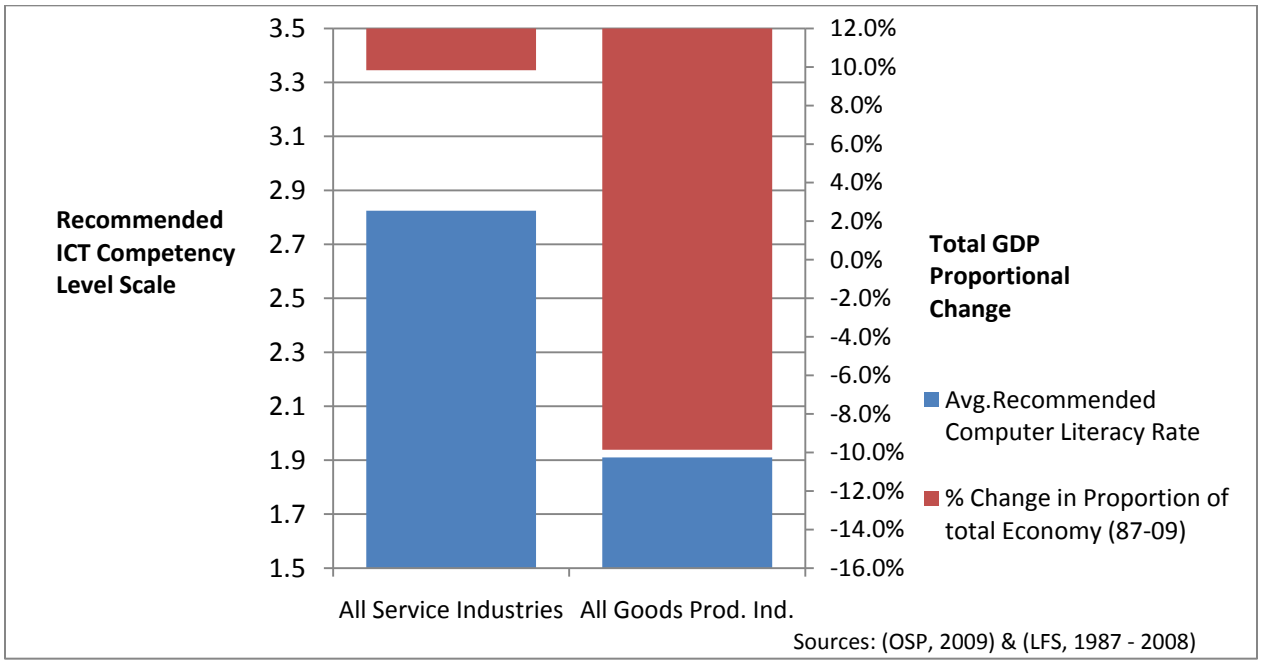
(Andrews, 1996; Babe, 1994; Clement & Shade, 1996; Ehrcke & Rosenberg, 1995; Johnston, 1994; Riley, 1993; Wilson, 1996).

2.6.1 Traditional Labour Market

The Ontario Skills Passport initiative documented all occupational categories in Ontario and compiled the recommended skills and competencies for each. Out of the three-hundred and ninety-six occupations defined, only fourteen or four per cent do not require any ICT competencies. They grade the recommended ICT competencies on a 0–5 scale. The average recommended level is 2.2. At level two one can perform tasks that require the use of several simple software features and use software for a limited number of functions that make use of existing structures or standard formats. At level three one can perform tasks that involve several operations and the use of a wide range of software features or options and perform various kinds of tasks that may involve some experimentation to achieve the desired levels. At level five one can assess technological needs, design and write software and design computer networks (OSP, 2009).

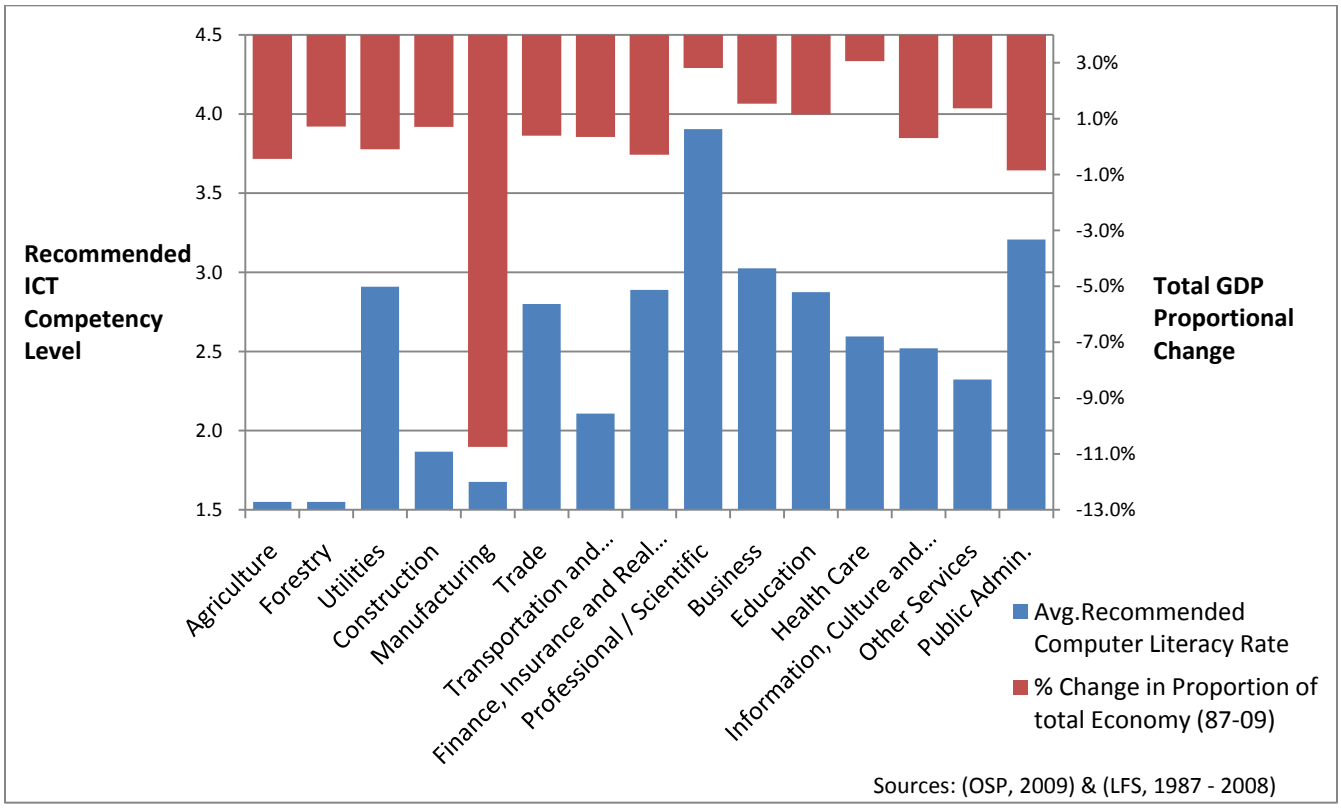
Economic fluctuations demonstrate that ICT competencies are important for economic vitality. The surging Service Providing industry jobs require higher ICT competencies then the receding Goods Producing industries. Figure 7 demonstrates the evolution of the labour market opportunities since 1987 in comparison to the average recommended computer literacy level of all jobs within service providing and goods producing industries.

Figure 7: Average Recommended Computer Literacy for Industry Categories and Per Cent Change in Proportion of Total GDP



A disaggregated look at these categories specifies this trend further. The professional/scientific industry gained a larger proportion of the total economy than any other sector since 1987 (Statistics Canada, 2010), excluding health care – a publicly funded, non-competitive industry. It also requires the highest level of computer competencies, on average, across all industries within the North American Industrial Classification System (NAICS). The manufacturing industry suffered the largest decline in proportion of GDP production and requires the lowest computer literacy rates - excluding the agriculture and forestry sectors (OSP, 2009). Figure 8 demonstrates the evolution of GDP production since 1987 in comparison to the average recommended computer literacy level of all jobs within the NAICS economic sectors.

Figure 8: Average Recommended Computer Literacy and Per Cent Change in Proportion of Total Economy for Industries



This data illustrates a trend for the surging industries to require higher levels of ICT competencies than the declining industries.

2.6.2 Tele-Work

Research finds tele-workers have improved employee productivity and satisfaction, company loyalty and belonging, and retention (Pisonneault and Boisvert, 2001). These results primarily rely on self-reported data. Many of the participants in tele-work studies volunteer to tele-work. This may produce a participant bias that overstates these benefits (Bailey and Kurland, 2002). Research has also identified some negative attributes of tele-work, including reducing quality of family time (Sixsmith et al., 2002), reducing productivity for workers who are not self-driven (Bailey and Kurland, 2002) and reducing life satisfaction for some tele-workers. The contention in this field indicates the complexity of this issue. It requires careful consideration to

determine the benefits of tele-working in specific contexts; however, it is non-contentious that tele-work increases the employment opportunities for people living in rural areas. To capitalize on tele-work opportunities, workers must possess adequate ICT competencies.

2.6.3 Employment in the Digital Economy

Mesenbourg of the U.S. Bureau of the Census defines the digital economy as having three main components: supporting infrastructure, electronic business processes and electronic commerce transactions. E-business infrastructure is the share of total economic infrastructure used to support electronic business processes and conduct electronic commerce. Examples of this infrastructure are computers, routers and other hardware; satellite, wire and optical communications and network channels, system and applications software; support services and other human capital. Electronic or e-business is any business process conducted over computer networks. Electronic or e-commerce is the value of all goods and services traded over computer networks (Mesenbourg, 2001).

INSEAD's *Global Information Technology Report 2008-2009* states that the digital economy is growing rapidly and is the most important indicator of economic prosperity (INSEAD, 2009). This report compares Canada to other nations in the world using the Networked Readiness Index (NRI). The NRI uses three categories, nine subcategories and sixty-eight different criteria to rank nations in the global context. Overall Canada ranks tenth behind Denmark, Sweden, United States, Singapore, Switzerland, Finland, Iceland, Norway and the Netherlands but ahead of Japan, France, Australia and the United Kingdom (INSEAD, 2009). The disaggregated results reveal Canada ranks fourteenth on the Readiness component of the NRI – their poorest score out of the three categories – Readiness, Environment and Usage. This component measures the readiness of individuals, businesses and governments to access the digital economy. Individual readiness ranks ninth but business and government, nineteenth and twentieth respectively. Within business, Canada ranks poorly on the extent of staff training and

company research and development spending. Within government, they rank poorly on Government Prioritization of ICT and Importance of ICT to government vision of the future, thirty-seventh and thirty-fifth respectively (INSEAD, 2009).

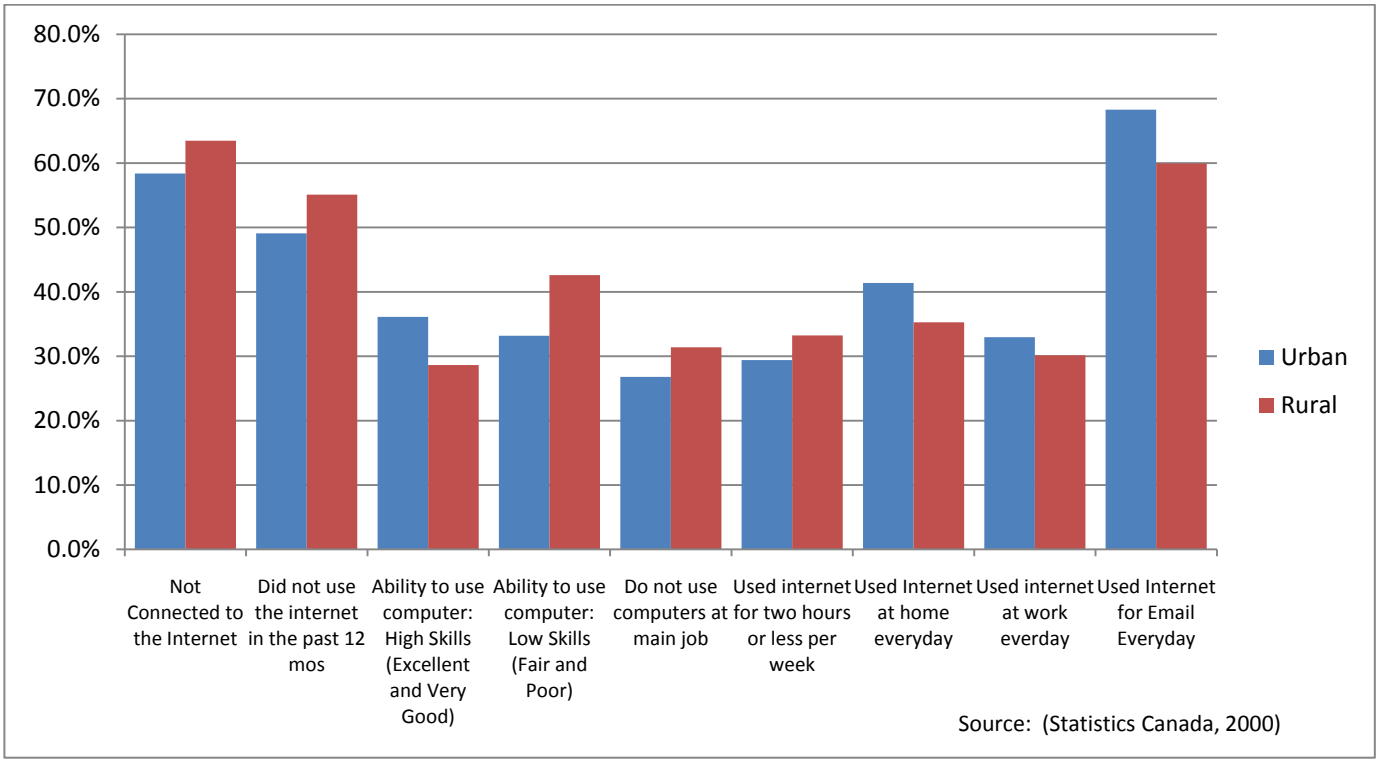
2.7 Digital Divide/ICT competencies Deficient Groups

Access and competencies in ICTs are crucial in the modern world (Hudson, 1994). People without adequate ICT competencies are disadvantaged. Specific populations experience varying degrees of ICT access and competencies. The disadvantaged populations are: the disabled (Paciello, 2002), women (Bolan, 2000), middle-aged or elderly (Fink and Kenny, 2003), people with low-educational attainment (Mcclure, 1994), people whom are unemployed (ILO, 2001) or people living in rural or remote areas (Hudson, 1994) (Looker & Thiessen, 2009).

2.7.1 Rural Digital Divide - Capabilities

People living in rural areas experience a digital divide because of broadband inaccessibility. When connected rural and remote people remain at a disadvantage because they have not practiced the essential competencies. Currently, there are no standardized tests to collect ICT competency aggregate data. Statistics Canada's General Social Survey in 2000 collected key indicators of ICT usage and self-reported skills. The study found that people that are more rural had not used the internet in the past twelve months. More urban participants reported using computers and the internet in the workplace regularly. Self-reported ICT competencies demonstrates the largest divide with more people in urban areas rating their skills as' excellent' or 'very good' compared to more rural people reporting their ICT competencies as 'Fair' or 'Poor' (GSS, 2000). Figure 9 demonstrates the Urban – Rural divide on key indicators of ICT access, usage and competency; known as the digital divide.

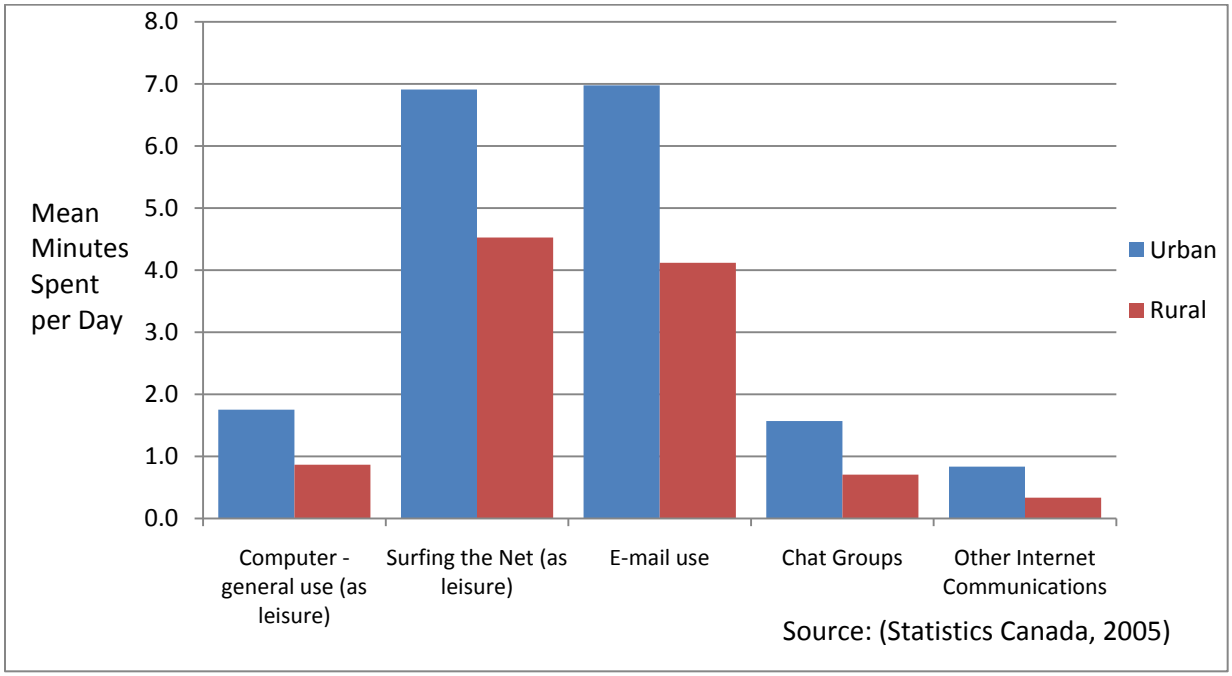
Figure 9: Urban – Rural Digital Divide in Ontario (2000)



This data is dated but remains useful as a demonstration of the urban – rural divide. While the scale of the current problem is ambiguous, access to ICT competencies training remains limited in rural regions (Digital Ontario, 2009).

The 2005 General Social Survey - Time-Use database measures the amount of time Canadians spend doing activities including computer-related. This data indicates that Ontarians in urban regions are using ICTs more often and for more time than rural Ontarians (GSS, 2005). Figure 10 demonstrates the persistence of Ontario's urban – rural digital divide on ICT usage in 2005.

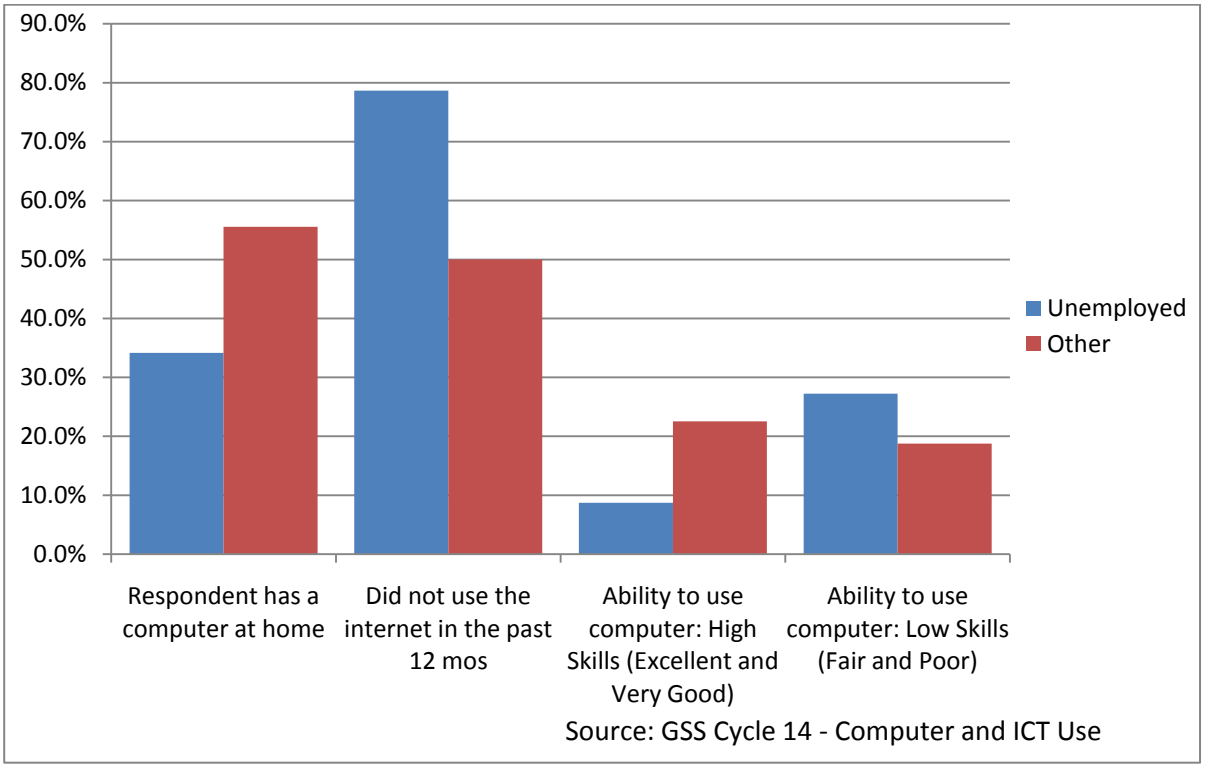
Figure 10: Urban and Rural ICT Time-Use Divide (2005)



2.7.2 Unemployed Digital Divide - Capabilities

Unemployed people demonstrate lower ICT competencies than the general population (ILO, 2001). This is an especially important target population because ICT competencies improve employability (OSP, 2009). According to the General Social Survey conducted in 2005, unemployed individuals have less access to a computer at home, less had used the internet in the past twelve months, more reported having low skills and less reported having high skills then the employed, students or retired individuals (Statistics Canada, 2005). Figure 11 demonstrates the magnitude of variance between the unemployed and all others in Ontario on select ICT usage and competency indicators.

Figure 11: Rural Unemployed and Other ICT Literacy Divide



2.8 Initiatives to Address Digital Divides

In this section, I provide the context of governmental and private initiatives targeting digital divides. Many papers have been published on the matter from a small group of Canadian researchers since 1993 (Riley, 1993). The primary barriers perpetuating the digital divides are access and capability (Hudson, 1994). Ontario has focussed on connecting all Ontario citizens to broadband internet (Digital Ontario, 2009). The competency facet of the rural digital divide has received less attention. The remainder of this section explores the history of initiatives to address the two facets of digital divides.

2.8.1 Public Initiatives

Digital Ontario is a branch of Ontario's Ministry of Government Services tasked with identifying the barriers to fully capitalizing on the opportunities of broadband technology. They identify the following six key research areas:

- Accessible and affordable broadband – encourages full participation and the attainment of a high quality of life in the digital economy
- Next generation infrastructure – a strong, digital and green economy fuels economic social and environmental progress.
- Innovation in a digital economy – encourages citizens and businesses to work together to create new ideas, products and services.
- Digital citizens and businesses – enables the achievement of a strong digital economy through life long e-learning initiatives.
- Digital governments and communities – encourages citizen engagement, efficient service delivery and intelligent, sustainable communities and regions.
- Digital inclusion – encourages equitable access for all to benefit from high-speed ICT. (Digital Ontario, 2008)

These priorities inform a strategy for capitalizing on the benefits afforded by ICT. The digital inclusion priorities address accessibility but also the capability facet of the rural digital divide. The rest of this section describes the specific initiatives resulting from Digital Ontario's priorities.

2.8.1.1 Accessibility

Historically, the largest barrier preventing rural people from capitalizing on ICT has been access to broadband internet. It is costly to provide digital broadband infrastructure to people living in rural and remote areas making it unviable for telecommunications companies. The Ontario government has recognized this by providing subsidies to telecommunications companies through Rural Connections Program (Digital Ontario, 2009).

Rural Connections Program

The Rural Connections program is a large initiative underway in Ontario. Digital Ontario - an inter-ministry agency accountable to OMAFRA, Ministry of Government Services and the Ministry of Economic Development and Trade - is the administrator. Its objective is to connect every Ontario resident to broadband internet to:

- reduce broadband access gaps in rural southern Ontario to enable small and medium size business to fully participate in the digital economy;
- enable municipalities to use broadband infrastructure for enhanced computer applications and provide innovative services to citizens;
- improve public access to e-government services and information; and
- support businesses and citizens to effectively utilize broadband for economic and social development. (Digital Ontario, 2009)

These improvements are foreseen to have the following benefits:

- Help make Ontario more productive, innovative, and competitive in the global economy;
- Enable a diversified economy in rural communities to foster entrepreneurship and enable the growth of small and medium enterprises;
- Enhance the quality of life for citizens in rural areas of southern Ontario through improved education and skills training, health care, multi-level government information and community and global information resources;
- Enable municipalities to use technology enhancements for cost-effective, innovative applications (e.g., GIS). (Digital Ontario, 2009)

This initiative has invested approximately one-hundred million dollars in sixty-nine different initiatives; however, gaps remain. In July 2009, the McGuinty government announced a four-year extension of the Rural Connections Program. The objective of this extension is to establish connectivity to as many outstanding municipalities as possible (OMAFRA, 2009).

2.8.1.2 Capability

The Connect Ontario strategy identifies improving ICT competencies using e-learning. E-learning is learning opportunities offered through online courseware. I describe the costs and benefits of e-learning below.

E-Learning

E-learning has emerged as a dominant education and training delivery mode. Its primary benefit is it allows individuals to access training and educational opportunities wherever there is

an ICT connection. "Technology renders place irrelevant to a considerable degree." (Martindale, 1964) It significantly improves the ability of potential rural and remote learners to access competency training. The primary detriment of providing e-learning for ICT training is low-level learners that do not possess rudimentary ICT competencies (e.g. mouse-use and typing) have severe learning limitations. E-learning programs and environments are typically beginner user-friendly; however, some level of competency is necessary (Interviewee G, 2009).

E-learning has also improves on traditional classroom learning in the following ways:

- has higher retention rates,
- requires less time to complete courses,
- enables self-paced learning,
- is less intimidating than classroom courses, and
- encourages more interaction in synchronous learning courses.

It also has the following drawbacks for learners:

- it is difficult for very low ICT competencies learners,
- it lacks the portability of printable workbooks, and
- it reduces social and cultural interaction. (CCL, 2009)

The nature of the drawbacks compared to the benefits offered by e-learning programs suggests some learners will benefit more. The learner best suited for e-learning:

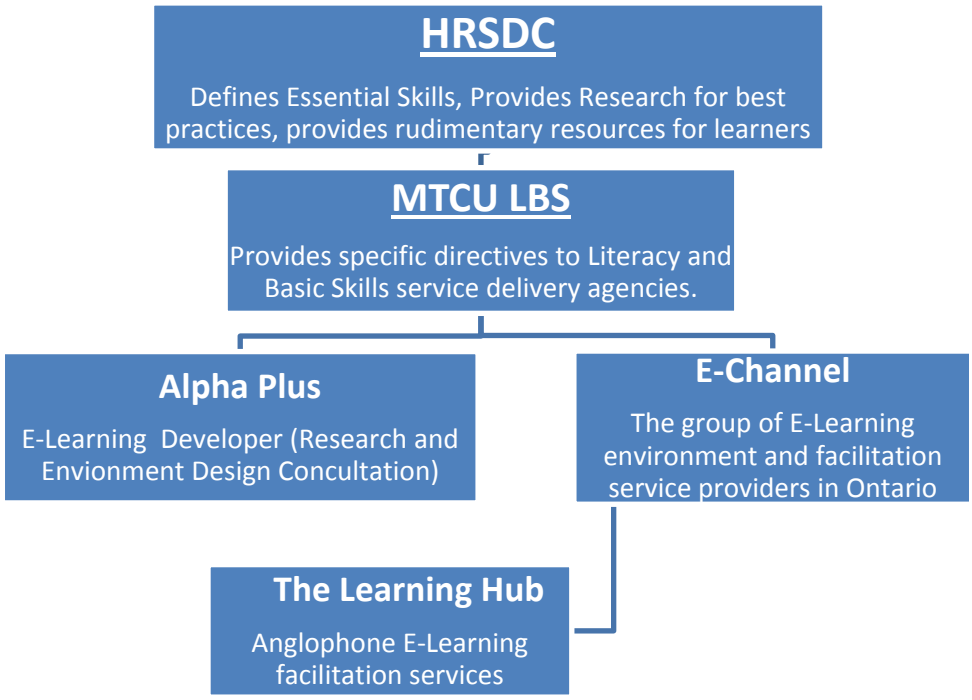
- does not differ demographically from traditional classroom learner,
- has a higher preference for working on their own,
- has similar needs for support and connection to their program and facilitators as traditional classroom students, and
- may take longer to complete courses because they have less time to devote to learning activities (Porter and Sturm, 2006)

Understanding the benefits and drawbacks and the type of learner best suited for e-learning opportunities informs the design, delivery and referral process.

2.9 Essential Skills Adult Training in Ontario

An amalgamation of public and private entities delivers the public-funded adult training services in Ontario. The primary task of the Ministry of Training, Colleges and Universities (MTCU) is to provide directives and management for private service delivery agencies. The public bodies involved in adult training e-learning programs in Ontario are Human Resource and Skills Development Canada (HRSDC), MTCU, Literacy and Basic Skills (LBS) agencies, AlphaPlus, other E-Channel services providers, including the Learning Hub. Figure 12 illustrates the hierarchical relationship between key partners involved in delivering LBS e-learning services in Ontario.

Figure 12: Hierarchical Relationship between Key Organizations for LBS E-Learning in Ontario



2.9.1 Human Resources and Skills Development Canada (HRSDC) – Defining Essential Skills

HRSDC Essential Skills division is responsible for specifying and defining the essential skills for succeeding in modern society. HRSDC includes the following competencies as essential for Ontario's workforce:

- Reading Text – reading material in the typical structure
- Document Use – tasks that involve a variety of information displays in which meaning is designated to words, numbers, and symbols based on their spatial arrangement
- Writing - writing in documents such as filling in forms and non-paper –based writing such as typing on a computer
- Numeracy – use of numbers required to think quantitatively
- Oral Communication – use of speech to exchange thoughts
- Thinking Skills – evaluating ideas or information to reach a rational decision (i.e. problem solving, decision making, critical thinking, job task planning and organizing, significant use of memory, and finding information)
- Working with Others – work in a team to efficiently complete tasks
- Computer Use – variety and complexity of computer use
- Continuous Learning – recognizing the importance of lifelong competency upgrading. (HRSDC, 2010)

They also provide self-assessment tools, learning resources and training supports corresponding to the essential skills. The tools and resources provide an overview of the types of skills involved within each essential skill category. They do not suffice as comprehensive training (HRSDC, 2010).

2.9.2 Ministry of Training, Colleges and Universities (MTCU)

MTCU is responsible for providing tertiary education and adult training services in Ontario. The ministry is divided into six divisions:

- Post-Secondary (Tertiary)Education;

- Strategic Policy and Programs;
- Corporate Management and Services;
- French Language,
- Aboriginal Learning and Research; and
- Employment and Training.

The Employment and Training division is divided into four branches:

- Business and Systems Management;
- Service Delivery;
- Service Standards and Accountability; and
- Service Standards and Management.

The Business and Systems Management acts as a liaison between industry and available human resources. The Service Delivery Branch develops, coordinates, implements and evaluates public-funded training and education programs. It also works with economic sectors to help them identify successful strategies to addressing economic transitions.

The Service Standards and Accountability Branch addresses management issues for their private partners, including: contract, operations and resource planning. It sets the standard across Ontario for leading edge employment, training and adult training services. They provide oversight for Literacy and Basic Skills organizations. MTCU's branches fund, develop policy, ensure fairness and equity in the contracting process and provide service standards for the over four thousand private Literacy and Basic Skills firms in Ontario (MTCU, 2010).

2.9.3 Literacy and Basic Skills Division

The Literacy and Basic Skills (LBS) division is responsible for providing essential competency training for Ontarians. LBS services include:

- Information and referral – direct clients to programs appropriate to their goals.

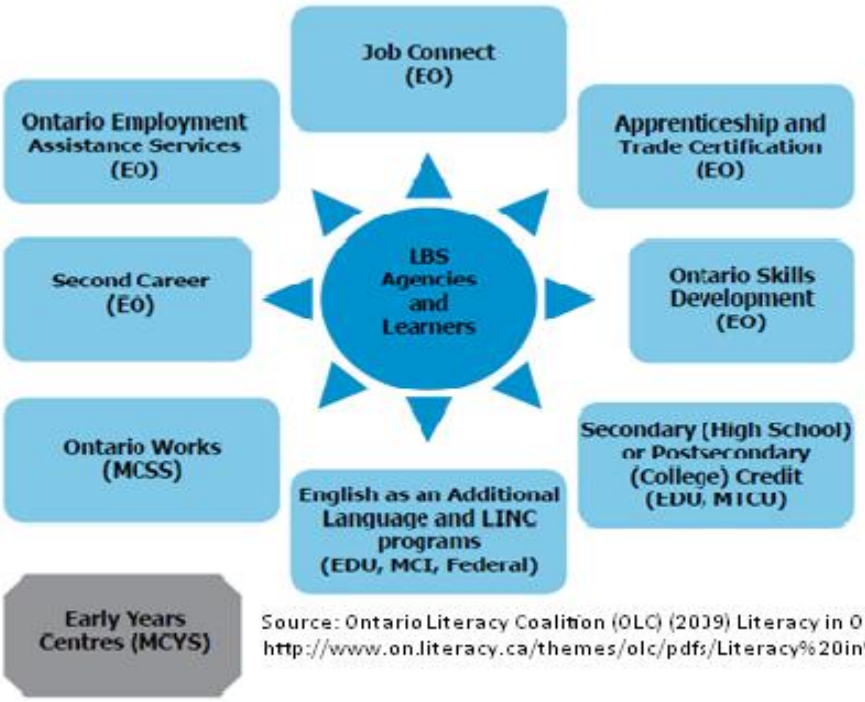
- Initial Assessment – understand the type of services the client will benefit from by collecting the learner and other outcome goals.
- Training Plan Development - develop a complete needs assessment to tailor the training approach.
- Training – provide quality training in areas beneficial for client's economic and social success, and
- Follow-up – ensure the client is benefiting from the service they have received and does not require additional assistance. (OLC, 2009)

These services are presented in the typical order the client will access them. The typical procedure for delivering LBS services is:

- Community outreach advertising and promotion informs potential clients of the existing services.
- Clients access the initial referral agency within LBS (e.g. internal employment counselling, external employment barrier assessors)
- An initial assessment is conducted to identify the client's goals and barriers.
- The assessment results are used to provide referral to the most appropriate services under the LBS umbrella.
- Training services conduct another assessment to identify specific learning goals and barriers to develop an individualized learning pathway.
- The learner follows through with their learning plan.
- A follow-up is conducted with the client to understand their perception of the services they received and assess if they require more. (OLC, 2009)

Figure 13 illustrates the agencies and organizations available to LBS clients through referral by LBS initial assessors.

Figure 13: MTCU's LBS Referral Options for Learners in Ontario



LBS services also manage service delivery agencies. Their management defines the target populations who require unique learning pathways (i.e. Anglophones, Francophones, Aboriginals and the Deaf), curriculum development to improve these competencies, program delivery methods (i.e. traditional or e-learning), the firms who receive service delivery contracts, and the targets service providers must report to indicate their success (OLC, 2009).

2.10 Research Question

How can the services defined in section 2.9 be improved to comprehensively train in all the essential ICT competencies? In addition, how can these services be made more accessible to people living in rural areas and the unemployed to overcome digital divides? E-learning adult training offers an opportunity for adults living in remote and rural regions to access education. In addition, the current adult training services in Ontario targets unemployed individuals through their partnership with Employment Ontario, who's Employment Counsellors provide referral services (OLC, 2009). Ontario's e-learning adult training regime is the government body

responsible for addressing this issue. The question that will direct my analysis is **how does Ontario's current public-funded, e-learning ICT training programs offered through adult training services perform against the benchmark and alternative programs, considering the specific needs of rural and/or unemployed learners?**

3: ICT training, E-Learning Program Evaluation Study Design

This chapter outlines the study's research design. I conduct data collection and analysis to inform policy alternatives and recommendations pertaining to the implementation of a more robust ICT training program in the public-funded, e-learning adult training regime in Ontario. This study is specifically interested in unemployed adults and adults living in rural areas. I chose the type of methodology to enable data collection techniques that will produce a valid, reliable and robust analysis used to address the policy problem.

3.1 Case Study Methodology

I use a case study methodology to generate information about the effectiveness of ICT training programs. A case study approach is "an intensive study of a single unit for the purpose of understanding a larger class of (similar) units." (Gerring, 2004) This approach is appropriate to generate information about the policy problem because it is an empirical approach to identifying the components of an effective ICT training program. A quantitative approach will provide more precise information about the net benefit of the program but requires data that is currently unavailable. A qualitative case study approach is flexible using a variety of techniques to collect data.

A case study approach is often used as a catchall for qualitative comparison research. The most closely related approach is the cross unit analysis. Table 1 describes the differences between a case study and cross-unit analysis study.

Table 1: Methodology Comparison - Case Study to Cross-Unit Analysis

	Case Study	Cross-Unit Analysis
Type of Inference	Descriptive	Causal
Scope of Proposition	Depth	Breadth
		Boundedness
Unit Homogeneity	Case Comparability (internal)	Representativeness (external)
Causal Insight	Causal Mechanisms	Causal Effect
Causal Relationship	Invariant	Probabilistic
Strategy of Research	Exploratory (Theory Generation)	Confirmatory (Theory Testing)
Useful Variance	For only a single unit	For many units

Source: (Gerring, 2004)

The comparison of these two approaches further illustrates my decision to use a case study approach. The data and studies on ICT training programs are limited because they are relatively new and often delivered by private companies - do not collect outputs and outcomes data. This is an in-depth analysis using all available information, which evaluates inputs to an effective program because outputs and outcomes data are limited.

Table 1 also illustrates the limitations of case-study analyses. A case study approach does not provide definitive results on the magnitude of benefits. It is an analysis that describes the costs and benefits of other jurisdictions who have taken similar initiatives (Yin, 2006). It is inappropriate to generalize the results with certainty to a base unit. It is more appropriate to use the results of the comparison as suggestive for potential reforms and the benefits that may accrue as a result.

3.1.1 In-Depth Program Evaluation

I use a particular kind of case study where I evaluate all the necessary inputs of an effective program. I use this analysis to make informed decisions about the type of program requ7ired to address the barriers perpetuating the rural and unemployed digital divides.

3.2 Study Design Details

The research question directs the entire research process. It contains all the key characteristics required to conduct sound research. The base case is the current public-funded e-learning ICT training regime - defined in section 2.9 and 4.1.1. I am comparing the base case to other ICT training programs. The programs are compared on a variety of criteria representing the necessary inputs for ICT e-learning programs. Programs with evidence of comprehensively identifying the important components of the most essential criteria are deemed effective.

3.3 Data Collection Methods

The objective of data collection is to compile as much information as possible to represent all the essential criteria of effective ICT training programs. The case study approach allows the use of a variety of data collection techniques. The goal is to maintain consistency on data collection techniques across organizations to maximize their comparability. The objective takes precedence over the goal: the metrics used across organizations to measure a criterion ideally will be identical; however, if information is not available and I collect it using idiosyncratic means, this information will be included. Measures collected using idiosyncratic means can reduce the reliability of the data collection technique. It does allow for more information to be included in the analysis which improves the robustness of the study. The primary modes of data-collection are document/website analysis and interviews. The following sections describes the methods used to conduct each primary data collection technique.

3.3.1 Document/Website Analysis

Case study methodology combines a variety of evidence (i.e. documentation or archival records, interviews, direct observations, participant-observation and physical artefacts) to produce a robust analysis (Yin, 2006). I use document and website analysis for any criteria where documentation evidences its presence within the program. I consider official documents (i.e.

reports, memos, academic studies, extensive evaluation document) to be more objective than interview or survey data. Its objectivity depends on the importance of providing reliable and valid data. I discuss this in further in section **Error! Reference source not found.** Website analysis is similar to document analysis with the primary difference being the medium and exposure to the public.

I use a flexible protocol for data collection from documents and websites:

- Develop criteria for evaluating ICT program.
- Determine the criteria that are suitable for document analysis.
- Conduct an extensive search of the organization's website and documentation; including hidden information
    - accessed via:
        - online membership,
        - contacting the documentation administrator, and
        - reveal during interviewing.
- Determine the applicability of information in the documentation and on the website to criteria.
- Use this information as proxies to measure the criteria.

3.3.2 Interviews

I use interviews for any information required of a subjective nature; this includes data that I could not access in document form and criteria where corroboration between documents and reported data is useful. I collect subjective data to provide information on specific perceptions of stakeholders indicating any inconsistencies with documented evaluation data; to reveal tacit knowledge on the efficiency and effectiveness of programs; and to reveal experiences of implementing and delivering programs and to indicate level of morale from practitioners.

3.3.2.1 Perception Data

The perception data is used to document stakeholder perceptions of the institution's performance. This information alone is insufficient to assess the quality of the program because the administrators, personnel, and learners vary between different institutions, which limit comparability. Perception data does reveal the strengths and limitations of the organization from an internal perspective which is only available using interview methodology. A mix of objective and subjective data improves the robustness of the evaluation. .

3.3.2.2 Outstanding Data

My objective is to collect as many indicators of a program's ability to address the policy problem while considering feasibility and applicability. This impacts the reliability of the study as it is impossible to maintain a completely systematic process. I collect as much information as possible using interviews despite problem that may arise in comparing this information to information compiled from documentation. This approach will reduce comparability but provide a more detailed understanding of the programs' effectiveness.

3.3.2.3 Interview Style

This study uses three types of interviews: Face-to-Face (FtF), Telephone and Email. Face-to-Face interviewing is the preferred technique whenever perception data is required. In FtF interviews, the researcher can document non-verbal cues, revealing useful information not available via verbal expression. Also FtF interviews allow the researcher to adopt a conversational approach to elicit more meaningful results from participants. FtF interviewing is not possible for many of the interviews with participants due to large travel distances. Interviews with participants that are not physically accessible are conducted via telephone. The telephone allows for a dynamic interview process, assessing tonal and pace cues that impact the response.

The non-verbal and non-tonal cues are sacrificed using the telephone as opposed to FtF (Opdenakker, 2006).

I conduct purely informational interviews via email. Email interviewing reduces the flexibility of the interview instrument as the interviewer is unable to probe for additional or better data if elaboration is required. It does not allow the researcher to assess tone, facial and body expressions. It also allows the participant to analyze their response allowing for more politically-oriented or self-benefiting responses (Opdenakker, 2006). These limitations are less detrimental when collecting purely informational data because the context will have little impact on the response and there is less incentive to skew the responses than perception data. Allowing more time is a significant benefit because the participant can access pertinent documentation and provide more accurate and valid responses (Murray and Sixsmith, 1998). This can be detrimental because it allows the participants to procrastinate with their responses. I schedule reminder emails to overcome this limitation. An effective reminder email is important to avoid non-responses. Email is also a cheap and accessible method for distributing the interview instrument.

3.3.2.4 Interview Considerations

The interview approach contains limitations primarily due to the comparability of units to the base unit. Its strength being a method of revealing the reflexive perceptions of stakeholders on the effectiveness and feasibility of the program are crucial for understanding the true utility of the program. Using sound interview techniques will reduce limitations while improving the benefits of the interview technique. The interviewer should consider:

- implications arising from the interviewee's characteristics (i.e. authority, level of education, language skills and incentive for biased responses),
- maximizing the quality of responses by designing an interview instrument that:
    - reduces the length and complexity of the questions,
    - words the questions to best elicit accurate and valid responses, and

    - orders the interview instrument to achieve logical progression.
- how to effectively probe to get useful additional information, and
- the optimal amount of participants to collect enough information to adequately measure the study criteria (Opdenakker, 2006).

3.4 Case Selection

Selecting units is a crucial component in the case study methodology process. Effort during the selection process maximizes the validity and reliability of the analysis.

3.4.1 Considerations

I use a most similar approach, which minimizes confounding unit characteristics. Confounds reduce the validity of the case study analysis (Gerring, 2004). I considered the following characteristics to control confounds and to maximize the validity, reliability and importance of the analysis:

- it is an e-learning program,
- it includes robust ICT curriculum and training,
- it has respected content and service,
- it has a large amount of users,
- it compiles and stores service quality data,
- it is accountable to an authoritative body,
- it has the capacity to conduct sound research, and
- it offers access to internationally recognized accreditation testing.

The importance of e-learning for addressing the policy problem is discussed in section 2.8.1.2. The objective of this analysis is to analyze the current e-learning regime to improve service delivery. I chose to analyze effective programs with robust ICT training to understand what should be done rather than what should not. The remaining considerations target the reliability and validity of the data. A respected and well-used program is more reliable because there reputation is dependent on the trust they have established with their clients and partners. Data

availability is crucial to the robustness of this analysis. Consistently reporting to an authoritative body scrutinizes the quality of their performance. Authoritative bodies are also more likely to enforce strict service quality reporting. A program using sound research techniques will produce more valid and reliable data. Larger organizations are more likely to have specialized and skilled research departments with the capacity to conduct sound research. I provide a description of the importance of accreditation testing in section 0.

3.4.2 Selections

Jenison's Impetus Plus (Jenison) and the Goodwill Community Foundation – GCFlearnfree.org (GCF) were chosen as comparators. ECDL/ICDL offers accreditation services; however, they recognize that their clients must possess adequate competencies to attain this accreditation. There are over forty ECDL/ICDL approved e-learning facilitation partners (ECDL, 2010). It would be over burdensome to evaluate all these e-learning services. This analysis uses one e-learning service provider as a representative of approved partners. Jenison is chosen under the recommendation of the Program Director Executive for the ECDL Foundation (Interviewee D, 2010).

GCF is the current recommended ICT training program by the Learning Hub and other LBS partners (Interviewee B, 2010) (Learning Hub, 2010). GCF is included in the base case but I analyze it separately because the Learning Hub has some ICT training in its internal environment. I analyze GCF to determine its effectiveness in comparison to internal Learning Hub training and ECDL/ICDL recommended facilitation partners.

3.4.2.1 Considerations Results

Table 2 describes the unit selection considerations across the selected units.

Table 2: Unit Selection Considerations Results

	Base Case	GCF	Jenison's Impetus Plus & ECDL/ICDL
E-Learning Program	Yes	Yes	Yes
Robust Comp. and ICT Curriculum	No	Yes	Yes
Respected Content and Service	Respected locally	Respected throughout North America	Most used program internationally
Well-Used	Increasing usage but limited in comparison	Over 1,000,000 users in 10 years	Top recommended ECDL/ICDL partner (Interviewee E, 2010)
Data Availability	Report bi-annual targets to MTCU	Free not-for profit organization – mandate is to spread ICT competencies	Largest program - over 148 potential cases
			Well-established
			Mandate to spread program - requires evidence
Accountability	Target management by MTCU	Not accountable via user funding or a regulatory body	Incentive to present euphemistic results
Sound Research	Limited capacity due to labour resource constraints	Limited funding for non-essential research	Large company with specialized Research and Development
Internationally Recognized Accreditation	No	Not well-recognized	Yes

GCF offers relatively robust ICT curriculum as defined by E-Skills UK's ICT training curriculum[1] is respected and a significant number of users. There are concerns with data availability, accountability and ability to conduct sound research, which may limit the validity and reliability of the program analysis; however, GCF is the current external ICT training partner of the public-funded, e-learning adult training regime in Ontario making inclusion necessary. Jenison's Impetus Plus also contains all the essential characteristics. The only concern raised by the consideration is its accountability making it important to design data collection methods to guard against euphemistic reporting.

[1] See Appendix A for detailed description of E-Skills UK Curriculum.

3.5 Evaluation Framework

What are the necessary components of an effective and efficient ICT training program? This section defines an ideal e-learning program and summarizes the process of converting the conceptual criteria into pragmatic measures.

3.5.1 Ideal E-Learning Program Benchmark

I use a verified benchmark to define the important components of an ICT e-learning program. I derive this benchmark from general and e-learning program evaluation literature. The National Educational Technology Standards for Students (NETS-S) *Essential Conditions: Necessary Conditions to Effectively Leverage Technology for Learning* defines the necessary components of an ideal e-learning program (NETS, 2009). Criteria from other sources represent general characteristic of educational program evaluation that are omitted from the NETS-S benchmark but pertinent for analyzing the effectiveness of ICT e-learning programs. I split the benchmark into five domains: Outputs, Content, Support, Administration and External Context to clarify the evaluation process. I define the criteria within these domains below.

3.5.1.1 Outputs

All other domains define the inputs required to achieve the ICT e-learning benchmark. The Outputs domain illustrates the quality of outputs from the training program. Outputs for training and educational programs are the benefits experienced by participants because of the program. Educational and training benefits are improved when learners receive respected and recognized credentials used as a convenient symbol of competencies possessed. Table 3 defines the criteria within the Outputs domain.

Table 3: Outputs Domain - Ideal E-Learning Program Benchmark Criteria Definition

Criteria	Description	Source
Improves Competencies	The program must achieve it manifest function of improving ICT competencies of its learners.	Harkness, 2005
Number of Users	The program must attract, enroll and retain its learners to be considered effective. Usage is a function of exposure to potential clients, barriers to usage (e.g. cost) and satisfaction from clients who recommend it to others, which partially indicates quality of service delivery.	Harkness, 2005
Learner's are Satisfied	Learner satisfaction is one of the key factors indicating the success of a program.	Askar
Provides Credentials	Credentials significantly improve employment and income prospects controlling for the impacts of improved competencies. The sheepskin effect is significant in Canada.	Ferrer and Riddel, 2002 Jaeger and Page, 1996 Park, 1999

Provides Credentials is an Input category that is essential for assessing the quality of the outputs. Credentialing is the process of verifying competencies attained using a symbol (e.g. diploma, degree, and certificate). Reliable credentials improve the prospect of gaining employment and attaining a higher salary (Ferrer and Riddel, 2002, Jaeger and Page, 1996, Park, 1999). Reliable credentials are especially important for ICT competencies because they allow access to the digital economy. The digital economy is less bounded by regional or national boundaries. Digital economy and other global employers need to verify the skills and competencies of potential employees prior to hiring. Making a mistake in the hiring process can be costly making the employers reluctant to hire without verification. Internationally recognized and respected credentials are crucial to access the full breadth of opportunities afforded by possessing a base level of ICT competencies.

3.5.1.2 Content

The Content domain includes the components of the e-learning environment that are essential for a high-quality program. This domain encompasses content as well as the style of delivery. The literature indicates that an individualized and dynamic learning process is a preferable method of delivering educational activities. Table 4 defines the criteria within the Content domain.

Table 4: Content Domain - Ideal E-Learning Program Benchmark Criteria Definition

Criteria	Description	Source
Robust Curriculum	Content standards and related digital curriculum resources that are aligned with and support digital-age learning and work	NETS, 2009
Assessment and Evaluation	Continuous assessment of teaching, learning, and leadership, and evaluation of the use of ICT and digital resources	NETS, 2009
Instructional Method	Learning environment includes a variety of instructional methods (e.g. reading, doing activities, seeing pictures, hearing someone talk) to acknowledge that different learners have different learning styles.	AlphaPlus, 2003
Learning Communities	Develops and facilitates a learning environment that encourages interaction between learners and facilitators in a convenient-manner and comfortable atmosphere.	AlphaPlus, 2003

3.5.1.3 Support

The Support domain includes the components of an e-learning program required to facilitate the attainment of competencies. It is important to have a variety of supports including documentation and real-time interaction (NETS, 2009). Table 5 defines the criteria within the Support domain.

Table 5: Support Domain - Ideal E-Learning Program Benchmark Criteria Definition

Criteria	Description	Source
Learning Documentation	Learners are made aware of their expected learning outcomes, expectations, beliefs and feelings toward learning which encourages active participation and self-directed learning.	AlphaRoute, 2003
Facilitator Support	Educators, support staff, and other leaders skilled in the selection and effective use of appropriate ICT resources	NETS, 2009
Student-Centered Learning	Planning, teaching, and assessment centered around the needs and abilities of students	NETS, 2009
Technical Support	Consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources	NETS, 2009
Student-Centered Learning	Planning, teaching, and assessment centered around the needs and abilities of students	NETS, 2009
Assessment and Evaluation	Continuous assessment of teaching, learning, and leadership, and evaluation of the use of ICT and digital resources	NETS, 2009

3.5.1.4 Administration

The Administration domain includes the components of an e-learning program required for effective management of an e-learning organization. An autonomous management style that

is accountable to learners and has consistent and adequate funding is considered effective administration (NETS, 2009). Table 6 defines the criteria within the Administration domain.

Table 6: Administration Domain - Ideal E-Learning Program Benchmark Criteria Definition

Criteria	Description	Source
Management Style - Shared Vision	Proactive leadership in developing a shared vision for educational technology among all education stakeholders including teachers and support staff, school and district administrators, teacher educators, students parents, and the community	NETS, 2009
Management Style - Empowered Leaders	Stakeholders at every level empowered to be leaders in effecting change.	NETS, 2009
Ongoing Professional Learning	Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas	NETS, 2009
Consistent and Adequate Funding	Ongoing funding to support technology infrastructure, personnel, digital resources, and staff development	NETS, 2009

3.5.1.5 External Context

The External Context domain includes the external conditions required to enable an ICT e-learning program to provide high-quality service to the appropriate amount of receptive learners. This involves analysis of government commitment and general public awareness for e-learning and ICT competencies (NETS, 2009). Table 7 defines the criteria within the External Context domain.

Table 7: External Context Domain - Ideal E-Learning Program Benchmark Criteria Definition

Criteria	Description	Source
Government Commitment	Policies, financial plans, accountability measures, and incentive structures to support the use of ICT and digital learning resources	NETS, 2009
General Public Awareness	Policies and initiatives at the national, regional, and local levels to support schools and teacher preparation programs in effective implementation of technology for achieving curriculum and learning technology (ICT) standards	NETS, 2009

I include criteria from outside the NETS-S framework to improve the robustness of the evaluation. The criteria included outside of the framework are all the Outputs criteria (i.e. does the program improve competencies, is the program used, learners' indicate satisfaction and does

the program provide credentialing upon successfully attaining competencies), instructional method, learning communities and learning documentation.

3.5.2 Data Collection and Organization

I introduce concepts in the previous section; these concepts must be adapted into measurable heuristics to assess the performance of the base case. I convert the concepts into measurable heuristics by splitting the broad criteria into more understandable and manageable sub-criteria based on the important components of the criteria. These sub-criteria inform the data required for comprehensive assessment of the criteria, the ideal data collection method, where to look, who to ask for the information and whether qualitative or quantitative assessment is preferred[2].

I was not able to collect all the information using the ideal methods. Going through the process of concept to measurable heuristic conversion maintains a systematic approach to qualitative research. Qualitative research can often lack structure and morph into a variety a forms to suit partisan interests. It is important to guard against this to achieve valid and reliable results (Gerring, 2004). This study does use a flexible design and does deviate from the ideal systematic approach; however, defining the ideal research project enables assessment of the impact of deviations from the ideal.

3.6 Scoring Scheme

I report the results as frequencies to enable comparisons between the programs on the selected criteria. I convert this qualitative data into quantitative using an objectified scoring scheme using benchmark criteria and sub-criteria. The process of converting qualitative assessment into a numerical scoring scheme is defined below:

[2] See Table 10 to Table 27 for the identified sub-criteria within each domain.

- Compile all the sub-criteria observations,
- Assess the programs performance on each sub-criterion.
- Use these elements to generate a score for the program on each criterion.
    - Programs displaying evidence of each sub-criterion with no features limiting performance on the criteria receive a score of three.
    - Any limiting feature reduces the score by a half mark.
    - Any sub-criteria completely omitted reduce the score by the sub-criterion's proportion of the encompassing criterion.
    - Programs demonstrating some semblance of possessing elements of a criterion but also demonstrate significant limitations based on the sub-criteria receive a score of one.
    - Programs demonstrating no sub-criteria receive a score of zero

The sub-criteria vary in importance to the effectiveness of the program in improving ICT competencies and addressing the barriers to educational opportunities facing rural and/or unemployed people. Thus, limited or omitted sub-criteria and/or criteria may reduce scores more or less than the process defined above. This process outlines the decision-making process for scoring typical or average sub-criteria. I omit the scores from the final assessment if data is missing. If the collection or reporting of data indicates effective performance on a criterion, I assess the importance of data collection for the overall criterion. I designate a zero to the proportion representing data collection and omit the results for the remaining proportion. I illustrate omitted results using a dotted line with a blank area[3].

3.7 Results Interpretation

The scoring scheme attempts to maximize the objectiveness of the results. Programs that attain a score of three on any criterion adequately demonstrate all the sub-criteria identified. The aggregate percentages for the domains represent the proportion of all the sub-criteria within each domain adequately assessed. Higher percentages indicate higher quality in comparison to the

[3] See Figure 14 to Figure 20 for evaluation results graphs.

benchmark. The highest percentage overall indicates the highest quality program. I use the scores to indicate the strengths and weaknesses of the programs. I assess the scores on the base case against the benchmark and the scores of the other programs. I use the results to inform recommendations on the strength of each program for improving ICT competencies and reducing the barriers to accessing learning opportunities experienced by rural and unemployed people.

4: ICT E-Learning Program Evaluation Results and Analysis

Chapter 4: seeks to provide an empirical answer to whether or not reforming the existing ICT e-learning programs within Ontario's Adult Training regime worthwhile. I determine this by assessing the performance of alternative e-learning ICT training programs. This chapter provides descriptions of the cases used for comparison, the results of the evaluation and analysis of these results. The specific observations of each case on each domain are available in Table 10 to Table 27 (Appendix B).

4.1 Case Descriptions

In the following section, I provide descriptions of the programs establishing the necessary context for understanding the results.

4.1.1 Ontario E-Learning Adult Training Regime (OEATR) – Base Case

This analysis reveals strengths and deficiencies with the current e-learning programs and ICT training used by Adult Training and Literacy and Basic Skills (LBS) services in Ontario. There are many e-learning and ICT training service providers in Ontario. I represent these programs using the moniker Ontario's e-learning adult training regime (OEATR). E-learning provides the opportunity for those with mobility issues due to geographic isolation, physical disability or other issues inhibiting traditional classroom learning access to learning opportunities. There are four streams of e-learning provided in Ontario- Anglophone, Francophone, Deaf and Aboriginal to target the unique barriers of these populations (Interviewee A, 2009). The E-Channel and AlphaPlus combine efforts to develop the e-learning environments for all streams. Four different services providers deliver the facilitation services. The Francophone stream uses

J'aime Apprendre, Aboriginal - Sioux Hudson and deaf – Canadian Hearing Services and Durham Deaf Services. The Anglophone stream uses the Learning Hub. I analyze the Anglophone services exclusively as they have the largest proportion of clients and potential clients.

The Learning Hub acts as a hub to access all Anglophone e-learning services available through OEATR. They provide access to four different e-learning programs: Centra, Moodle, Plato and LearnScape (Learning Hub, 2010). The Avon Maitland District School Board (AMDSB) administers the Learning Hub. It receives most of its funding in conditional transfers from the Ontario Government and local municipal governments (MTCU, 2010). They were awarded the contract in 2007 and have been fully functional for two years (Interviewee C, 2010). Their training services are in their infancy but are continuing to develop with the help of the Learning Hub administration, AlphaPlus research and MTCU's targets.

The E-Channel develops e-learning environments and provides learning facilitation services. The Learning Hub provides synchronous[4] and asynchronous[5] courses. The E-Channel programs are the most used e-learning service offered by the Learning Hub (Learning Hub, 2009).

AlphaPlus provides the theoretical and empirical base for developing e-learning environments, support services and facilities in Ontario. They work in conjunction with all LBS e-learning services to remain up-to-date on e-learning best practices.

This evaluation considers all the capabilities within OEATR's e-learning programs. The current ICT training programs have limited breadth. I analyze the full capabilities of their

[4] Synchronous learning is an e-learning style where the learner interacts directly with a learning facilitator, and often peers, in an on-line e-learning environment.

[5] Asynchronous learning is an e-learning style where the learner can participate in learning activities at any time from any place with a computer and the required software but does not have real-time access to a learning facilitator.

training regime including e-learning programs for reading, writing and numeracy. Robust Curriculum is the only criterion exclusively analyzing ICT content, which affects direct comparability.

4.1.2 Goodwill Community Foundation – GCFlearnfree.org (GCF)

GCF is the recommended external ICT training partner of OEATR. People using Employment and Training services in Ontario that require ICT skill upgrading may be referred to GCF for more robust ICT training (Interviewee B, 2010). GCF is a not-for profit organization which offers e-learning in courses including Everyday Life, Math and Money, Work and Career and Computer Training (GCF, 2010). They offer all their courses free of charge relying on donations for funding. They have significant usage having served over one million learners in their ten years of operation (GCF, 2010).

4.1.3 Jenison's Impetus Plus – ECDL Training Partner

ECDL provides internationally recognized accreditation for ICT competencies. From an employer's perspective, accreditation is an efficient and reliable method for ensuring potential labour or human resources have the necessary competencies to perform tasks required in vacant positions (ECDL, 2010). From the individual's perspective, accreditation improves competencies to a base line defined as adequate for accessing occupational opportunities. Recognition is a crucial determinant of the value of accreditation. ICT competencies enable improved access to the digital and global economies making it crucial that it internationally recognizable.

Accreditation is only useful if the person attempting to attain accreditation has a level of competence to obtain it. ECDL/ICDL has collaborated with competency facilitation services to improve clients' ICT competencies. These partners must offer ICT curriculum congruent with the most recent, official ECDL Syllabus to get ECDL/ICDL endorsement (ECDL, 2010). There are over twenty partners approved by the ECDL foundation. Analyzing all twenty partners is not

feasible; thus, I asked ECDL officials to recommend one approved e-learning program that best represents all e-learning partners. Jenison's Impetus Plus program is recommended as this training partner (Interviewee D, 2010).

4.2 Results and Analysis

In this section, I present the case study analysis of the domains described in section 3.5.1. I explain key observations used to assess the cases on the criteria[6] I then present the aggregate scores on the criteria by each domain. I identify each case in the graphs and I denote the criteria by different colours within the stacked bar graph. The graphs illustrate the strengths and weaknesses of the programs by the criteria. The overall height of the bars indicates the aggregated performance within each domain. The tallest bar indicates the top performing case. I then provide a brief analysis of the implications of the scores on the criteria and/or overall scores on the domain. I then aggregate all domains for each of the programs to indicate the overall performance on the E-Learning Program Benchmark. The graphs compare the performance for the programs. A perfect score on any domain can be determined by multiplying the number of criteria by three. This number in comparison to the program's score enables assessment against the benchmark.

4.2.1 Outputs

The Output domain represents the quantifiable effect of the program on users and graduates. I assessed the criteria using official corporate reports, e-learning environment participant observation and interviews with program facilitators and administrators.

[6] See Appendix B for detailed observations on each criterion.

4.2.1.1 OEATR

OEATR documents its outputs for target reporting to the Ministry of Training, Colleges and Universities (MTCU) on a bi-annual basis (Interviewee G, 2009) (Learning Hub, 2008) (Learning Hub, 2009a). I use these documents to assess the Outputs criteria. I also conducted interviews with the Learning Hub Project Co-ordinator and a Learning Hub Facilitator to supplement the reports for MTCU or generate information that is not available in these reports. I consider the Learning Hub representative of the entire OEATR capability.

The Learning Hub reports competency improvement for reading, writing and numeracy but does not have a method for evaluating improvement for ICT competencies. They use a tasked-based assessment that separates competencies into five levels; where people at level one can accomplish rudimentary tasks such as reading signs, filling out personal information and telling time and at level five they can read complex literary pieces, write reports and decipher complex graphs (OLC, 2009). The target reports indicate low-level learners (levels one and two) are most successful at improving their competency levels in reading, writing and numeracy. Moderate and high-level learners (levels three and four) rarely improve their competencies by one or two levels (Learning Hub, 2009).

They also assess goal attainment to determine the success of learners. Goals are defined in the assessment stage to determine the best method of achieving their target. Typical goals are "to find employment", "feel more confident", "get my General Equivalency Degree (GED)" – High School diploma equivalency, and "improve my skills to access higher learning opportunities" (Interviewee G, 2009). In the 2008 – 2009 fiscal year, sixty per cent met their goals upon exiting the program; forty-six per cent exited to further training opportunities and fifteen per cent exited to employment (Learning Hub, 2009). It is difficult to collect accurate data on goal attainment because learners exiting the program are unlikely to report back making the reports less representative and accurate (Interviewee G, 2009).

The Learning Hub collects demographic, competency and preference data on entrants. One-thousand and seventy-eight new learners were enrolled in a Learning Hub and E-Channel/AlphaPlus program between April 2008 and September 2009 (Learning Hub, 2008) (Learning Hub, 2009a). MTCU sets enrolment targets at one-hundred and twenty new learners per year (Interviewee G, 2009). The potential demand for Adult Training Anglophone e-learning is significantly higher than the target and the actual enrolment[7].

AlphaPlus collected detailed user-satisfaction data in 2003 on E-Channel service delivery – services most extensively used by the Learning Hub. The Learning Hub collects user-satisfaction surveys to report on the effectiveness of services periodically. The April 1, 2009 to September 30, 2009 survey found that 100 per cent of asynchronous learners were 'satisfied' and would recommend the program to friends. When asked to specify what they enjoyed most, participants reported they liked that "they could work whenever they wanted" and "at their own pace". In the synchronous format, learners liked that the "instructor provided opportunity for questions" and the "value of interacting with other learners". When asked about potential improvement, learners reported most often "different courses should be offered", "more types of classes", "teachers explained too fast", "break courses into smaller sections" test to determine what is still not understood" (Learning Hub, 2009b). There is no accreditation testing, mandatory final tests or any credentials for learners successfully completing OEATR learning activities.

4.2.1.2 Goodwill Community Foundation (GCF)

GCF are a not-for-profit organization that provides free e-learning services. I was unable to access any GCF administrators or practitioners for interviews. Evidence from which to evaluate the effectiveness of the GCF program was generated from analysis of GCF corporate

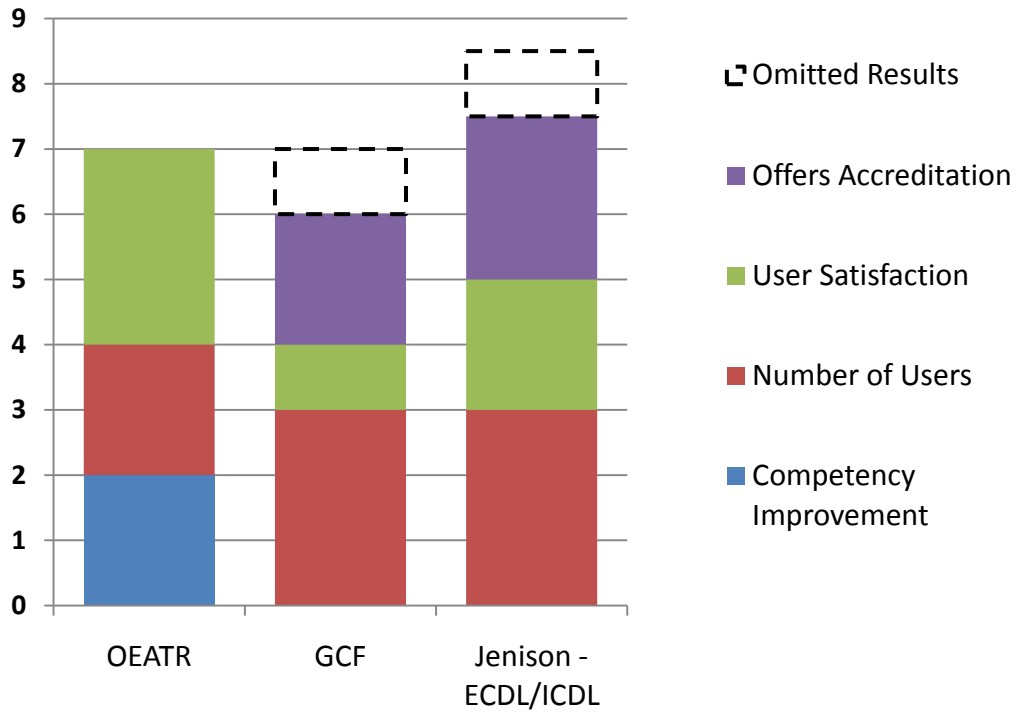
[7] Approximation of Potential Demand for Adult Training E-Learning services in Ontario - 1,100,000 unemployed in Ontario (Statistics Canada, March 2010), approximately 29% from rural areas = 317,000 (OMAFRA, 2007), approximately two thirds of unemployed people have low literacy (OLC, 2009) suggesting low ICT competencies = 209,000.

documents and website, and from participant observation in the e-learning environment. GCF does not collect competency improvement data or empirical user-satisfaction data as they are over-burdened providing e-learning service and have no incentive to invest in service monitoring initiatives. They do however monitor the number of users served. Over one million clients have accessed GCF services during its ten years of operation. GCF offers accreditation in the form of Continuing Education Units (CEUs). CEUs provide evidence that a learner has completed a certain number of class hours in a particular knowledge area. Their legitimacy maintained by a central body that designates the right to distribute CEUs. A continuing education body must demonstrate certain characteristics to attain CEU designation (IACET, 2010). CEUs have some international recognition but are not specific to ICT training and have limited recognition in this field.

4.2.1.3 Jenison's Impetus Plus

As in the case of GCF, I primarily use corporate documents and the e-learning environment participant observation to assess Jenison's performance on Outputs criteria. I also interviewed the Account Manager for Jenison to obtain information on any missing criteria, gained referrals from ECDL Foundation's Communication Manager and Program Development Executive. Jenison does not monitor or report competency improvement resulting from their e-learning services (Interviewee I, 2010). While they do monitor the number of clients using their services, they do not categorize it to report on the overall usage by program (Interviewee I, 2010). Jenison was the ECDL Foundation's recommended e-learning facilitator (Interviewee D, 2010). It also offers services worldwide and aggressively seeks new clientele. Jenison does not collect user satisfaction. They do facilitate connection between potential clients and previous clients to enable discussion of their services (Interviewee I, 2010). Jenison does not directly offer accreditation; however, their Impetus Plus program is designed to prepare clients for success in ECDL/ICDL Core and E-Citizen accreditation testing (Jenison, 2010).

Figure 14: Outputs Domain - Criteria Results



4.2.1.4 Analysis

Ontario's e-learning adult training regime is the only program that collects competency improvement data. They do not collect this data for ICT competencies, only reading, writing and numeracy, resulting in a deduction of one mark. The entire score for competency improvement was not omitted because OEATR demonstrates capability to collect and use competency improvement data to improve service delivery. The programs have one mark omitted from the scoring to represent no data on competency improvement. The other two marks represent the collection of data.

GCF has the highest rate of usage across the programs. This demonstrates some level of satisfaction with outputs as usage is a function of exposure to potential clients, barriers to usage (e.g. cost) and satisfaction from clients who recommend to others. The Learning Hub is meeting

their funding requirements but does not have the capacity to service the potential demand for e-learning services in Ontario.

OEATR collects and uses user-satisfaction data to inform service improvements. They collect it because they are governed by the MTCU, which demands reporting on targets. This management style enforces accountability to users. The other programs use testimonial user-satisfaction for advertising purposes as the general user does not demand empirical studies.

GCF provides accreditation in the form of CEUs. ECDL/ICDL certification is specific to ICT competencies and is more internationally respected and recognizable than CEUs. Ontario's public-funded e-learning training regime does not provide accreditation testing.

4.2.2 Curriculum

The Content domain evaluates the quality of e-learning environments. I split this domain into two sub-categories: ICT curriculum and Content. Curriculum is an important consideration as it is the base for all learning activities. Robust curriculum is a prerequisite to providing quality training services. I use E-Skills UK curriculum framework[8] to assess robustness. I collect all the information by gaining access to the ICT e-learning environments and assessing its knowledge items. I assess the curriculum on its comprehensiveness and levels provided. I determine the comprehensiveness of the curriculum by examining the learning activities that encompass part or all of each knowledge item included in the benchmark. A program that includes learning activities that fully encompass all the aspects of the knowledge item is perfectly comprehensive: score of two. Any limiting feature reduces the score by one half mark. I assess the amount of learning levels offered by examining the approach, style, complexity and desired end-result of the learning activity. I consider programs with beginner (1), intermediate (2) and advanced (3) levels to be top-performers; however, possessing training at a beginner level is essential.

[8] See Appendix A for E-Skills UK Curriculum Benchmark description.

4.2.2.1 OEATR

The Learning Hub's internal ICT curriculum is designed to orientate learners to the skills required to be successful in an e-learning environment (Interviewee G, 2009). Centra synchronous courses have a more comprehensive ICT curriculum, including the following courses: Basic Computer Functions, Understanding Power Point Presentations, How to Save Computer Files, MS Word for Beginners, Surfing the Internet for Beginners, and Understanding Excel Spreadsheets (Learning Hub, 2010). AlphaPlus also provides a number of ICT competencies exercises and games, including a treasure hunt that requires learners to find information on the internet and mouse and keyboard proficiency games (AlphaPlus E-Learning Environment, 2010).

4.2.2.2 GCF

I collect information on the robustness of GCF's curriculum by accessing their e-learning environment. However, due to high demand for synchronous classes with limited space, I was unable to gain direct access to GCF's synchronous courses. GCF does report the learning activities available with detailed descriptions of the content, which provides evidence for assessing the robustness of GCF's curriculum.

GCF ICT e-learning content consists of asynchronous and synchronous programs. The asynchronous program contains fifteen modules:

- Computer Basics
- Windows
- Internet Basics
- Email Basics
- Internet Safety
- Mozilla Firefox
- Facebook 101
- Word
- Excel
- PowerPoint
- Access
- Office
- Open Offic.org
- Outlook 2003
- Publishers 2003

These modules contain an average of fifteen units that approximately require five minutes each to complete. GCF also offers synchronous e-learning courses in the following topics:

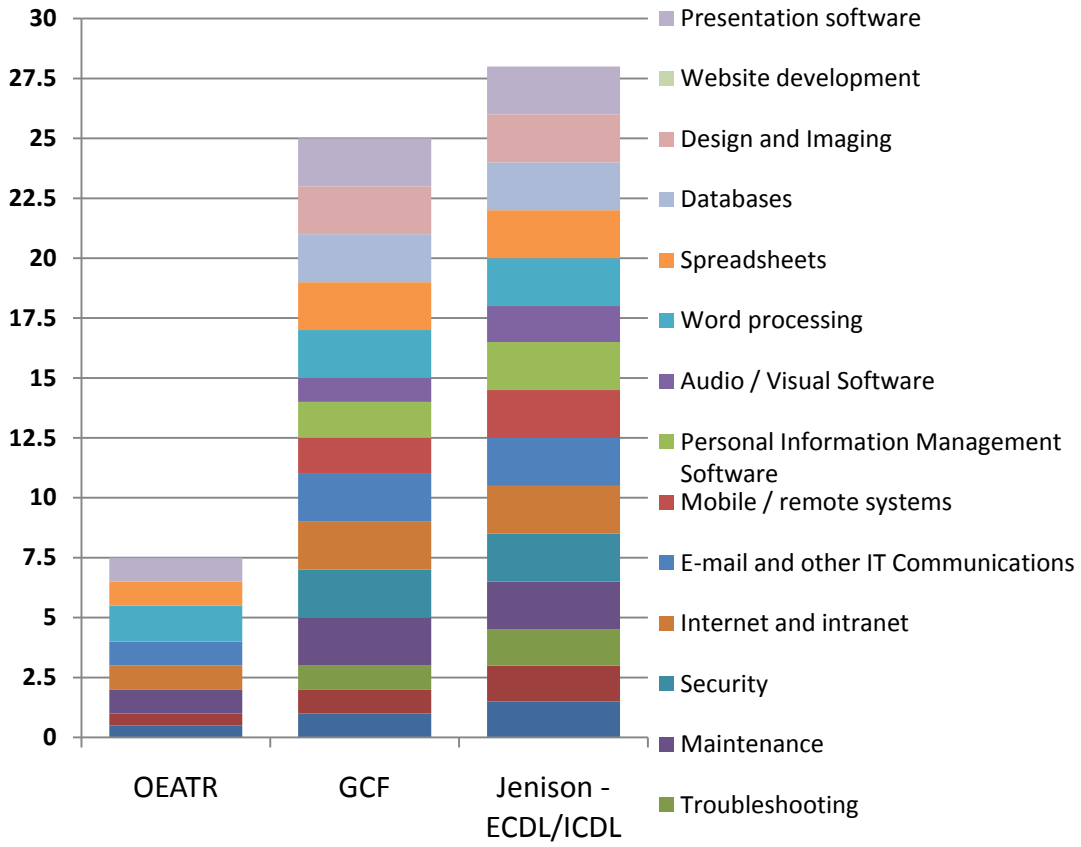
- Microsoft Access 2007
- Microsoft PowerPoint 2003 and 2007
- Microsoft Word 2003 and 2007
- Microsoft Excel 2003 and 2007
- Math Basics (GCF Environment, 2010)

These courses provide real-time online mentoring to facilitate e-learning.

4.2.2.3 Jenison

I gained trial access to Jenison's Impetus Plus ICT training program. The ECDL/ICDL curriculum is the same for all approved facilitation partners. They offer a number of modules including Core, E-Citizen and various advanced software training programs. ECDL Core is designed to improve the competencies generally understood as essential for being proficient with general ICT operation. The Core curriculum is most closely aligned with E-Skills UK's curriculum. E-Citizen trains in competencies to improve digital economic, commerce, political and social engagement (ECDL, 2010). It is an innovative and useful program for training in the essential competencies for accessing the digital economy but it is not heavily aligned with the benchmark. ECDL/ICDL Advanced improves the competencies gained in the Core program – intermediate level upon completion – bring the e-learner to an advanced level – as designated by this study. Figure 15 illustrates the robustness of each programs curriculum by the comprehensiveness with which they address essential knowledge items.

Figure 15: Robust Curriculum Criterion – Results



4.2.2.4 Analysis

OEATR has limited internal ICT curriculum; however, AlphaPlus activities and games do offer an innovative approach to informal ICT training. The Treasure Hunt in particular offers informal training in an essential competency for engaging in the digital economy or succeeding in a workplace that requires use of the internet. ECDL's E-Citizen trains learners in comparable skills, but in a formal e-learning program. Jenison has the most robust curriculum; however, GCF contains almost all the same knowledge items. GCF has less coverage on many of the knowledge items, which reduces their score.

OEATR only offers beginner level ICT curriculum, which orients learners to knowledge items but is unlikely to improve them to an intermediate level. GCF offers some knowledge items in intermediate and beginner but no advanced curriculum. ECDL/Jenison offers most of

their knowledge items in beginner and intermediate levels. They also offer advanced courses in important software courses (i.e. Word Processing, Spreadsheets, Presentation and Database). OEATR is best equipped to train absolute beginners.

4.2.3 Other E-Learning Content

I collect information for the E-learning Content using participant observation and user satisfaction studies, if available.

4.2.3.1 OEATR

The Learning Hub offers real-time facilitated synchronous e-learning courses, asynchronous e-learning courses and blended which is a combination of synchronous and asynchronous learning formats. The synchronous courses offer in-person, real-time instructor contact and timely instructor feedback, screenshot slide shows, white board interaction – a tool used to draw and write enabling digital interaction for working on course exercises and activities. They adapt to individual learning styles and provide quizzes to monitor competency progress (E-Channel E-learning Environment, 2010).

The Learning Hub collects user-satisfaction data concerning e-learning content. Participants were asked, “What helped you reach your goal?” The most often cited responses in order were, “Able to work at any time”, “Able to play lessons more than once.”, “Instructions were clear.” and “Teacher/mentor was online to help me.” When asked, “What did you like about your online course?” The most frequent response from synchronous learners was, “Instructor provided opportunity for questions”, followed by, “the value of interacting with others” and asynchronous learners responded, “Work whenever I wanted.” and “Work at my own pace.” When all learners were asked, “What improvements could be made?” they responded, “Different courses should be offered”, “More types of classes”, “Extend lessons longer”, “Teachers explained too fast”, “Break courses into smaller sections”, “Test to determine what is

still not understood" and "teach more skills on how to use a computer". When asked, "What courses would you like to see offered in the future?" learners responded – in the order of most frequent to least, "More work-related", "More computer-related" and "More science-related" (Learning Hub 2008).

The Learning Hub conducts pre assessments to develop individualized learning paths. It is also used in conjunction with the post-assessment to indicate competency improvement for reading, writing and numeracy. There is no indication of effectiveness of specific courses or learning pathways for the other six essential competency categories including ICT competencies.

Synchronous courses do not require mandatory pre, post or interim testing. These courses are predicated on peer and facilitator interaction making it less important to monitor progress and competency improvement via testing. Asynchronous learning is heavily dependent on effective assessments. Assessments are required for asynchronous learning courses but low scores do not entail significant ramifications.

OEATR synchronous courses have developed an extensive learning community equipped with facilitator controlled microphone and whiteboard capabilities - during class, blogs and emails - after class. Synchronous learners are encouraged to engage in group discussions during and after class (E-Channel E-Learning Environment, 2010). Facilitators are available for face-to-face interaction with learners who are able to physically access the facility. There is limited learner interaction involved in Asynchronous learning. Learners complete courses and learning activities independent of facilitators and peer learners. Learners are encouraged to contact facilitators or other peer learners through the learning environment to discuss learning-related issues; however, there is no official incentive to engage in these discussions.

4.2.3.2 GCF

GCF asynchronous courses use a screenshot slideshow approach to delivering the curriculum. They also incorporate instructional videos generally as the first slide. The content is exclusively concept-based offering no practice in using the intended competencies and there is little interaction within the e-learning environment. Success in these courses requires memorization of the information presented. Using the tutorial to assess their synchronous classes, the synchronous courses are an instructional – assignment based learning style where learners watch lectures with a real-time facilitator and submit mandatory assignments throughout the program (GCF E-Learning Environment, 2010).

The asynchronous courses provide a test at the end of each module. This module test is delivered in a multiple-choice format and requires approximately five minutes for completion. It is not mandatory and there is no incentive other than the learner can understand their comprehension of the intended competencies. There are no assessments within each unit. At the end of each unit, the learner is requested to complete a task external to the course environment related to the intended competencies. This exercise is not mandatory and not used as an assessment. There is no pre-assessment for learner placement or used in conjunction to assess competency improvement. The synchronous courses rely heavily on assignments to supplement the instruction and other learning activities conducted in class. They also provide an assessment upon course completion for learners to gain a certificate. Continuing Education Unit (CEU)s are designated to successful learners, which offers a credential symbolizing attained competencies. GCF provides email interaction between facilitators but not peers.

4.2.3.3 Jenison

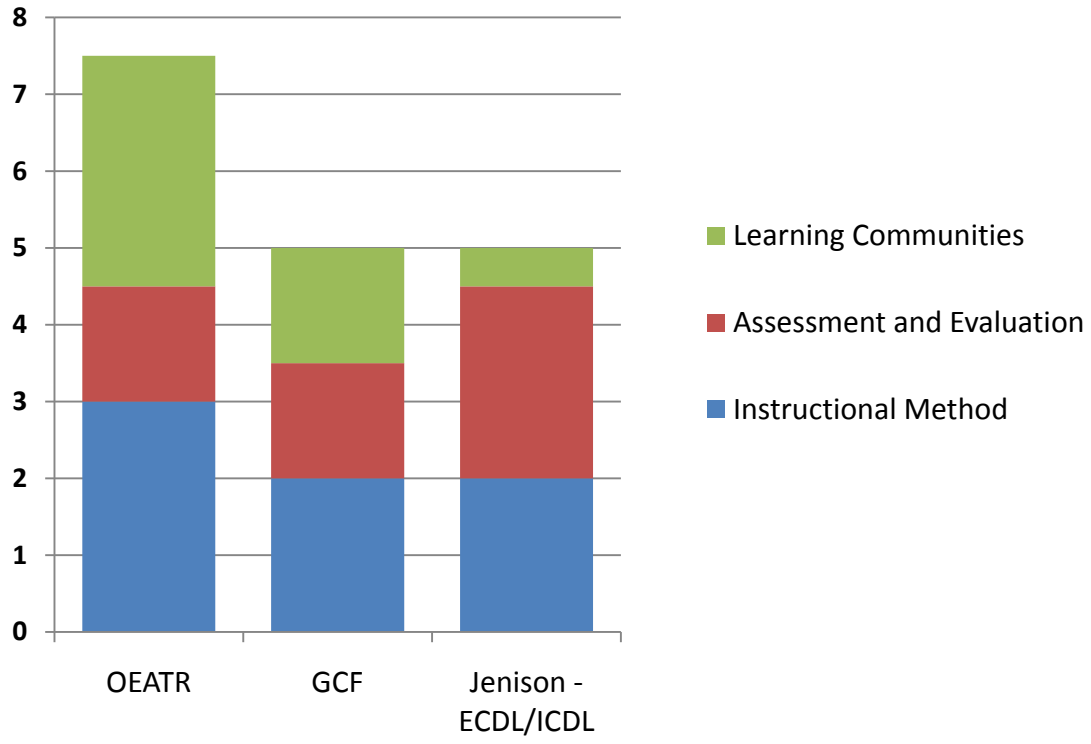
Jenison only offers asynchronous e-learning. To overcome shortcomings, they have established a dynamic and interactive asynchronous e-learning environment. The tutorials use the traditional audio slideshows with screenshots instructional approach. In addition they have

implemented an innovative interactive touch screen component that enables the learner to practice the skills as they navigate through the tutorials. Jenison e-learning includes pragmatic training as well as concept training (Jenison E-Learning Environment, 2010).

Jenison's website advertises only positive testimonials regarding their instructional method. Jenison does not collect impartial and empirical user-satisfaction surveys (Interviewee I, 2010).

Jenison recommends learners take a behavioural assessment to determine their individual needs and learning style. It is not mandatory and does not assess their level of competency. It is used for course recommendations. Jenison conducts interim assessments at the end of every unit section. This is a multiple-choice assessment of important concepts. Jenison's interactive touch screen assessment is an innovative method for evaluating the learner's precision for software navigation. These methods are also used for post-assessments. Certificates are available upon completion of this post-assessment. The learner obtains the certificate by achieving a mark above the base-line for certification. The learner is recommended to repeat the course if they do not obtain a high enough mark. As there is no pre-competency assessment, the post-assessment is not used to indicate competency improvement. Jenison currently does not provide the capability for concurrent learners to interact. They are in the process of developing this capability (Interviewee I, 2010). Figure 16 illustrates the performance of each program on the Outputs domain criteria.

Figure 16: Results on Content Domain Criteria



4.2.3.4 Analysis

OEATR has the most diverse and effective instructional methods to facilitate competency attainment for clients with different learning styles. GCF offers diverse instructional methods. However, their asynchronous courses lack the content to be considered comprehensive and the design to keep learners interested. Jenison has a well-designed e-learning environment that contains all the key content required to attain 'core' ICT competencies. Its major flaw is the instructional method's rigidity – it only offers asynchronous learning. Jenison has the best performing assessment and evaluation methods because they have mandatory automated testing that includes innovative pragmatic evaluation and traditional concept testing. OEATR offers testing in their asynchronous courses and idiosyncratic testing for the synchronous courses. These evaluations do not entail any ramifications for poor performance. GCF has mandatory testing and a final test for their synchronous courses. I was unable to assess the effectiveness of

these test methods. Their asynchronous courses have short multiple choice tests that only provide a personal indication of competencies possessed. OEATR is the only case that allows peers to interact in a meaningful way. GCF and Jenison only provide access to facilitators or administrators to address specific issues.

4.2.4 Support

The Support domain contains criteria that indicate a program's ability to support learners to facilitate competency improvement. I collect all the information used to assess criteria in the Support domain by interviewing, analyzing corporate documentation and participant observation in the e-learning environments

4.2.4.1 OEATR

OEATR has instructional documentation; including, how to navigate through the environment, description of key concepts and how-to conduct exercises. They use a variety of methods including instructional videos, instructional slideshows, question mark cursor for point and click assistance. Their synchronous courses have responsive real-time facilitators with a low teacher to pupil ratio. They also offer individualized learning pathways using an in-depth pre-assessment to determine goals and including a variety of formats and approaches available within their e-learning environment.

OEATR provides technical support for the e-learning environments and complex technical issues. Learning Hub practitioners provide the first-line of support to learners and, thus, often are the sounding board for issues. For quick resolution, Learning Hub practitioners resolve the issues they are capable of addressing. According to Learning Hub and AlphaPlus user-satisfaction surveys, technical issues were the most often cited problems (Learning Hub, 2008). They offer e-learning that is accessible to rural and/or unemployed people as their learning activities are easy to use and designed for beginners. Also they provide referral to proximal

computing facilities for rural and remote people who do not currently have access to a computer or broadband internet (Interviewee B, 2010).

4.2.4.2 GCF

Their learner documentation includes how to navigate through the e-learning environment, description of key concepts and how-to conduct exercises. They provide the documentation exclusively in the form of Frequently Asked Questions (FAQs). The FAQs provide answers in text and video format. Answers to non-FAQs are unavailable leaving the learner to contact the corporation for any issue that is not aligned with one of the FAQs topics. They have facilitator support available in their synchronous courses but due to high demand there is a high pupil to facilitator ratio. This reduces the ability of the facilitator to provide high-quality support. They do not focus on student-centred learning to provide learning activities. Learners do have autonomy to choose their own courses. Due to the high-demand and limited funds for GCF services, it is difficult to provide high-quality technical support. I did not encounter any technical problems while participating in the GCF e-learning environment. GCF does not require extensive equipment and does provide synchronous learning, which is conducive to rural, remote and low competency learners. The high demand on synchronous learning and limited positions in the courses makes it virtually inaccessible. The asynchronous learning activities are inadequate to comprehensively improve competencies identified by the E-Skills UK Curriculum benchmark.

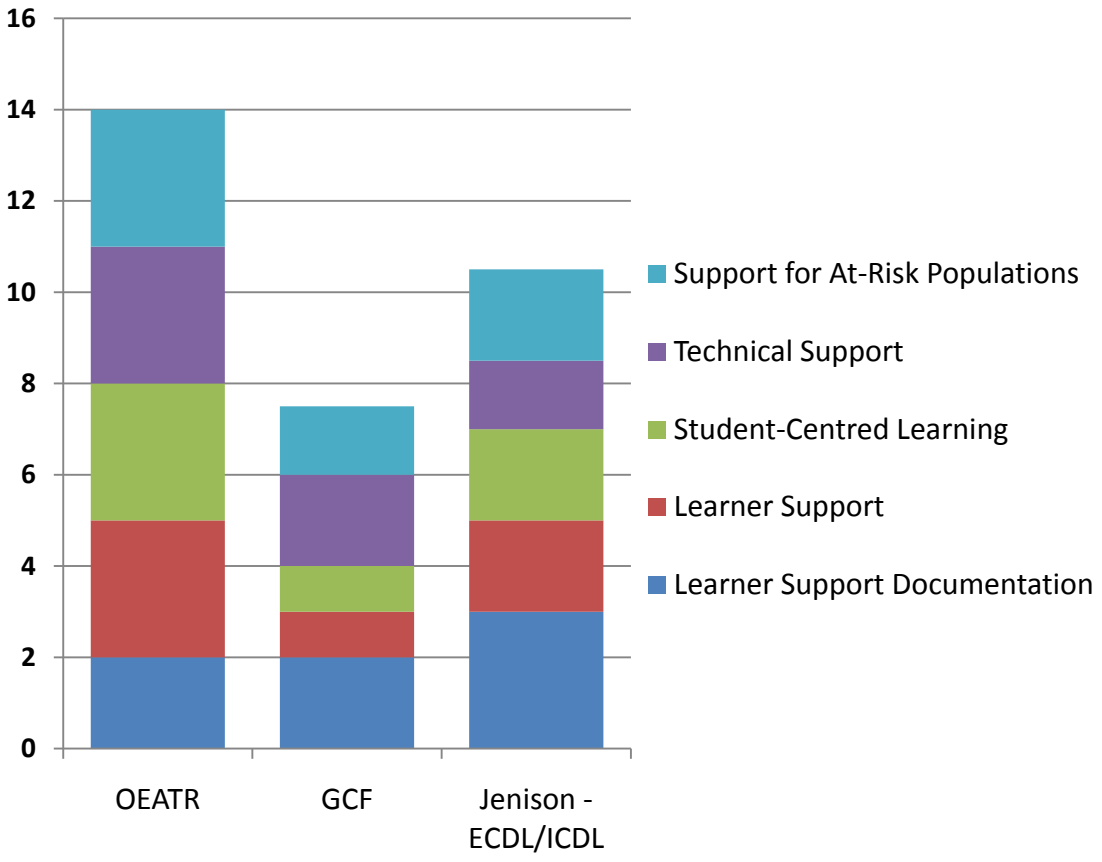
4.2.4.3 Jenison

Jenison's learner support services are primarily dependent on the accessibility and effectiveness of their help and support documentation. They only offer asynchronous learning meaning that learners cannot access a human facilitator for immediate questions. It is imperative that their e-learning environment alleviates these issues before the learner becomes complacent or completely disengages from the program (Interviewee G, 2009).

Jenison orientates its learner to the capabilities and potential issues of their e-learning environment with a 'Getting Started' tutorial. I experienced significant technical issues when attempting to access the tutorial. Jenison describes specific components of their e-learning environment. The 'Quick Help' feature allows the user to click on any area of the page to get a description of a link, text, picture or interactive media. This is designed to provide quick support for learners confused about facets of the e-learning environment. Prior to 'Launching' a course, Jenison provides a description of the course including duration, expected outcomes, prerequisites and a course content summary (Jenison E-Learning Environment, 2010).

Jenison only offers asynchronous learning, which is less dependent on human facilitators to support learners. There is an 'administrator' assigned to each user's Learning File. This administrator sets up user profiles, assigns courses and provides reports on progress (Interviewee I, 2010). Jenison's learning approach lacks flexibility for tailoring learning activities to individual learning styles. They do recommend all learners take a behavioural pre-assessment to understand the potential barriers that will inhibit success. Jenison does not conduct empirical user-satisfaction studies to assess their technical support. I experienced a variety of technical issues when accessing and navigating through the e-learning environment (i.e. Web Browser compatibility, jumbled graphics and exorbitantly long time lags). Jenison targets the needs of low-competency learners by having extensive and effective support documentation. They lack the flexibility of synchronous courses for identifying specific needs of learners. Figure 17 illustrates program performance on the Support domain criteria.

Figure 17: Results on Support Domain Criteria



4.2.4.4 Analysis

Jenison scores the best on Learning Documentation because it is comprehensive, diverse and innovative. OEATR scores the best on Learner Support because they have the most responsive and extensive facilitation services. They also score the best on Student-Centred Learning because it is a cornerstone of their learning approach, which is represented by their diverse individualized learning pathways, extensive pre-assessments for efficient placement and responsive support services. All programs offer technical support. OEATR has the most responsive service with least observed problems. All programs address the barriers of remote and low-level competencies. The OEATR identifies access issues, offers good support services and

individualizes learning to target barriers – all key features to addressing the barriers facing rural and unemployed learners. Jenison does not offer synchronous learning which can create problems for low-level competency learners. GCF does not possess any of the features of the OEATR but it does have adequate learning documentation. Overall, OEATR demonstrates the best performance on the Support domain. GCF demonstrates the worst performance on the Support domain.

4.2.5 Administration Domain

The Administration domain assesses the effectiveness of each program's administration for enabling skill and competency attainment. I collect the information for the Administration domain using corporate documents and interviews with administrators and facilitators.

4.2.5.1 OEATR

OEATR is funded and managed by MTCU. MTCU provides targets for the Learning Hub to demonstrate their success for six months of service delivery. They must report on the number of clients served, the number of clients successfully completing programs, the number of exits during the program and the percentage of clients attaining competency improvement for reading, writing and numeracy. In-depth target management holds subordinate organizations accountable. MTCU takes a developmental approach to target management. They do not remove contracts from poor performers; rather, they work with them to facilitate improvement (Interviewee B, 2010). Annual corporate objective documents are developed and distributed to inform employees of the current corporate vision. They also encourage input from practitioners to voice any concerns (Interviewee G, 2009).

OEATR encourages skill upgrading. They have a policy that allows facilitators to take paid leave for skill upgrading contingent upon them justifying the benefits of the training to a

supervisor (Interviewee G, 2009). This policy alleviates professional repercussions for participating in professional development programs.

4.2.5.2 GCF

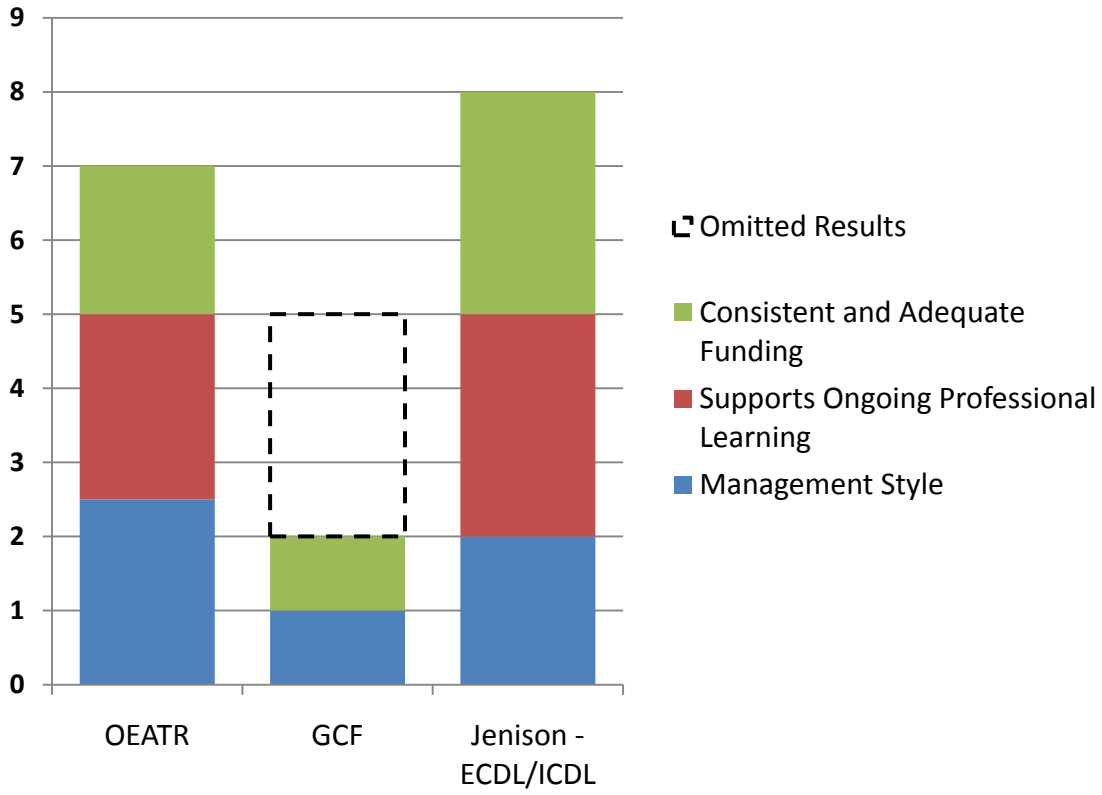
GCF has to high of demand for their capacity. This limits their ability to implement a management style that encourages high-quality service delivery. They do not collect key indicators for high-quality service delivery because they do not have a regulator that requires reporting on these targets nor do they have incentive to report because they do not charge user fees as their entire budget is dependent on donations. I was unable to access corporate documents or interview participants to assess GCF's support for ongoing learning. Their online synchronous learning courses are in high demand. I spent two weeks attempting at least once a day to register and did not succeed. The difficulty registering demonstrates over-burdened services which create long waits and frustration. These service gaps can result in disengagement and complete withdrawal from the program and e-learning in general. This funding is inherently inconsistent; it is impossible to predict with accuracy a budget primarily based on ad-hoc donations.

4.2.5.3 Jenison

Jenison is held accountable to its clients by charging user fees in a competitive market, although they are not accountable to a regulatory body that sets service standard targets. Their charges represent the cost of providing high-quality service. Target management supports a shared vision and empowering leaders. Jenison supports ongoing professional learning and provides these opportunities internally. They offer robust facilitator and management e-learning courses. This reduces the cost on the organization and the barrier for employees to access ongoing professional learning. User fees account for the full cost of operations ensuring adequate and consistent funding in a market that places a high emphasis on quality. The quality of their service and responsiveness of their staff indicates adequate funding for appropriate number of

employees and to support service improving initiatives. Figure 18 illustrates the performance of each case on Administrative domain criteria.

Figure 18: Results on Administration Domain Criteria



4.2.5.4 Analysis

The OEATR is the best performing program concerning management style because they employ target management from an authoritative external body. I did not designate the top score of three because they do not apply strict sanctions for non-compliance on targets. Jenison does not employ target-management; however, they are accountable to their clients by charging user fees in a market with many alternative competitors. GCF does not employ any of the recommended management styles and they have no accountability mechanisms. Both OEATR

and Jenison support ongoing professional learning; however, Jenison is an expert in facilitator training. Jenison is the best performing program on the funding criterion because they charge for their services. MTCU has demonstrated commitment to e-learning evidenced by the increasing funding throughout their duration of operations; however, the funding for the future is somewhat dubious and OEATR administration is given little time prior to year-end to plan for the upcoming year (Interviewee C, 2010). GCF has the most precarious funding structure and the highest demand for their services.

4.2.6 External Context (Jurisdictions)

The External Context domain represents the external factors that affect the effectiveness of training programs. This poses complexities for analyzing e-learning programs because they are aspatial. I include external context considerations in the analysis by selecting jurisdictions where the program has been implemented. OEATR is the one case that has a defined jurisdiction. Jenison is a training program for ECDL/ICDL testing, which is a global initiative. ECDL/ICDL has been implemented in over one-hundred and forty-eight countries and territories (ECDL, 2010). There are many opportunities to assess its external context. Considering the case study selection considerations, I chose to analyze the external context in Canada and Ireland. I use official corporate documents and interviews with administrators and other experts in the ICT training field to generate information on the criteria.

4.2.6.1 OEATR

The Ontario government is committed to delivering adult training programs. There are over fifteen hundred organizations delivering adult training, literacy and basic skills, and essential skills services in Ontario. There are only three government funded e-learning facilitation services in Ontario – the Learning Hub, Sioux Hudson and Contact North (MTCU, 2010). The Canadian Federal government identifies enhanced support for adult re-training as a key pillar in the

Canadian Economic Action Plan (GoC, 2010). HRSDC has established nine essential competencies – ICT use being one. The Ontario Adult Literacy Curriculum (OALC) initiative is currently in the process of developing curriculum to encompass the development of all of these essential skills (OALC, 2010).

Ontario performs well on developing exposure to training and employment services for those making initial contact. The extensive network of government funded adult training, literacy and basic skills, and essential skills service providers are aware of other service providers' strengths and provide referrals when appropriate (OLC, 2009). An individual requiring employment services must access an Employment Counsellor who provides referrals based on identified barriers and goals. ICT training services are limited within this network. There is limited exposure within the general public making it difficult to identify the services available prior to accessing employment and training counselling.

4.2.6.2 ICDL – Canada

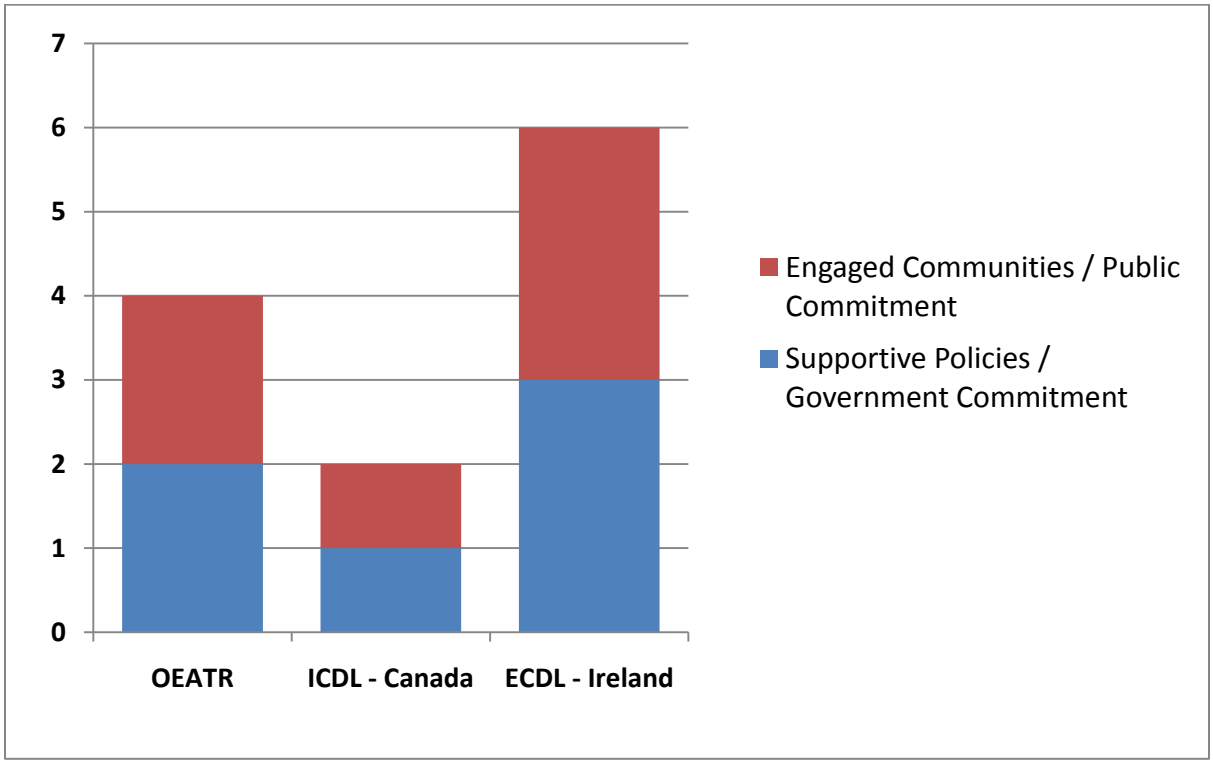
ECDL/ICDL ICT accreditation testing is available in Canada but it has limited exposure. The Ontario and Canadian government do not provide referral to or subsidies to help cover the cost of ICDL accreditation for clients. Adult literacy programs in Canada are developing outputs assessment measures. The Towes test, which assesses literacy and numeracy skills, is being used to assess the outputs of literacy programs. The interviews conducted with literacy practitioners and administrators indicate an awareness and respect for the results on the International Adult Literacy Survey (IALS), which again only assesses reading, writing and numeracy. Computer skills lack a valid a reliable assessment of outputs. ICDL offers a viable option for not only assessing outputs but also improving the benefits of training by offering opportunity to gain credentials for possessed competencies. Ontario's public are, generally, unaware of ECDL/ICDL accreditation (Interviewee F, 2010). The majority of Ontarians undertaking ICDL accreditation testing are required to do so by their employers and are primarily in the information technology

sector (Interviewee F, 2010). Employers and educators are generally unaware of ICDL credentials, which reduce their gravity in Canada (Interviewee F, 2010).

4.2.6.3 ECDL – Ireland

ECDL originated in Ireland using modest funding from the Irish Government to fund its development. The Department of Training and Employment has continued to fund ECDL in Ireland as part of their plan to develop ICT competencies. They identify it as one of their basic skills along with literacy and numeracy (DoTE, 2010). The support of the government along with significant exposure throughout the population has allowed ECDL to flourish in Ireland. In 2003, a study was published on the impact of ECDL in Ireland. At that time, two-hundred and fifty thousand people or six per cent of the population had ECDL accreditation (ECDL, 2003). A study has not been conducted since but ECDL estimates that this growth rate has accelerated. ECDL is recognizable by the majority of the population in Ireland (Interviewee F, 2010). Many employers demand ECDL accreditation as a verification of ICT competencies (ECDL, 2010). Figure 19 illustrates the performance of each case on External Context criteria.

Figure 19: Results on External Context Domain Criteria (Jurisdictions)



4.2.6.4 Analysis

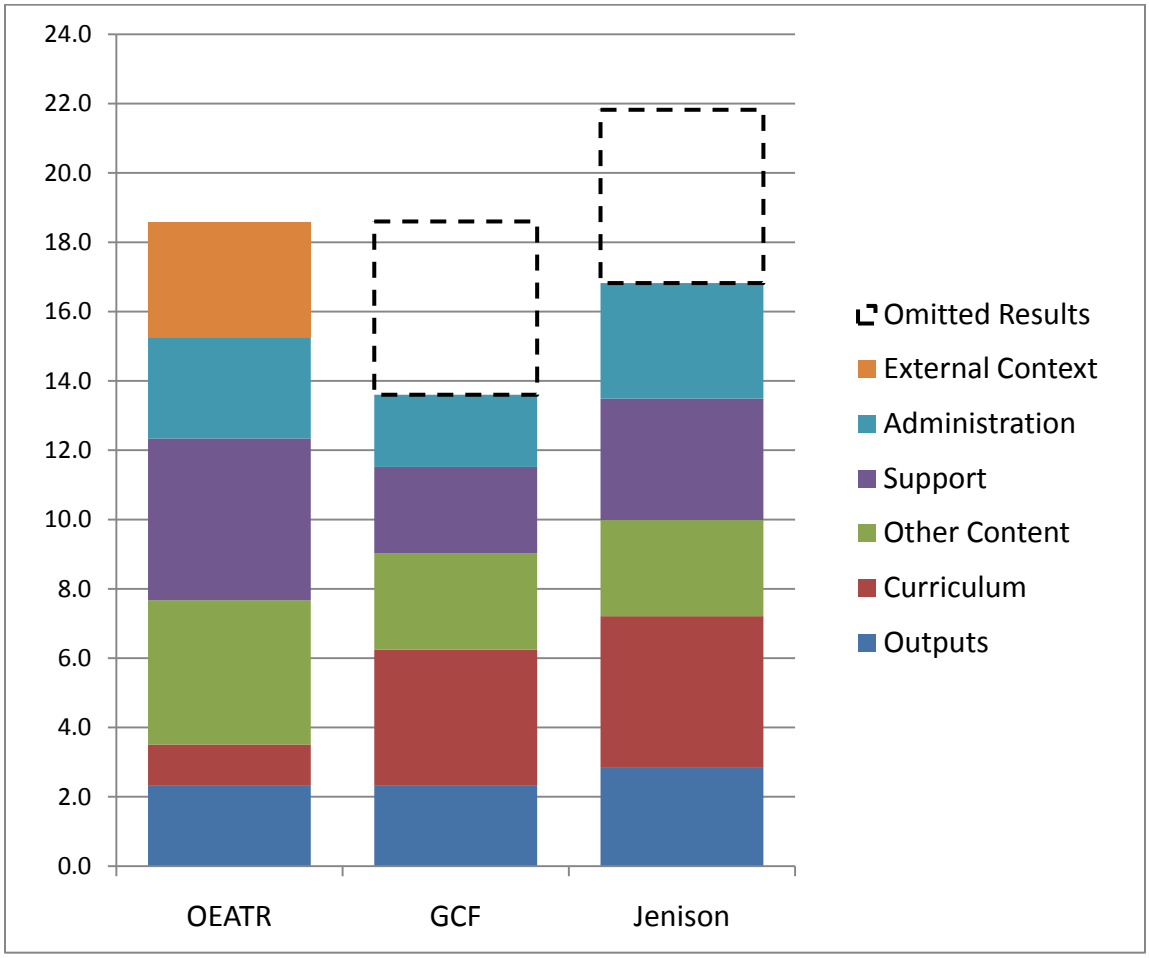
I score the programs considering the governmental and public support of the jurisdiction for the program. The Irish government supports ECDL accreditation and their approved training partners with policy and funding. OEATR receives consistent and adequate support from the Ontario government; however, ICT competencies do not. The Ontario Adult Literacy Curriculum (OALC) is developing new more robust and consolidated adult training curriculum in Ontario. OALC is considering expanding the robustness of the ICT training indicating emerging commitment for this initiative. The Ontario government currently has minimal affiliation with ICDL - Canada outside of exposure in some of Ontario's colleges (Interviewee F, 2010). Employment and Training services in Ontario do not provide referrals or subsidies for those attempting to attain internationally recognized accreditation. There is vast exposure to ECDL accreditation and their training partners in Ireland. The people receiving a referral from Ontario's

Employment and Training services will gain exposure; however, public-funded, e-learning programs remain obscure.

4.3 Results Summary

I aggregate the results to provide a comprehensible illustration of the programs' performance overall. I attribute the same weight to each domain. The scoring on the criteria assessments varies based on the number of criteria. I standardized the criteria by dividing each score by the best potential score then multiplying by five. A perfect score on any domain is five and the worst, zero. Omitted results on criteria were included in the overall assessment. The External Context domain does not allow for comparison because the cases are jurisdictions not ICT training programs. The impacts of GCF within a jurisdiction were not included. Also the external context varies with the jurisdiction. Jenison and ECDL/ICDL are used in many jurisdictions making it faulty to attribute performance in one jurisdiction to its overall score for the External Context domain. The jurisdiction is absolute for Ontario's e-learning adult training regime but I could not assess other programs on External Context criteria. The omission of the External Context domain is represented by the Omitted Results category. Figure 20 illustrates the performance of each program on the domains and overall.

Figure 20: Aggregate Results on Ideal ICT E-Learning Evaluation by Domain and Program



Jenison was the best performing program on the Outputs domain driven by their performance on the Provides Credentialing and Well-Used criteria. They do not collect empirical data on competency improvement and only testimonial data on user-satisfaction. The decision to omit portions of the competency improvement rather than giving a zero score had a positive impact on their overall score. OEATR was significantly better than the comparators on collecting information however; they do not collect competency improvement for ICT training. Their major failing is the lack of accreditation to provide substantial credentials to those who successfully complete the courses and programs.

Jenison's Impetus Plus and GCF both performed relatively well on the comprehensiveness of their ICT curriculum in comparison to the benchmark[9]. OEATR has limited ICT curriculum but was the top performer on the Other Content criteria. To inform this score, I consider all of their courses. It also offers the best support primarily due to its low pupil to facilitator ratio in their synchronous courses. Jenison scored slightly better than OEATR on the Administration domain primarily due to it being a private company that ensures adequate funding via their pricing structure. The External Context domain was best in Ireland for ECDL and it training partners. ICDL in Ontario scored the worst on public exposure and government commitment. I was unable to attribute these scores to the program because GCF and Jenison are not location-specific.

[9] See Appendix A for E-Skills UK's Benchmark

5: Policy Alternatives – More Robust ICT Curriculum for Ontario's Adult Learners

In this chapter, I define potential policy reforms to address improvement to the current ICT training strategy delivered by Ontario's e-learning adult training regime considering the barriers facing rural and unemployed people. Chapter **Error! Reference source not found.** identifies the components of an Ideal E-Learning Program. Chapter 4 analyzes the OEATR programs, their recommended external partner for ICT training and the number one recommended program by the ECDL Foundation to enable a comparison of the necessary inputs identified as essential for an effective program[10]. The policy alternatives, I define below, represent incremental changes to the status quo to improve ICT competencies while limiting the negative external impacts created by the reforms.

This policy analysis does not address all the issues identified through evaluation of OEATR. Chapter 4: identifies three significant problems:

- Limited ICT training within the internal programs,
- Limited overall capabilities of the current ICT external training partner,
- No accreditation available enabling convenient identification of competencies possessed,

and a number of minor potential reforms to improve service delivery. I address the first two problems with the policy alternatives presented below. This policy analysis is limited for addressing the entire policy problem. The full problem requires major investment that cannot be justified without outcomes data to understand the economic benefits of ICT training and internationally recognized credentials for people accessing Adult Training services in Ontario.

[10] See Appendix B for a list and descriptions of essential e-learning program inputs.

This objective of this policy analysis is to address the sub-problem of limited ICT curriculum available from OAETR.

5.1 Status Quo

The status quo is constituted by OEATR. AlphaPlus, the E-Channel and GCF are the organizations that combine efforts to provide ICT e-learning via the centralized referral services offered by the Learning Hub. These organizations offer ICT e-learning in the following ways:

- the ICT activities available in the AlphaPlus' e-learning environment,
- the synchronous classes available through the E-Channel, and
- the training offered by GCF available via referral from Learning Hub facilitators and MTCU's Training and Employment branch's employment counsellors.

This policy alternative also considers ongoing initiatives. The Ontario Literacy Coalition (OLC) is a non-governmental organization with the mandate of improving adult training service delivery in Ontario (OLC, 2010). They are currently developing the Ontario Adult Literacy Curriculum (OALC). The OALC is developing curriculum to encompass HRSDC's nine essential skills in the adult training regime in Ontario (OALC, 2010). The OALC is aware of the ECDL/ICDL ICT curriculum and are interested in the breadth and succinctness of knowledge items identified in the official ECDL/ICDL curriculum (Interviewee H, 2010). They are also considering the importance of international accreditation for ICT competencies for making choices on knowledge items included in the OALC. The status quo assumes ECDL/ICDL curriculum is under consideration for inclusion in the OALC.

5.2 More Robust ICT Curriculum - Internal

This policy alternative considers the impacts of implementing more robust ICT curriculum into the existing services. I also consider that the delivery of ICT training would be in

both synchronous and asynchronous course formats. All the capabilities described in the program evaluation would be included in the ICT training activities including:

- instructional methods,
- evaluation methods,
- learning community capabilities offered in the existing synchronous courses,
- learning documentation,
- skilled real-time facilitator support,
- skilled technical support, and
- individualized learning pathway capabilities.

This conception of the policy analysis simplifies policy analysis for interview participants who will are asked to provide accurate estimates of the impacts of the policy alternative. I assume that all the existing courses would remain in addition to the new curriculum, which would include all the knowledge items within the ECDL/ICDL curriculum. The existing courses would act as an orientation for beginners to improve competencies to a level where they can easily use the e-learning environments. Separating the new curriculum into essential ICT skills training from the existing curriculum will require planning and though to re-package into two distinct curriculums. Some ICT courses available in synchronous format will be redundant with the new curriculum.

5.3 More Robust and Effective ICT Curriculum – External Partner

This policy alternative considers delivering ICT curriculum using a different third-party partner that has already designed and tested their e-learning environment using ECDL/ICDL curriculum. GCF currently offers free e-learning services but their services are over-burdened causing them to provide ineffective e-learning service delivery. Instead of providing referrals to GCF, Learning Hub facilitators and Employment Counsellors would refer clients requiring ICT competencies upgrading to an ECDL/ICDL training partner. This program charges user fees for group access, thus the incremental costs of this alternative are an important consideration. I consider this alternative to allow experts in the field of ICT training to deliver training in Ontario.

Note that the results for this option are estimated using a representative training partner. Another ECDL/ICDL training partner may demonstrate different results; however, ECDL/ICDL has high standards for approval (Interviewee F, 2010). These standards will hold many aspects of the training environment relatively constant. The curriculum offered by each approved partner is identical as defined by ECDL/ICDL.

This program will allow a domestic administrator to have full administration rights over the site. They will designate administrators and managers who will create user profiles and allocate courses to the learners. Access will be online via the web and course delivery is via Jenison's learning management system. There is also full reporting functionality allowing domestic administrators insight into who is accessing the environment, what course they are working on and their progress over a timeframe. Results of any test taken are also readily available. The service has unlimited access for learners meaning, once set up, there is unrestricted access to all courses for the duration of the licence (Interviewee I, 2010).

This alternative also assumes that OEATR will maintain its existing ICT curriculum, which is an effective orientation tool for absolute beginners. They may have to repackage or make incremental additions to this curriculum depending on its assessment considering improvement of learners to a level where they can easily navigate and access learning activities. I include these considerations in the Implementation Complexity criterion measure.

Jenison is currently unlicensed by ICDL – Canada. An organization must have this license to distribute ECDL/ICDL materials in Canada. Licensing requires an annual fee and a review of the materials to ensure they match ECDL/ICDL standards. I use Jenison as representative of ECDL/ICDL online learning courseware. ICDL- Canada currently has three online training partners licensed in Canada: CIA Training, Advance Learning and Third Force (ICDL – Canada, 2009). These programs already pay the licensing fee. Using them would avoid the lag and any additional fees as a result of the licensing process. Jenison is the recommended

training partner by the ECDL foundation (Interviewee D, 2010) and did exhibit innovative approaches compared to the alternatives. These programs' curriculum and quality can be verified by their license but their capabilities remain ambiguous. This option assumes that Jenison would go through the licensing process.

6: Criterion Measures – More Robust ICT Curriculum for Ontario's Adult Learners

Criterion measures are the criteria used to assess the viability of policy alternatives. In this chapter, I explain the criterion measures, including:

- what the criterion assesses,
- why it is important to consider,
- how it will be measured, and
- unique considerations or deviations for certain alternatives.

It is important to delineate these criterion measures to establish consistency in the analysis and avoid misinterpretation.

6.1 Effectiveness

This criterion measure assesses the policies' ability to improve the ICT competencies and address the barriers inhibiting unemployed and/or people living in rural areas from accessing educational opportunities. I measure both facets of effectiveness using policy alternatives' performance on the E-Learning Program framework. This framework assesses the program's ability to deliver e-learning to the public; thus, the overall results on the framework assesses the effectiveness on the Improves ICT Competencies component of the Effectiveness criterion measure. Rural and remote people experience the unique barrier of accessing a physical learning facility. On average, unemployed and people living in rural areas have lower ICT competencies than the general population. The e-learning environment and support services will be most pertinent for allowing access to low competency and remote learners.

6.2 Cost

The Cost criterion measure assesses the total cost of the policy alternative. Fiscal costs associated with the reform are considered. Cost consideration is important as all public bodies in Ontario have budgetary constraints and there is an opportunity cost associated with investing money in one area as opposed to another. The costs will be measured using market prices for inputs that have set prices and shadow prices for inputs without a set price. I use interviews with administrators of e-learning programs to inform the shadow prices. The inputs that require pricing include:

- third party programs,
- operation labour,
- facilities,
- equipment, and
- program development labour.

All of these inputs require an estimate of the number of users. I estimate the number of users based on a projected demand using the Learning Hub usage figures available for the past two and a half years.

6.3 Horizontal Equity

Horizontal equity is an evaluation of winners and losers across demographic, geographic, socioeconomic class, religious etc. when each category has similar weight. The primary horizontal equity consideration in this study is the distribution of costs and benefits between rural and urban people. I assess these benefits by identifying the potential costs and benefits of the reforms and how they will likely be distributed between urban and rural people. I consider success to be no one geographic group suffers a disproportionate amount of the costs.

6.4 Vertical Equity

Vertical equity is an evaluation of the nature of the impacts on socio-economic class winners and losers. I consider the impacts on low and high socio-economic classes to determine

if any of the costs or benefits are disproportionately distributed. This criterion measure informs potential disputes that may arise due to the policy alternative. I measure the Vertical Equity criterion by determining how who will experience the benefits and costs. I consider success to be there are no definite losers because of the reforms created by the policy.

6.5 Political and Public Acceptability

The Political and Public Acceptability criterion measure assesses the political climate surrounding the issue to determine if the policy will receive consideration. Political and Public Acceptability is a critical component for any policy alternative because without political support, there is little chance of implementation. I measure Political and Public Acceptability using the projected funding for similar initiatives, implemented policies that encourage the adoption of the policy alternatives, initiatives that are currently in programs that support the adoption of the policy alternatives and discussions with policy and decision-makers in field.

6.6 Implementation Complexity

Implementation complexity is a criterion used in policy analysis to measure the work required to implement the policy alternative. I identity some of the considerations for Implementation Complexity in the Cost criterion; the remaining costs that cannot be easily monetized are included in this section. The majority of these non-monetary costs accrue to the administrators in the form of decision-making to implement the policy alternative in a cost-effective manner. I measure this criterion by thinking about what the most cost-effective implementation strategy will be and determining the amount of work required for implementation.

7: Policy Analysis – More Robust ICT Curriculum for Ontario's Adult Learners

This chapter analyzes the policy alternatives to determine the most viable course of action considering the criterion measures. I consider each criterion measure for each policy alternative. I summarize the results of the policy analysis at the end to indicate the most viable alternative informing the recommendations.

7.1 Status Quo

OEATR is the status quo. Below I describe how the status quo performs on each criterion measure.

7.1.1 Effectiveness

OEATR was the best performing program on the Other Content and Support domains. They are well-equipped to identify the unique barriers facing rural and unemployed people because they:

- have superior synchronous classes that are better equipped to adapt to different learning styles,
- offer individualized learning pathways designed to target barriers for best attaining learner goals,
- provide flexibility in the learning process afforded by their responsive facilitators who target difficulties in a timely manner, and
- their learning content is designed to support low ICT competencies learners.

Their limited internal ICT curriculum and ineffective external ICT training partner – GCF – is not good for facilitating ICT competencies for the general learner and rural and unemployed learners. GCF was the poorest performer on the Content, Support and Administration domains

primarily because they have limited funds to service their high demand resulting in poor support services, limited capability to improve their asynchronous learning environment, and virtually inaccessible synchronous classes. GCF is relatively poorly equipped to identify the barriers facing rural and/or unemployed learners. Their curriculum is robust but ultimately it is an ineffective program for addressing the policy problem.

OEATR is proficient in providing literacy training that identifies unique barriers; however, without adequate ICT curriculum, these capabilities are not utilized. They do possess some curriculum internally and GCF offers enough knowledge items but uses ineffective training methods. This is represented by a moderate score on both Effectiveness criterion measures.

7.1.2 Cost

There are no incremental costs for the status quo because it is the current state.

7.1.3 Horizontal Equity

The adult training e-learning programs offered by OEATR benefit people living in both urban and rural areas. Geographic distance is a significant barrier impeding access to learning opportunities. This barrier disproportionately affects people living in rural areas because they have, on average, a much greater distance to travel to educational institutions. Other barriers (e.g. time required for commute, familial, occupational, and social obligations etc.) affect access to educational opportunities for both rural and urban individuals (CCL, 2009). E-learning alleviates these barriers by allowing the learner to access learning opportunities from anywhere with an adequate computer and high-speed internet access. Public-funded e-learning opportunities require investment of taxpayer dollars. Rural people do gain additional marginal benefit over urban people; however, both rural and urban people get benefits from e-learning. There are no losers considering horizontal equity for urban and rural people.

7.1.4 Vertical Equity

ICT adult training targets un and under-employed people. The majority of these people are in lower socio-economic classes. Investment in OEATR initiatives directly benefits the lower disproportionate to higher socio-economic classes. The higher socio-economic classes benefit indirectly from public-funded adult training. Employers benefit from a higher skilled aggregate labour pool. Higher skilled labourers are more productive and require less on-the-job training, which entails double the costs for the employers: wages paid to the trainees and the cost of the training services themselves (Interviewee F, 2010). A labour pool with higher ICT competencies also improves a nation's international competitiveness by improving domestic firms' productivity and domestic workers' ability to capitalize on international employment and commerce opportunities (e.g. the digital economy). Therefore, lower socio-economic classes collect the majority of the direct benefits from adult training but these benefits eventually disperse to all classes. I score the status quo as moderate because the current ICT curriculum is inadequate; thus, it is worse for both high and low socio-economic classes than having more robust and effective ICT curriculum.

7.1.5 Political and Public Acceptability

The MTCU demonstrates commitment to e-learning adult training in Ontario. They are funding the Learning Hub, AlphaPlus and the E-Channel to deliver e-learning services to Anglophones accessing adult training services in Ontario. The Learning Hub's funding significantly increased from 2008/2009 to 2009/2010 from one-hundred and twenty thousand dollars to seven-hundred and fifty thousand dollars (Interviewee C, 2010). This funding was expected to increase in 2010-2011 because the Learning Hub is exceeding their usage targets and meeting all the required service quality targets. Some of this funding is in jeopardy because of concurrent adult training development initiatives pulling from the service providers' budget

(Interviewee C, 2010). This indicates ambiguous commitment from MTCU for improved ICT competency training.

The Canadian Economic Action Plan identifies additional funding for adult training services to equip Canada to excel coming out of the economic downturn (GoC, 2009). MTCU will have additional funding to improve the adult literacy curriculum. MTCU is currently funding the development of the OALC, which is an initiative to develop a more robust adult training curriculum in Ontario. The OALC is focusing on e-learning as an innovative approach to delivering learning service in Ontario (OALC, 2010). OEATR has moderate political and public acceptability and there is support for policies to improve its effectiveness.

7.1.6 Implementation Complexity

The status quo has no additional incremental implementation complexity because it is the current state.

7.2 More Robust ICT Curriculum - Internal

This alternative analyzes the impacts of implementing the recommended ICT curriculum into their existing services. Below is an analysis of this alternative's incremental impacts on the status quo based on the criterion measures.

7.2.1 Effectiveness

Implementing a more robust ICT curriculum similar to ECDL/ICDL or E-Skills UK curriculum addresses the primary limitation identified in the program evaluation. The more robust curriculum implemented into the current service would identify the major problem of limited ICT curriculum. The current services already target many of the barriers impeding unemployed and rural people from accessing learning opportunities. This alternative identifies all the key issues for both dimensions of the effectiveness criterion.

7.2.2 Cost

This alternative would require developing between twenty and thirty new synchronous courses and an entire asynchronous training option (Interviewee C, 2010). The 2009 E-Channel's Centra curriculum has forty-two courses. The additional operation costs to administer the new curriculum with all the capabilities of the existing program is estimated to be to be at least $500,000 annually (Interviewee C, 2010). This figure does not include the program development costs, the additional facilities and the training requirement to improve the capacity of existing practitioners.

7.2.3 Horizontal Equity

This is the most costly alternative and addresses the barriers that specifically affect rural individuals. The additional costs require more public funding, which burdens all taxpayers. The benefits of a more accessible, adaptive and user friendly e-learning environment benefit urban people as well. This is the best option for identifying the barriers of low-competency learners. A rural digital divide on competencies persists, however, there are many other groups experiencing digital competency divides. I recognize that this alternative is more targeted to rural people making the additional funding a disproportionate cost on urban people. This alternative burdens a disproportionate amount of the costs on urban people giving it a lower score on horizontal equity.

7.2.4 Vertical Equity

The incremental impact on vertical equity across socio-economic classes is negligible when compared to the status quo. Improved ICT competencies will have greater direct benefits for lower socio-economic classes. In a similar way to that of the status quo, these benefits disperse to higher socio-economic classes by creating a higher skilled work force making potential employees more productive and improving Canada's international economic competitiveness. No particular socio-economic class suffers from investment in improved ICT

competencies. This alternative's ability to address the barriers of rural and unemployed people will increase the skilled labour pool and reduce economic dependency. The benefits accrue indirectly, which offsets the costs on the higher socio-economic classes.

7.2.5 Political and Public Acceptability

MTCU is currently investing in developing a comprehensive adult training curriculum – the OALC, which encompasses ICT competencies. This initiative suggests a political preference towards providing improved curriculum within the existing services. They also have an extensive network of adult trainers within Ontario that is capable of providing high-quality service. Improved ICT curriculum will enhance the capacity of domestic practitioners. The Ontario government would be predisposed to capitalizing on their existing services (Interviewee H, 2010).

7.2.6 Implementation Complexity

Developing the curriculum and the considerations involved in expanding e-learning facilitation services entails much of the implementation complexity for this alternative as it capitalizes on the existing capacity. The ECDL/ICDL allows public access to their syllabus including all four-hundred and sixty-eight knowledge items in the ECDL/ICDL core (ICDL - Canada, 2002) and the numerous other knowledge items in E-Citizen (ICDL – Canada, 2006) and ECDL/ICDL Advanced (ICDL – Canada, 2001). This resource streamlines the curriculum development process. The e-learning content, support and administration components have already been developed and can be transposed to the ICT curriculum. Furthermore, the Learning Hub already provides some synchronous ICT courses with competent facilitators.

The additional labour, facility, equipment and other operational costs are included in the Fiscal Cost criterion measure. The capable administrators are well equipped to estimate the investment that is required to administer the additional curriculum. There is additional implementation complexity involved with this alternative; however, the existing services are well

equipped for including ICT curriculum and developing the learning activities if funding matches the requirements to deliver the expanded services.

7.3 More Robust and Effective ICT Curriculum - External

This alternative analyzes the impacts of using an ECDL/ICDL approved training partner. The results in this section are all estimates based on Jenison's performance and other characteristics. I use Jenison as the ECDL/ICDL approval process is stringent attaining uniformity. I estimate the impacts on the status quo for implement Jenison's Impetus Plus. Below is an analysis of this alternative's incremental impacts on the status quo.

7.3.1 Effectiveness

Jenison's Impetus Plus program includes robust ICT curriculum. They use effective learning content and innovative evaluation techniques. Overall, they are well-equipped to deliver asynchronous ICT competencies training. There service is not conducive to addressing the barriers experienced by rural or unemployed people; however, the internal curriculum will orient absolute beginners – improving their competencies to a level where they can easily use the external partner's learning environment. Their asynchronous learning is not flexible, does not provide access to real-time facilitators, has limited individualized learning pathway capability and does not provide extensive rudimentary computer training for very low-competency learners.

7.3.2 Cost

I use the market price of Jenison's service to estimate the cost of ECDL/ICDL approved online learning partners. I base the price on the program's description in section **Error! Reference source not found.**. The cost of these services for up to 1000 learner per annum is £5,000, up to 2500, £7,500, and up to 6000, £10,000. The current conversion of pounds to

Canadian dollars is 1.54 making the cost $7700 CAD for up to 1000 users, $11,550 CAD for up to 2500 users and $15,400 CAD for up to 6000 users per annum (Interviewee I, 2010).

In addition to the program costs, there are licensing fee costs of $3000 per annum (Interviewee F, 2010). It is likely that MTCU will have to burden a portion of these licensing fees to encourage Jenison to provide services within Canada. An assessment of the competency pre-requisites to use this program may yield that additional courses must be offered to allow all learners access to the program. The existing curriculum addresses most of the base competencies required to use the program. The number of additional courses would be minimal. Additional courses will entail additional costs for developing and administering the courses. Depending on the number of additional courses – if any – the cost is estimated to be between ten to fifteen thousand dollars per courses per annum. The total estimated cost for this option ranges between $20,000 and $50,000 per annum.

7.3.3 Horizontal Equity

This alternative performs more poorly on addressing the barriers of rural and/or unemployed people. Its e-learning environment is designed for the average learner. Considering this is a more feasible alternative, there are less distributional concerns for cost and benefits accruing disproportionately to rural or urban people. There are less costs and more equal benefits.

7.3.4 Vertical Equity

This alternative improves ICT competencies for Ontarians similarly to the internal curriculum alternative. Low-level competency learners will benefit less from this alternative because it is ill equipped to address the barriers of low ICT competencies learners. The reduced costs counteract these indirect effects on employers and investors from higher socio-economic classes. The incremental impacts will have a negligible effect on vertical equity.

7.3.5 Political and Public Acceptability

This option does not capitalize on the current efforts of the OALC to develop ICT curriculum within the existing services. It does capitalize on the strengths of the current curriculum – orient absolute beginners to e-learning. This option will not improve the capacity and employment opportunities of Ontario's adult training facilitators and administrators, which is likely to garner low political and public acceptability (Interviewee H, 2010). It is in congruence with the general progression of the Ontario government to capitalize on public-private partnerships.

7.3.6 Implementation Complexity

On the surface, this appears to be a non-complex alternative to implement. Jenison is based in the United Kingdom. There are concerns with local licensing and adapting the curriculum from United Kingdom English to Canadian English. ICDL – Canada provides licensing for their approved international vendors. A new vendor must apply with ICDL – Canada to disperse material with ECDL or ICDL in the title. ICDL reviews their materials to ensure that they have considered the compatibility of their services with Canadian standards. The annual licensing fee is $3000 for a firm (Interviewee F, 2010). Licensing also requires time, which will delay the use of this courseware. The lag should not cause a large delay in service delivery if planned for and completed while the contract is being formalized, information is being distributed to employment counsellors, facilitators and administrators in the Ontario's e-learning adult training regime, the official protocol for referral is being established and the technical and content problems are being identified during the pilot process.

In addition, there will be an assessment of the external partner's program to determine the competency pre-requisites for learners. This assessment will determine any additional curriculum must be added to the existing programs. Skilled analysts must undertake this assessment to

ensure that all learners can capitalize on this program. This will require time and effort and may result in additional courses, which require additional development and operational costs.

7.4 Policy Analysis Summary

I use a policy analysis matrix to summarize the policy analysis results.

Table 8 signifies which policy alternative performs well on each criterion. I rank the alternatives using a colour scheme:

- Green indicates high performance,
- Yellow indicates moderate performance, and
- Red indicates poor performance.

The ranking scheme does not indicate the magnitude of differences and alternatives with significant net benefits receive the same ranking. There is no quantitative weighting, however qualitatively; the effectiveness criteria receive more consideration because they represent the alternative's ability to address the policy problem.

Table 8: Policy Analysis Matrix

		Status Quo	More Robust Comp. and ICT Curriculum – Internal	More Robust Comp. and ICT Curriculum - External
Effective-ness	Improves Comp. and ICT Competencies			
	Identifies the Specific Barriers Affecting the Rural Unemployed			
Fiscal Cost				
Horizontal Equity				
Vertical Equity				
Political and Public Acceptability				
Implementation Complexity				

The status quo performs poorly on both effectiveness criteria. It also has minor vertical equity concerns because the current ICT curriculum does not provide adequate training in an essential competency for individuals' and society's success. The More Robust ICT Curriculum Implemented Internally alternative performs well on both improving ICT competencies and identifying the barriers specifically affecting rural and/or unemployed people. It does entail a significant fiscal cost for MTCU, moderate horizontal equity and implementation complexity concerns. Contracting an ICDL/ECDL approved ICT training partner entails moderate fiscal

costs, has moderate implementation complexity and moderate political and public acceptability. The major concern is the program's ability to identify the barriers that prevent rural and/or unemployed people from accessing learning opportunities; however, the existing internal curriculum quells this reservation.

This matrix identifies one alternative that can be omitted from final consideration for an action item. Implementing the more robust ICT curriculum into the existing services entails significantly higher and somewhat variable costs compared to delivering the curriculum using an external partner. They achieve similar results on effectiveness if the existing ICT curriculum is maintained and perhaps repackaged to train in all the pre-requisite competencies. If more robust curriculum is to be adopted, this policy analysis reveals using an external partner in conjunction with the existing internal ICT orientation curriculum is preferable.

Both the Status Quo and More Robust Curriculum Delivered by an External Partner receive three ratings of Moderate Performance. Two of those are designated to the effectiveness criteria for the Status Quo. This study was unable to define the magnitudes of the benefits of improving ICT competencies to the ECDL/ICDL recommended level because outcomes data is unavailable. Section 2.6describes ICT competencies as critical for employment in the traditional labour market, the emerging digital economy and enabling aspatial work arrangements, which increases the labour pool. I consider this argument to justify a greater weight for the effectiveness criterion measures. Therefore, I recommend developing and implementing an external ICT training partner for delivering training services to citizens accessing Ontario's Adult Training services.

8: Recommendations

This chapter describes the actions and considerations recommended for MTCU to address ICT competency training deficiencies. Section 8.1 describes the actions that I recommend to undertake as soon as possible. Section 8.2 describes considerations for the future to better address ICT training deficiencies.

8.1 Action Items

GCF e-learning includes most of the same knowledge items as ECDL/ICDL curriculum. They do not comprehensively train making their ability to improve competencies dubious. In addition, GCF:

- has inaccessible support staff and administration,
- does not collect any competency improvement data,
- does not collect any user-satisfaction data,
- has asynchronous courses that only train in concepts – no pragmatic training,
- has synchronous courses that are virtually inaccessible due to extraordinarily high demand,
- has no pre-assessment to create individualized learning pathways,
- has limited flexibility for course choice,
- has limited real-time support for learners that may be intimidated by computer communication,
- has minimal support documentation considering its importance for an organization that cannot provide responsive facilitator help, and
- has no target management or user fees to hold it accountable to for service delivery.

The most concerning of these deficiencies is the unresponsive support services and inaccessible synchronous learning courses. Learners must receive timely assistance and access to learning

activities or else they disengage (Interviewee G, 2009). Educators and other education providers are cognoscente of the importance of maintaining learner engagement. Disengagement results in low attention for the learning activities and often withdrawal (Interviewee G, 2009). GCF does not keep learners engaged due to their unresponsive service.

I recommend discontinuing referrals to GCF and contracting an ECDL/ICDL training partner. This involves:

- choosing an effective and feasible training partner,
- ensuring they have or can procure the necessary licensing,
- ensuring prospective learners can easily use all the e-learning environment's capabilities,
- ensuring the domestic service providers have the capacity to perform the administrative tasks required to monitor learners progress, and
- disseminating information to pertinent Employment and Training service providers to provide appropriate referrals.

Conducting an in-depth evaluation prior to formalizing a contract with an e-learning program addresses some of these issues. The E-Learning Program Evaluation framework defined in Section 3.5 and executed in Chapter 4: enables assessment of the effectiveness of e-learning programs. I have already conducted the evaluation for Jenison's Impetus Plus program. They perform well on the framework and are a viable candidate. They are not currently licensed by ICDL – Canada – only the ECDL Foundation. Using their services may result in marginally higher costs and lagged implementation time[11]. The alternative is to conduct more evaluations - using the same methodology – for ICDL – Canada approved vendors (i.e. CIA Training, Advance Learning and Third Force). This process will provide a more fulsome understanding of the range of effectiveness of ECDL/ICDL approved training partners to verify the contract decision.

[11] See Sections 7.3.2 and 7.3.6.

This evaluation also reveals the essential competency pre-requisites for prospective learners and utilize the existing internal training services to enable equitable access. Their strength is their ability to target low-competency individuals with many learning barriers. Develop and implement programs to address the required competencies not identified in the current curriculum. Training and Employment services are already skilled in conducting pre-assessments to identify learning barriers and goals. It is prudent to assess learners identifying or revealing goals to improve ICT competencies for the pre-requisite competencies. If they are deficient in any prerequisites, they should complete the corresponding course in the orientation curriculum.

There are additional administrative tasks for domestic service providers to deliver high quality training. Learners may require assistance registering and accessing the e-learning environment. In addition, it is prudent to monitor the progress of learners to ensure they are not lost in the process. These tasks will require minimal additional administrative capacity.

Lastly, to capitalize on the additional capacity, it is recommended that information is disseminated to all pertinent service-providers in Ontario's Employment and Training community. This involves understanding, documenting and marketing the program's capabilities and benefits, intended target populations, procedure for accessing the program, required administrative capacity, required equipment and organization offering administrative and facilitator support for the program.

8.2 Initiatives for Consideration

The absence of accreditation testing remains a deficiency with the reforms outlined above. Using an ECDL/ICDL training partner exposes learners to and prepares learners for success on ECDL/ICDL accreditation testing. Learners still must pay for the testing. This fee acts as a deterrent. It is difficult to justify investment in accreditation if there is no immediate

gain. Subsidizing the cost of the accreditation testing will alleviate this barrier. Without adequate outcomes data to determine the magnitude of benefits from accreditation testing, the utility of subsidization is ambiguous. This report suggests the importance of accreditation for accessing digital economy opportunities, allowing employers to assess ICT competencies in the traditional economy and allowing learners to understand the competencies possessed. It is prudent to use empirical outcomes research to justify the investment required to subsidize ECDL/ICDL accreditation testing for all prospective clients.

Outcomes data in conjunction with aggregate ICT competency data enables monitoring of the importance of investment in ICT competencies. Reliable ICT competencies data is unavailable. I use usage and self-rate skills as proxies for ICT competencies to define digital divides. This data loosely indicates computer and ICT competencies. Aggregate rates of reading, writing and numeracy have been collected using the International Adult Literacy Survey (IALS) since 1994 (GoC, 1996). The IALS initiative recognized that literacy is an important indicator of productivity and should be monitored to understand how literacy and education initiatives are performing. Asking people how many books they can read and whether or not they can multiply 156 by 145 is an ineffective method for understanding literacy rates but is the only type of data available for ICT competency monitoring. It is important to develop a valid reliable method for obtaining aggregate ICT competencies rates.

ECDL/ICDL accreditation bodies are in one-hundred and forty eight countries and continuing to spread. Testing centres are spreading throughout these nations and are available in much smaller geographic jurisdictions. The ECDL/ICDL accreditation test incorporates all the essential ICT knowledge items in their Core, Advanced and E-Citizen curricula (Interviewee F, 2010). It can be used as international standardized testing for ICT competencies. Collaborating with a body such as IALS may equip comprehensive ICT competency monitoring without having to conduct any additional testing – people already participate in testing to gain the credentials.

There are many intangibles to analyze prior to using it as standardized testing of ICT competencies, most important are the security and privacy concerns of ECDL/ICDL clients. ICDL – Canada is committed to their promise to protect their clients' test results and demographic information (Interviewee F, 2010). A lengthy consultation and negotiation process is necessary for utilizing test scores as aggregate ICT competency data.

9: Future Research

There are two areas of deficiency for data accessibility: aggregate ICT competency and ICT competency outcomes. ECDL/ICDL tests provide reliable computer and ICT competency data but it is inaccessible to anybody outside of the organization. There are no ICT outcomes data available in Ontario. I recommend MTCU partner with ICDL – Canada to collect this data. A longitudinal study to assess the improved outcomes in employment, income and confidence will inform the future benefits of ICT competencies and international ICT accreditation. This study would measure the outcomes of learners with international accreditation against those without who have completed similar programs. It will provide empirical evidence of the magnitude of benefits accruing from ICT accreditation. These outcomes in-comparison to the outcomes of a comparable representative sample who have not had any formal ICT competency training will reveal the magnitude of economic benefits from ICT training including the knowledge items of E-Skills UK's ICT curriculum benchmark. This study will allow MTCU to make a precise assessment regarding how to proceed with facilitating ICT competencies in Ontario. The current recommendation represents an incremental step towards establishing an effective and robust ICT training regime. The recommendation is scaled to represent unavailable data for making a truly informed policy decision. The data collected in this proposed study will provide a more definitive understanding of the utility of investment in ICT competency training and accreditation.

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Appendix A – E-Skills UK ICT Curriculum Benchmark Description

Table 9: E-Skills UK ICT Curriculum Benchmark

Competency area	Compet-encies	Description
Using IT systems	General operation of hardware / software	Plan, use and review and devise solutions for software solutions appropriate to necessary tasks
		Plan, use, review and devise solutions to improve the use Hardware components to better accomplish necessary tasks
		Plan, use, review and devise solutions to improve the use IT tool solutions appropriate to necessary tasks
	IT Setup	Connecting all common external components of a computer
		Connecting to communication hardware or a communication service.
		Install and configure software including Operating Systems by using setup files for typical software products
	IT trouble shooting	Use correct startup and shutdown procedure, adjust system setting and access the internet.
		Check that components are working successfully by systematically running tests and responding to error messages.
		Understand when it is appropriate to consult experts to avoid further damage
	IT maintenance	Carry out routine maintenance and be able to respond to routine IT problems (i.e. using anti-virus software, scandisk)
		Use to efficiently organize, store and retrieve information by understanding File Navigation software, having the ability and system to backup and restore files and carrying out routine file housekeeping.
		Customize the working environment to meet individual's needs.
	IT security	Recognize the danger of computer viruses
		Access, develop, understand and/or follow recommended guidelines and procedures
		Securely store information by managing access to information sources and having an effective backup and archiving procedure
Using IT to exchange information	Internet and intranet	Access, search for, select and use internet-based information and assess its fitness for purpose
		Use appropriate search techniques to locate relevant information
		Follow and understand the need for safety and security practices when working online (i.e. understand information privacy laws)
		Select and set up an appropriate connection to access the internet
	E-mail and other IT Commu-nications	Create, access, read and respond appropriately to e-mail and other IT-Based Communications
		Use browser software to communicate information online
		Manage storage of IT-based communications
		Respond appropriately to common IT-based communication problems
	Mobile / remote systems	Setup, customize and following maintenance guidelines and procedures for efficient use of mobile devices
		Use applications and files on the mobile device
		Transfer data to and from the mobile device

		Maintain the performance of mobile devices by performing virus checks and understanding common problems to respond to their occurrence
	Personal Information Management Software	Use a calendar to schedule appointments
		Use a task list to prioritize activities
		Use an address book to store, organize and retrieve contact information
Using IT software	Audio / Visual Software	Use, edit, play, store and retrieve built-in or external software to record information to meet needs
	Word processing	Enter, edit and combine text and other information accurately within word processing documents
		Structure information within word processing documents
		Use word processing software tools to format and present documents
	Spreadsheets	Use a spreadsheet to enter, edit and organize numerical and other data
		Use appropriate formulas and tools to summarize and display spreadsheet information
		Select and use appropriate tools and techniques to present spreadsheet information effectively
	Databases	Enter, edit and organize structured information in a database
		Use database software tools to extract information and produce reports
		Create and modify non-relational database tables
		Use database software to run queries and produce reports
	Design and Imaging	Ability to use a software application designed to create, modify and layout artwork or images for display in print or on a screen
	Website development	Plan, create, format and publish webpages to effectively display information on the inter or intranet.
	Presentation software	Input and combine text and other information within presentation slides
		Use presentation software tools to structure edit and format slides
		Prepare slides for presentation to meet needs
	Computerized Accounting Software	Ability to select and use a computerized account software application to input and process data.
		Obtain, insert, create and/or combine designs or images
		Understand how to manage order and invoices, receipts and payments and compare management and period end reports
	Specialist / bespoke software	Ability to select and use a suitable bespoke or specialist software application to carry out an appropriate data processing task
		Understanding capabilities of the software and the types of tasks it carries out
		Possessing the skills and techniques needed to use the software appropriately and effectively

Source: (E-Skills UK, 2009)

Appendix B - Program Observations Indicating Performance on Ideal E-Learning Framework

Outputs

Table 10: OEATR Observations on Outputs Criteria

Criteria	Sub-Criteria	Observations
Improves Competencies	Training Improves Competencies	Training methods demonstrate competency improvement for reading, writing and numeracy (Learning Hub, 2009a)
		Very few learners improve to a high (4 or 5 - OLC 2009) levels of literacy (Learning Hub, 2009a).
	Collects Data	Only collects competency improvement data for reading, writing and numeracy (Learning Hub, 2009a).
Utilized / Attracts Target Populations	Total Enrolment	April 2008-September 2009 = 1078 new learners (Learning Hub, 2009a) (Learning Hub, 2008).
		Significantly exceeds the enrollment target = 120 learners per year (Interviewee G, 2009)
	Meets Potential demand	Target significantly below the actual demand for services - 1,100,000 unemployed in Ontario (STATISTICS CANADA, March 2010), approximately 29% from rural areas = 317,000 (MoF, 2007), approximately 2/3rds of population have low literacy (OLC, 2009) suggesting low ICT competencies = 209,000 - Potential demand significantly exceeds the capacity of the existing services.
Participants Demonstrate Satisfaction	Collects data	Periodically collect user-satisfaction data (AlphaPlus, 2003a) (AlphaPlus, 2003b) (Learning Hub, 2009b).
		Collect satisfaction as well as service improvement data
	State Satisfaction	Majority state high-satisfaction (Learning Hub, 2009b).
	Complete the Program	27% exited after assessment - not known if these learners completed any learning activities (Learning Hub, 2009a)
Includes Accreditation	Final Test Taken	Courses not required to offer final test of competencies possessed (LH E-Learning Environment, 2010).
	Effectiveness of Test	Some courses offered tests but not focused on challenging the users to fully understand competencies attained (LH E-Learning Environment, 2010).
	Recognition	No accreditation designated (Interviewee C, 2010).

Table 11: GCF Observations on Outputs Criteria

Criteria	Sub-Criteria	Observations
Improves Competencies	Training Improves Competencies	No data
	Collects Data	Does not collect any competency improvement data (GCF, 2010).
Utilized / Attracts Target Populations	Total Enrolment	Over 1,000,000 users in 10 years of operation (GCF, 2010)
	Meets Potential demand	Does not define target population or collect demographic information from its users (GCF, 2010)
		Geographic composition of enrolment reveals equal composition of rural and urban users (GCF, 2010)
Participants Demonstrate Satisfaction	Collects data	Collect non-empirical, euphemistic testimonials from previous users (GCF, 2010)
		Only collect for advertising purposes, not for service improvement (GCF, 2010)
	State Satisfaction	Testimonials overwhelmingly positive but no effort to be representative (GCF, 2010).
	Complete the Program	Data unavailable
Includes Accreditation	Final Test Taken	Synchronous and asynchronous courses do require final tests (GCF Learning Environment, 2010)
	Effectiveness of Test	Asynchronous tests are short and only multiple choice (GCF Learning Environment, 2010)
		Not able to access synchronous tests
	Recognition	Offer Continuing Education Units (CEU)s (GCF, 2010)
		Limited international recognition (IACET, 2010)
		Not specific to ICT competencies(IACET, 2010)

Table 12: Jenison Observations on Outputs Criteria

Criteria	Sub-Criteria	Observations
Improves Competencies	Training Improves Competencies	No data
	Collects Data	Does not collect any competency improvement data (Interviewee I, 2010).
Utilized / Attracts Target Populations	Total Enrolment	Unavailable total enrolment data (Interviewee I, 2010).
		Well used the ECDL Foundation's number one recommended online learning partner (Interviewee D, 2010)
	Meets Potential demand	Demographic information on enrolments is unavailable (Interviewee I, 2010)
		Private company that advertises to attract the potential demand (Jenison, 2010)
Participants Demonstrate Satisfaction	Collects data	Allow access to previous users to discuss quality of service (Interviewee I, 2010).
		Only collect for advertising purposes, not for service improvement (Jenison, 2010)
	State Satisfaction	Unknown
	Complete the Program	Data unavailable
Includes Accreditation	Final Test Taken	Training service offers final test but only to prepare for ECDL/ICDL test (Jenison Learning Environment, 2010)
	Effectiveness of Test	Test mimics the ECDL/ICDL test which is a robust assessment of ICT competencies (Jenison Learning Environment, 2010).
	Recognition	Internal test has no recognition – preparatory for ICDL/ECDL accreditation (ECDL, 2010)
		Referral to ECDL/ICDL for the most recognized ICT competencies accreditation test internationally (ECDL, 2010)

Curriculum

(All observations are generated from participant observation in the respective e-learning environments)

Table 13: OEATR Observations on Curriculum Framework

Criteria	Knowledge Items	Results		Observations
		Comp.	Level	
Using IT systems	General operation of hardware / software	0.5	1	One Centra course for these competencies
				2 hours of class time
				Designed for beginners
	Setup	0.5	1	One Centra course for these competencies
				3 hours of class time
				Designed for beginners
	Troubleshooting	0	0	N/A
	Maintenance	1	2	Entire Centra course designated to file storage
				2 contact hours, 1 session
				Games practice mouse skills - few levels and easy mastery
				Games practice keyboard skills
				Omitted Competency Components:
				Computer and IT maintenance
				Customizing work environment
	Security	0	0	N/A
Using IT to exchange information	Internet and intranet	1	1	Centra Course - Intro. To Surfing the Web
				2 contact hours, 1 session
				Omitted parts of Competency:
				Follow and understand the need for safety and security practices when working online
				Select and set up an appropriate connection to access the internet
	E-mail and other IT Communications	1	1	Centra Course - Email in the Workplace
				2 contact hours, 1 session
				Omitted competency components:
				Use browser software to communicate information online
				Manage storage of IT-based communications
				Respond appropriately to common IT-based communication problems
	Mobile / remote systems	0	0	N/A
	Personal Information Management Software	0	0	N/A
Using IT software	Audio / Visual Software	0	0	N/A

	Word processing	1.5	1	Centra Course - Microsoft Word for Beginners 8 hours contact time, 4 sessions Exercises available through Moodle - blended learning Major Limitation: software-specific
	Spreadsheets	1	1	Beginner Excel Centra Class 4 hours of total contact time 2 different sessions Exercises available through Moodle - blended learning Omitted competency components: Use appropriate formulas and tools to summarize and display spreadsheet information Select and use appropriate tools and techniques to present spreadsheet information effectively
	Databases	0	0	N/A
	Design and Imaging	0	0	N/A
	Website development	0	0	N/A
	Presentation software	1	1	Beginner Powerpoint Centra class 4 hours of contact time, 2 sessions Omitted competency components: Use presentation software tools to structure edit and format slides
	Computerized Accounting Software	0	0	N/A
	Specialist / bespoke software	0	0	N/A

Table 14: GCF Observations on Curriculum Framework

Categories	Knowledge Items	Results		Observations
		Comp	Level	
Using IT systems	General operation of hardware / software	1	1	Parts of sub-courses designated to knowledge item Designed for beginners to advance
	Setup	1	1	Parts of sub-courses designated to knowledge item Designed for beginners to advance
	Trouble-shooting	1	1	Short subsection with limited information.
	Maintenance	2	1,2	Whole domain dedicated to computer maintenance.
	Security	2	1,2	Parts of two domains dedicated to knowledge item.
Using IT to exchange information	Internet and intranet	2	1,2	Full section containing 21 domains dedicated to knowledge item
	E-mail and other IT Communications	2	1,2	Full section dedicated to knowledge item
	Mobile / remote systems	1.5	1,2	Subsection dedicated to knowledge item
	Personal Information Management Software	1.5	1,2	Subsection dedicated to knowledge item
Using IT software	Audio / Visual Software	1	1	Some of a subsection identifies this software
	Word processing	2	1,2	Full section and online synchronous course
	Spreadsheets	2	1,2	Full section and online synchronous course
	Databases	2	1,2	Full section and online synchronous course
	Design and Imaging	2	1,2	Full section and online synchronous course
	Website development	0	0	N/A
	Presentation software	2	1,2	Full section and online synchronous course
	Computerized Accounting Software	0	0	N/A
	Specialist / bespoke software	0	0	N/A

Table 15: Jenison Observations on Curriculum Framework

Criteria	Knowledge Item	Results		Observations
		Comp.	Level	
Using IT systems	General operation of hardware / software	1.5	1,2	Sub-courses designated to knowledge item
				Designed for beginners to advance to intermediate level
	Setup	1.5	1,2	Sub-courses designated to knowledge item
				Designed for beginners to advance to intermediate level
	Troubleshooting	1.5	1,2	Sub-courses designated to knowledge item
	Maintenance	2	1,2	Whole domain dedicated to computer maintenance including, physical upkeep, file management.
	Security	2	1,2	Whole domain dedicated to knowledge item
Using IT to exchange information	Internet and intranet	2	1,2	Full section dedicated to knowledge item
	E-mail and other IT Communications	2	1,2	Full section dedicated to knowledge item
	Mobile / remote systems	2	1,2	Parts of internet section dedicated to knowledge item
	Personal Information Management Software	2	1,2	Parts of internet section dedicated to knowledge item
Using IT software	Audio / Visual Software	1.5	1	Computer basics identifies audio/visual software
	Word processing	2	1,2.3	Full section in core and advanced courses.
	Spreadsheets	2	1,2.3	Full section in core and advanced courses.
	Databases	2	1,2.3	Full section in core and advanced courses.
	Design and Imaging	2	1,2.3	Full section in core and advanced courses.
	Website development	0	0	N/A
	Presentation software	2	1,2.3	Full section in core and advanced courses.
	Computerized Accounting Software	1.5	1,2	Parts of excel and database software program identify computerized accounting.
	Specialist / bespoke software	0	0	N/A

Content

(All observations are generated from participant observation in the respective e-learning environments)

Table 16: OEATR Observations on Content Criteria

Criteria	Sub-Criteria	Observations
Assessment and Evaluation	Pre-Assessment	Conducts assessment prior to participating in learning activities to individualize learning pathways
		Also used to indicate competency improvement for reading, writing and numeracy.
	Progress Monitoring	Asynchronous classes use a variety of evaluation methods (multiple choice and practical assessment) to monitor progress
		Synchronous classes do not always monitor progress using evaluations but the interaction enables informal progress assessment.
	Post-Assessment	Asynchronous courses conduct post-assessment mandatory for course completion
		Not essential for synchronous courses
Instructional Method	Variety of Methods	Have synchronous, asynchronous and blended learning formats.
		Delivers learning content using in-person, real-time insturctor contact, screen shot slide shows, whit board interaction, activities and exercises and quizzes to test competency progress
	Effectiveness of Methods	Learner satisfaction results indicate learner find the instructional methods effective
Learning Communities	Variety of Methods	Offer vocal, face to face, email and blog interaction
	Effective Tools	Uses White boards for visual interaction, microphones for verbal, screen clones to see instructor and peer work.
		Blog is used and organized by topics and courses

Table 17: GCF Observations on Content Criteria

Criteria	Sub-Criteria	Observations
Assessment and Evaluation	Pre-Assessment	No pre-assessment
		No opportunity for individualized learning pathways.
	Progress Monitoring	No progress monitoring in asynchronus courses as they are organized to facilitate the attainment of one knowledge item.
	Post-Assessment	Basic short multiple choice question at the end of each course.
		No incentive for high-attainment on test other than personal assessment of competencies.
Instructional Method	Variety of Methods	Have synchronous and asynchronous learning formats.
		Screenshot slide shows and videos used for instruction
		Primarily concept memorization in asynchronous classes
		Unable to access synchronous learning environment due to high demand
	Effectiveness of Methods	No user satisfaction results
		Only one primary method of content delivery.
Learning Communities	Variety of Methods	No interaction between peers in asynchronous courses
		Can interact with facilitator via email - high demands for existing labour
	Effective Tools	No data available for the effectiveness of learning communities.

Table 18: Jenison Observations on Content Criteria

Criteria	Sub-Criteria	Observations
Assessment and Evaluation	Pre-Assessment	Behavioural pre-assessment available in other programs - no skills assessment prior participating in learning activities.
		Not used to indicate competency improvement or provide individualized learning pathways - identify potential barriers for learners' personal understanding.
	Progress Monitoring	Conducts interim assessments at the end of every unit section
		Multiple choice to assess the learner’s understanding of important concepts
		Interactive touch screen assessment is an innovative method for evaluating the learner’s precision for software navigation.
	Post-Assessment	Post-assessment mimicking ECDL testing - robust ICT test
Instructional Method	Variety of Methods	Only asynchronous format - dynamic and interactive to overcome the shortcomings of asynchronous learning
		Use an innovative interactive touch-screen component that forces the learner to practice skills as they navigate through the tutorial.
		Pragmatic learning format and information dissemination
	Effectiveness	No user indication of satisfaction with instructional methods

	of Methods	The pragmatic training improves on the traditional concept memorization approach towards gaining skills and competencies.
Learning Communities	Variety of Methods	No learning community available.
		In the processs of developing one (Interviewee F, 2010)
	Effective Tools	Not Applicable

Support

Table 19: OEATR Observations on Support Criteria

Criteria	Sub-Criteria	Observations
Learner Support and Autonomy / Learning Documentation	Comprehensive	Instructional documentation on how to navigate through the e-learning environment, complete exercise helps descriptions and definitions of key concepts (LH E-Learning Environment, 2010).
		Use instructional videos in their asynchronous courses (LH E-Learning Environment, 2010).
		Question mark cursor application that allows users to get more detailed information about difficult concepts (LH E-Learning Environment, 2010).
	Effective	User satisfaction indicates that users are well-equipped to use the e-learning environment using the documentation available.
	Available	Easily accessible in the e-learning environment at anytime.
Learning Facilitation	Quantity	All courses provide access to facilitators designated to each learner
		Continual interaction between facilitator and learner in synchronous courses
		Policy to respond to any inquiry within 72 hours - commonly respond within 24 hours, which is the non-official target.
	Quality	Learners indicate satisfaction with facilitation support.
		No process for documenting individual complaints - only in the formal user satisfaction studies.
Student-Centered Learning	Individualized Approach	Formalized process for providing individualized learning pathways
		Involves the identification of: learning goals, reading writing and numeracy levels, preferred method of delivery, preferred courses and previous learning experiences
		Many options for each component to offer meaningful individualized pathways
		Goal to identify learning pathways for all learners - 78% of clients - 22% exited prior to capitalize on learning activities
Technical Support	Quantity	Provide timely technical support
		Allow learners to access technical support as well as facilitators
		Facilitators address issues if they are capable
	Quality	Technical issues are the most often cited issue according to user-satisfaction surveys
		Overall, satisfaction is indicated for resolution of technical issues.
Addresses the Barriers of At-Risk Populations	Unemployed and Rural	In 2008-2009 fiscal year, 62% of learners identified an employment-related learning goal, which indicates under and unemployment.
		In 2008-2009 fiscal year, 88% of learners were from rural or remote areas
		Remote accessibility only requiring a computer and broadband internet
		Full utilization requires headsets, whiteboard compatibility and web cam
		Addresses the needs of low competency learners by offering individualized learning, responsive synchronous learners.
		There learning environment is designed to address the specific problem of rural and low-competency people

Table 20: GCF Observations on Support Criteria

Criteria	Sub-Criteria	Observations
Learner Support and Autonomy / Learning Documentation	Comprehensive	Support link on their front page connect to Frequently Asked Questions (FAQ)s
		FAQs (16) presented in dropdown many that allows learner to access the answers delivered in written or video format.
		No other support documentation embedded in e-learning environment
	Effective	No user-satisfaction data indicating the perceived effectiveness of learner documentation
		Support bounded to one of the identified FAQs
		Two methods of delivery to support different learners
	Available	Available on the front page of the e-learning environment
Learning Facilitation	Quantity	Unable to access synchronous courses (Learning Facilitator assisted) due to high demand
		High pupil to facilitator ratio to support the high demand
		Not responsive to general requests outside of synchronous courses
	Quality	Could not gain access
		No user-satisfaction data indicating the perceived effectiveness of learning facilitation
Student-Centered Learning	Individualized Approach	No pre-assessment for placement
		Little choice to individualize learning, learner can choose the knowledge items
		Choose synchronous or asynchronous - very difficult to access synchronous courses
Technical Support	Quantity	Heavily burdened, relatively small technical support staff
	Quality	No user-satisfaction data indicating the perceived effectiveness of technical support
		I experienced no technical problems when navigating through the asynchronous courses
Addresses the Barriers of At-Risk Populations	Unemployed and Rural	High demand limits the amount of support available for low-competency learners
		Does not offer individualized learning pathways outside of personal course choices
		Only requires a computer and a broadband internet connection

Table 21: Jenison Observations on Support Criteria

Criteria	Sub-Criteria	Observations
Learner Support and Autonomy / Learning Documentation	Comprehensive	Provides a "Getting Started" tutorial delivered using an interactive slideshow describing the step-by-step process for using their e-learning environment
		Describes specific components using the 'Quick Help' feature
		Prior to 'launching' a course, a description of the course is available
	Effective	No user satisfaction data for learner documentation
		Use a variety of methods allowing access to a number of learning styles
	Available	Accessible within the e-learning environment - visible
Learning Facilitation	Quantity	Only asynchronous learning - requires less facilitator attention
		Administrator assigned to learners is responsive but responsible for a large number of learners (Interviewee F, 2010)
	Quality	No user satisfaction data for learning facilitation
		Personal experience - Administrators providing support are responsive to requests
Student-Centered Learning	Individualized Approach	Conduct a behavioural pre-assessment for learners to identify potential learning barriers
		Have broad modules for learners to access certain learning content -- have few opportunities to create an individualized approach
Technical Support	Quantity	Has a team of technical support staff that addresses issues outside of administrators' (first line contact) capabilities
	Quality	No user-satisfaction data for technical support
		Personal experience - significant technical issues encountered (compatibility with Internet service providers, lagging interactive screens)
Addresses the Barriers of At-Risk Populations	Unemployed and Rural	Well-designed, straight-forward and contains effective learning documentation
		Limited real-time interaction between administrators/facilitators and learners
		Asynchronous learning is inflexible compared to individualized, synchronous learning

Administration

Table 22: OEATR Observations on Administrative Criteria

Criteria	Sub-Criteria	Observations
Manage-ment Style (Shared Vision / Empowered Leaders)	Organizational Objectives Defined	Objectives defined at year end
		Must meet targets identified by MTCU based on these objectives
		Limited ramifications for deviation from these targets - no contract has been removed based on non-compliance to targets in the past 15 years (Interviewee G, 2010)
	Organizational Objectives Understood	Distribute annual objective documents to employees
		Interviewees demonstrated support and comprehension for objectives
	Systematic ICT Program Developed	Little focus on ICT competencies
		Targets and objectives primarily based on reading, writing and numeracy and general outputs (e.g. enrolment, learning plans developed)
Ongoing Professional Learning	Supportive and Enabling Process	Encourages skill upgrading with a policy allowing facilitators to take paid leave for skill upgrading contingent upon them justifying the benefits of the training to a supervisor.
		Facilitators must find their own sources for learning opportunities
Consistent and Adequate Funding	Fiscal Capacity	Learning Hub - Majority of funding comes from MTCU - some from ad hoc contracts with partners
		Learning Hub - Annual funding agreements
		Learning Hub - Increased significantly the past two years from $120,000 to $750,000
		Tumultuous for the upcoming year due to investment in competing e-learning adult training initiatives
	Public Fiscal Support	All comes from public sources to provide equitable access to services
	Administrative Support	Targets defined by MTCU to direct effort and investment in targeted areas

Table 23: GCF Observations on Administrative Criteria

Criteria	Sub-Criteria	Observations
Manage-ment Style (Shared Vision / Empowered Leaders)	Organizational Objectives Defined	Not-for-profit donation based makes it difficult to assess objectives
		Have overall mandate "to create and provide education, employment, and life enrichment opportunities for people who desire to improve the quality of their lives" (GCF, 2010)
		Funding style does not ensure accountability to learners to provide high quality service
	Organizational Objectives Understood	Unable to assess if objectives are understood as there is no documentation available and no interviewees to indicate understanding and support for organizational direction
	Systematic ICT Program Developed	Mandate includes providing ICT training
Ongoing Professional Learning	Supportive and Enabling Process	No documentation or interviewees available to assess their support and policy for ongoing professional learning
Consistent and Adequate Funding	Fiscal Capacity	Unable to obtain budget documents
		Entire budget based on inconsistent donations
		Very difficult to access synchronous learning courses indicated inadequate funding for the demand on services
	Public Fiscal Support	No public support for services but free e-learning allows for equitable access
	Administrative Support	Administrative support from GCF. GCF - learnfree.org delivers e-learning under the supervision of the mother organization

Table 24: Jenison Observations on Administrative Criteria

Criteria	Sub-Criteria	Observations
Manage-ment Style (Shared Vision / Empowered Leaders)	Organizational Objectives Defined	Private company with incentives to provide high-quality service to maintain a competitive edge within a competitive e-learning market
		Do not specifically define their objectives
		No regulatory body ensuring the meet targets for service delivery - users define what they want by choosing other services with varying approaches
	Organizational Objectives Understood	No objectives explicitly defined
	Systematic ICT Program Developed	Impetus Plus program is their ICT training program, which is well-used and a focal point of their e-learning services.
Ongoing Professional Learning	Supportive and Enabling Process	Have a supportive process and environment and also have the greatest capability to provide high-quality facilitator training within the Management program of Jenison's e-learning services
Consistent and Adequate Funding	Fiscal Capacity	User fees cover the costs required to fund the existing services and invest in initiatives for improvement to adapt in a continually evolving industry
	Public Fiscal Support	No public support
	Administrative Support	Administration is the responsibility of the company - no oversight body

External Context

Table 25: OEATR Observations on External Context Criteria

Criteria	Sub-Criteria	Observations
Supportive Policies / Government Commitment	Administrative Support	Funding history indicates increasing emphasis on e-learning
	Government Commitment	Ontario Adult Literacy Curriculum (OALC) initiatives suggests sustained commitment to providing essential skills training including ICT competencies
		Canadian Economic Action Plan (2009) identifies adult re-training as a pillar to recovery
Engaged Communities / Public Commitment	Public Support	Overall understanding of the importance of education and re-training services
	Public Awareness	Good referral process for those accessing Employment and Training services
		Little advertisement external to the Employment and Training services - limited exposure to services in general population

Table 26: ICDL - Canada Observations on External Context Criteria

Criteria	Sub-Criteria	Observations
Supportive Policies / Government Commitment	Administrative Support	No government referrals or subsidized funding for ICDL testing
	Government Commitment	Demonstrating willingness to invest in outputs assessment with their TOWES testing for reading, writing and numeracy.
		Awareness and respect for International Adult Literacy Survey used to understand literacy performance across and within nations.
Engaged Communities / Public Commitment	Public Support	Majority of general public are unaware of ICDL testing
		Limited exposure for the importance of ICT competencies.
	Public Awareness	Low public awareness of ICDL testing

Table 27: ECDL - Ireland Observations on External Context Criteria

Criteria	Sub-Criteria	Observations
Supportive Policies / Government Commitment	Administrative Support	Government funding and extensive government referral services to ECDL
	Government Commitment	ECDL originated in Ireland under the vision of Bertie Ahern the Taoiseach of Ireland from 1997 - 2008 - commitment to developing an information society
Engaged Communities / Public Commitment	Public Support	Understand the importance of ICT competencies - 6% of population certified in 2003
	Public Awareness	ECDL testing centres are saturated throughout Ireland
		Over 6% of the population was ECDL certified in 2003 - significant increase until now