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# Investing in Effective Adult Learning for Island Prosperity: Back to Basics

Dr. Audrey J. Penner  
Dr. Greg McKenna  
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May, 2011

Learning Policy Directorate  
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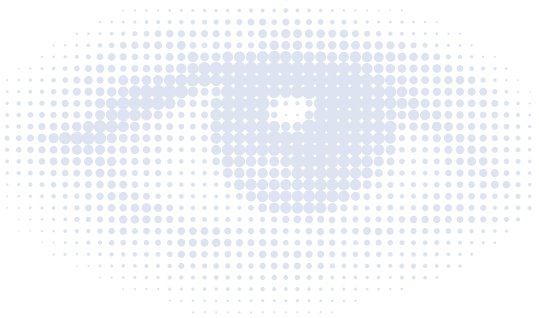
## Abstract

Canada's industrial competitiveness and continued economic growth depend upon a skilled workforce. However, it currently has over two million people without a high school diploma (Statistics Canada, 2009). Economic development and prosperity are policy issues with labour market development supported by federal/provincial agreements on adult learning and training. As Canada's smallest province, Prince Edward Island's (P.E.I.) economy has been dependent upon resource based industries such as fishing, farming, and tourism resulting in a workplace culture reliant upon seasonal industries that have a cycle of unemployment. The current P.E.I. workforce has 75,815 workers between the ages of 25 and 64, of which 13,585 workers do not have a high school diploma. As well, 42% of this working population have literacy levels below requirements for a highly skilled labour force. In an economic climate where knowledge means prosperity and with an ambitious provincial prosperity strategy, this research, *Investing in Effective Adult Learning for Island Prosperity: Back to Basics*, identifies the type and cost of learning gain for adults in the Adult and Community Education (ACE) programs at Holland College. As a provincially standardized adult education delivery system, ACE is unique in Canada, and offers adults literacy training, General Education Development (GED) preparation as well as high school credits to support learners in obtaining a high school credential and prepare for further postsecondary training. This study used the Canadian Literacy Evaluation (CLE), GED practice and GED exam as standards in a quasi-experimental, repeated measures design. The study involved over 480 learners across the province in rural and urban sites. The key research questions posed were: Which socio-demographic characteristics were positively linked to performance and learning gains in ACE programs? Which adult training factors were positively linked to adult learning gains? What was the cost of learning gain and how did costs relate to learner and training characteristics? Did the employment and earnings outcomes of learners improve after participation in adult training? How did learner attitudes and aspirations about education change at time of leaving? Key findings include: learners under age 25 were 16.7% less likely to complete an adult education program, while these younger learners also had smaller learning gains in high school credits when compared to other learners. Higher prose scores as measured by the Canadian Literacy Evaluation showed a strong correlation to preparedness for GED and performance in high school credits. Learners took longer to achieve learning gain when baseline measurements identified lower starting points. The cost of learning gain varied based upon program type with lower costs associated with GED preparation compared to high school credit programs. This study presents scenarios for investment in adult learning to attain a skilled labour force for Island prosperity.





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## Introduction

A borderless world has created a changing workplace with global markets where competition dictates innovative products, processes, and workers (Statistics Canada, 2005). In the 21<sup>st</sup> Century, well trained workers are fuel for economic prosperity where human capital needs match labour force supply to meet industry demands. Learning has become a lifelong requirement to ignite this fuel, as retraining, upgrading, and up skilling become essential for workers. Literacy and quantitative numeracy are the foundation of lifelong learning, which build labour force capacity and contributes to economic prosperity (Statistics Canada, 2005).

Formal and informal adult learning opportunities have increased so workers can adapt to new technologies in an evolving economy (Knighton, T., Hujaleh, F., Iacampo, J., & Werkneh, G., 2009). Individuals with low literacy or without high school credentials will be disadvantaged and/or less able to participate fully in this labour force (Field, Simon 2009).

### Policy Issues for Economic Growth

Labour force development to meet industry needs for highly skilled workers is a policy issue for Canada, where education is a provincial responsibility and human capital development is a national interest. Canada's industrial competitiveness and

continued economic growth depends upon a skilled workforce. Currently over two million Canadians in the workforce do not have a high school diploma (Statistics Canada, 2009).

As Canada's smallest province, Prince Edward Island's (P.E.I.) economy has been dependent upon resource based industries such as fishing, farming, and tourism, resulting in a workplace culture reliant upon seasonal industries with a cycle of unemployment. An example of changes to this traditional economic base has been a decline in the number of farms since 1976. A collateral decline in fishing licenses and tourism dollars has had a dramatic impact on Island economy and employability for Islanders (Mayne, M. 2007).

Economic development and prosperity are supported through federal/provincial agreements on labour force development and adult learning. Resources for adult education are part of economic prosperity plans provincially and nationally (Knighton *et al.*, 2009; Livingstone, D. 2007; President's Council of Economic Advisors July, 2009). Federal/provincial policies on adult education need to address accessibility to; capacity for; and costs of adult learning (Mayne, M., 2007).

### Island Prosperity

In 2007, *Island Prosperity a Focus for Change* was launched in P.E.I.. With a seven year vision, this document included support for new technologies, industries, and markets on P.E.I. to create and

expand knowledge based economic drivers (Mayne, M., 2007). New labour force demands are generated by this vision. The workforce of 75,815 people has 42% with literacy and quantitative numeracy measures below Level 3 on the International Adult Literacy and Skills Survey, the foundation required for work in a knowledge economy (Brink, Satya 2007) (See Appendix A for description of IALSS and literacy domains). With growing demand for a highly skilled and educated work force and a worker supply with low literacy, challenges for *Island Prosperity: A Focus for Change* emerge.

## Adult Education, Higher Education and Island Prosperity

Higher education support for labour force development is twofold, modifying traditional training and providing training for new job markets. On P.E.I., from 1997 to 2007, 4,000 jobs were lost that required less than a high school diploma, while 2,400 jobs requiring at minimum a high school diploma, were added. Expansion into biosciences, information technology, aerospace, and energy sectors represents economic diversification for the

Island. Bioscience Technologist is one example of a new career tied to the prosperity vision. This technologist is required to perform experiments, analyze data, and prepare reports among other analytical activities to support bioscience research (Human Resource and Skills Development Canada, 2009). Another new career example is Wind Turbine Technician. Established for maintenance of wind turbines, career essential skills for this technician include computer literacy, blueprint reading and sketching, and wind turbine controls (Holland College, 2009). Both careers require postsecondary credentials. Expanding sectors, net job increases, and estimates of growth are outlined in *Island Prosperity A Focus for Change* (See Table 1).

This current recession limits job recovery in primary sectors for workers with high school diplomas or less. On P.E.I., worker loss from inter-provincial out migration and a declining high school population also affect labour supply. By 2015, an annual net loss of 600 P.E.I. workers is predicted. Therefore, the need to invest in upgrading, up skilling, training, and retraining Island workers is important for Island prosperity (Mayne, M., 2007).

**TABLE 1**  
**Sector Expansion and Job Growth: P.E.I., 2008 – 2014**

Sector	Job growth by 2014	Net job increase
Bioscience	750 to 2,000	1,250
Information technology	1,200 to 2,000	800
Aerospace	900 to 1,400	500
Energy	no prediction	no prediction
Source: <i>Island Prosperity: A Focus for Change</i> , 2007		

For 13,585 Island workers between the ages of 25 and 64 who lack a high school credential (Statistics Canada, 2009), the opportunity to acquire a post-secondary credential or specific training is limited without opportunities and resources to upgrade their education. This 25–64 age group, represents the primary source of human capital to meet the Island’s labour force demand.

## The Research Issue

How P.E.I. can improve the efficacy of adult education to build foundation skills requires closer examination. Identifying the cost of learning gain in this system helps define a clearer picture of developmental supports required to meet labour force needs using targeted investments.

### Gap Between Future Needs and Current Work Force Skills

The Island has a workforce aged 25–64 of which 11% have a trades credentials; 24% have a college or non university diploma; and 17% have a university diploma; totalling 52% of P.E.I.’s labour force. The 13,585 without a high school credential could limit skilled labour availability for new and growing industries (Statistics Canada, 2009).

Adult education and training on P.E.I. encompass a broad spectrum of learning opportunities, including upgrading to obtain a high school diploma, literacy training to build foundation skills and completing additional high school credits to meet postsecondary program requirements. The province of P.E.I. has invested in adult education with the establishment of the Institute for Adult and Community Education (ACE) to assure access

for any adult interested in upgrading. Since 1998, over 10,000 Islanders have participated in ACE programs. Typical learners have ranged in age from their early 20s to mid 40s with an average age of 28–30. Underemployment and lack of a high school diploma were reasons cited most often for entering the programs. These learners recognize the need for postsecondary training, often citing to ‘go on to College or University’ (Institutional Research, Holland College, 2005) as the reason for attending. With locations across the province, and a continuous intake/exit model, the programs provide literacy development, General Education Development (GED) preparation, and high school credits equivalent to the public school system. Funded through provincial grants (20%) and the Labour Market Development Agreement (80%), the number of learners attending is directly dependent upon learner demand and fiscal resources to meet demand. The Island investment in adult education is important to close the gap between current skill and future workforce needs. How this investment best assures effective adult education for Island prosperity is an important policy consideration.

### Rationale for the Study and Objectives

ACE programming is designed for adult learners who have not been successful in the traditional kindergarten through Grade 12 public system. As a delivery model, ACE programs are standardized in terms of policies for learner registration, progress, evaluation, and completion to be equivalent, with high school curriculum in the public school system. Faculty are qualified according to teaching license

standards of the province. Island investment in this model has resulted in a 67% completion rate for GED.

This study included socio-demographic characteristics, current work and employment outcomes, aspirations, attitudes, and beliefs of learners enrolled in adult programs to assess future demand for postsecondary education in relation to training needs of this province. With a structured budget annually audited, resources used to support ACE were examined in relation to learning gain and labour market returns, which provided cost and investment information for policy development. Based upon the policy issues identified, the following research questions were posed.

**Question 1 Which socio-demographic characteristics were positively linked to performance and learning gains in ACE programs?**

- a** Which learner socio-demographic characteristics were associated with successful performance on standardized measures, (including the influence of literacy practices, continued formal education and/or altered work environment) of learning and retention of skills?
- b** Which learner socio-demographic characteristics are significant for discontinuation in the adult learning programs?

**Question 2 Which adult training factors were positively linked to adult learning gains?**

- a** How much learning gain/loss was observed?
- b** Does the amount of time attended have an impact on learning gain?
- c** Which other program factors influence learning gains?

**Question 3 What was the cost of learning gain and how did costs relate to learner and training characteristics?**

**Question 4 What is the employment and earnings outcomes of learners before and after participation in adult training?**

**Question 5 How did learner attitudes and aspirations about education change at time of leaving?**



## Literature Review

### Implications of Low Literacy for Society

Where strong skills and knowledge are broadly dispersed throughout a population, countries demonstrate an ability to more effectively weather global economic swings and to marshal human capital for economic growth. When low literacy affects human capital of workers they are unable to fully participate in society (Schuller & Watson, 2010).

Lower literacy reduces civic engagement, for example voting and participation in the democratic process. The quantity and quality of health issues are also greater for persons with low literacy (Bracken, S., 2008). *Building on our Competencies* (Human Resource and Skills Development Canada & Statistics Canada, 2003) outlines the health risks associated with low literacy. For workers with low literacy this report outlines the health risks potentially incurred in relation to safety, while for seniors with low literacy, health issues become a lifestyle and economic issue.

Persons with low literacy are usually in low skilled jobs with little upward mobility. Job growth in the future will be in sectors where knowledge industries are expanding. Knowledge intensive jobs such as health care workers have a predicted growth of two to 2.5 million workers in the next three years in the United States (President's Council of Economic Advisors, 2009).

Issues of self esteem are also noted in low literacy individuals, who often have had negative school experiences compounded by low paying, low skilled

jobs as well as limited opportunities for job mobility (Brimelow, Peter, 2001). As well, persons with low literacy often use social programs extensively such as employment insurance and social assistance (Mckenna, Penner & McMillan, 2008).

The myth that people are either literate or 'illiterate' (Norris, Snyder, Riem, & Motaldi, 1996) perpetuates stereotypes about literacy, and ignores the distribution of literacy and quantitative numeracy within the population. A person can have higher levels in reading skills than math, or lower reading skills than math use. Assisting adults to build these foundation skills is a role many higher education institutions play (President's Council of Economic Advisors, 2009). Engstrom and Tinto (2009) studied 5,729 learners in the United States to determine learner engagement and found a 10–15% increase in persistence in an institution when learners were engaged and motivated. Learner's in Engstrom and Tinto's (2009) study reported mastery of basic key skills were the foundation of their commitment and motivation.

### Continuation in Adult Learning Programs

Engagement in adult learning is a personal choice, once made, continuation can be challenging for individuals with low self esteem (Porter, 2006).

There are numerous studies of retention, attrition, and persistence of adults in post secondary education literature. However, there are no definitive conclusions as to why learners leave or conversely why they may stay (Mueller, 2008). Developmental adult education is even more complex than traditional post secondary, given the self confidence needs of these adult learners (Tinto, 2009). The issue of

persistence in an adult education learning environment still remains a large question mark (Marti, 2008; Meuller, 2008; Sauer & O'Donnell, 2006). Reasons for leaving or staying with, an adult learning program are complex and often a "revolving door" access exists (Engstrom & Tinto, 2008). Adult learning theories are premised upon support for the learner to achieve small incremental successes early in their enrolment to encourage retention (Chaves, 2006). Porter (2006) studied 6,870 learners from 412 universities in the United States using the Carnegie Classification of Engagement, and reported greater engagement when learners were enrolled full time. This "revolving door" with part time learners in upgrading environments, may increase learning barriers and persistence issues.

Engstrom and Tinto (2008) posit that academically under prepared learners simply do not find the support they need within a post secondary environment. They further state low income learners are more likely to be prepared given the relationship between low income families and low educational attainment of parents.

U.S. studies have included attitudinal data as determinants of persistence in adult education (Sorey & Duggan, 2008). Two year public institutions have overall persistence attainment rates of 56%, with 31% of leavers doing so within the first year (Sorey & Duggan, 2008). These attrition rates have remained consistent over the past two decades. Sorey and Crawford (2008) state determinants of persistence may be holdovers from intergenerational educational issues related to lack of post secondary achievement. Sorey and Duggan (2008) also elaborated on established risk factors for

community college attrition including being a high school drop out or a GED recipients. However, their study of 6,149 adult and younger learners at four community college campuses in the United States, showed there was no significant difference in persistence between those deemed high risk (a high school drop out or GED recipient) and learners following the traditional high school to college pathway.

Since the inception of community colleges in Canada, these institutions have been tasked with providing educational opportunities for under prepared and low skilled learners. Continuing in education for adult learners has become a focus of interest for colleges in general and the Adult Education program at Holland College in particular, where the retention rate averages 66% (Institutional Research, Holland College, 2005, 2006, 2007). This program was designed specifically to target under prepared and low skilled adults who require literacy development and educational credentials to go on to post secondary education. The mandate of the program was to provide adult learning in order to access postsecondary education or to go directly to the labour market. The self paced and individualized learning pathway established at ACE, can pose a challenge for Millennial learners (Oblinger, 2003). Learners also need a level of self-efficacy to work within a self paced, individualized learning pathway (Leeder, 2008). Supports for these learners have to be identified and resourced.

# Literacy Performance, Education Outcomes, and the Labour Market

Building foundation skills among adults who have low literacy or lack the requisite high school diploma can be challenging. These learners have experienced disadvantages in previous educational endeavours and returning to school can be a frightening process (Golden, 2003; Norris *et al.*, 1996; Perry, 2006). However, achieving positive labour market outcomes for disadvantaged learners is a linear process; beginning with literacy skills, adult upgrading bridging to postsecondary education, leading to full employment, adapting abilities to changing work environments and thus being fully able to participate in the economy (Engstrom & Tinto, 2008).

## Methodology

### Research Design

To determine learning gains through pre and post measures, a quasi-experimental study utilizing repeated standardized tests accompanied by survey on attitudes and aspirations was utilized. The impact of factors such as learner socio-demographics variables, program characteristics, time in program, were measured against achieved outcomes. The interventions were standard program offerings of ACE; literacy development, GED preparation, and high school credits. Performance was scored at baseline, post intervention, and 6 months

following the intervention (See Table 2).

Standardized measures were the Canadian Literacy Evaluation (CLE), and the GED practice test, along with the GED standardized test. These measures were developed by Educational Testing Services (ETS) in Princeton, New Jersey (See Appendix B for more information about these standardized measures). Costs for learning gains were analysed based upon changes in learning between repeated measures, along with budget information supplied by the Institute for Adult and Community Education. Ethics approval was obtained through the Holland College Research Ethics Board. While baseline data was gathered as a part of the registration process for ACE, participation in repeated measures was voluntary.

Limitations of the design were sample size, attrition from the study, and difficulties in data gathering for a study that spans a time frame of more than one academic year. The sample size of 484 learners permitted multivariate analysis, however, linear regressions were limited by degrees of freedom and may not be generalizable to a larger population. The sample is representative of adult learners who require upgrading on P.E.I. but not necessarily typical of adult learners in general, as an atypical subpopulation of participants with a high school diploma was identified within the sample.<sup>1</sup>

Repeated measures design runs the risk of attrition and this study is no exception. The socio-demographic factors of participants who did not complete repeated measures at post intervention

<sup>1</sup> Typical learner populations from the previous five years had an average of 25% with a high school diploma, this population had 36%. Previous populations had 50% below the age of 27 while this population had 50% below the age of 23, a younger population than previous years according to New Student Surveys.

were analysed. Respondent burden in this study was high at the outset, with two questionnaires and a literacy evaluation to complete. Item non response for some questionnaires was high resulting in incomplete data sets which limited potential analyses.

The study design overlooked a follow up questionnaire at the 6 months final testing, resulting in a missed opportunity to continue to match labour force outcomes to learning gain. Therefore, while data was gathered on literacy retention, no comparison data was gathered on aspirations, beliefs, employment, and education status. Table 2 provides the population distribution of the study by program and enrolment status. Table 3 provides a summary of standardized measures.

From the data, outcomes of performance and employment were used as dependent variables, while socio-demographic, learner characteristics and program characteristics were independent variables. Tests included bi-variate analysis such as Pearson correlation, independent sample t-tests, Manovas, in addition to multivariate, and probit regressions. Dependent variables of learning outcomes were literacy gain, CLE scores, GED final marks and credit marks which compared over time yielded learning gain ratios. Effectiveness of programs was analyzed by assessing learning gain relative to costs. Summaries of the analysis are presented in tables and charts throughout the report and within Appendix D.

**TABLE 2**  
**Learner Population in Sample**

			Number	Percentage
Credit	Day	Full time	169	35%
		Part time	32	7%
	Night	Full time	0	0%
		Part time	97	20%
GED	Day	Full time	102	21%
		Part time	*	1%
	Night	Full time	0	0%
		Part time	51	11%
Levels	Day	Full time	16	3%
		Part time	*	1%
	Night	Full time	0	0%
		Part time	*	2%
Total			481	100%
* Numbers too low to report				

TABLE 3

## Summary of Standardized Measures and Survey Topics

	Baseline (t0)	Post intervention (t1)	6 month follow up (t2)
<b>Tests</b>	<ul style="list-style-type: none"> <li>• Canadian literacy evaluation</li> <li>• GED practice tests</li> </ul>	<ul style="list-style-type: none"> <li>• Canadian literacy evaluation</li> <li>• GED practice tests</li> </ul>	<ul style="list-style-type: none"> <li>• Canadian literacy evaluation</li> <li>• GED practice tests</li> </ul>
<b>Survey topics</b>	<ul style="list-style-type: none"> <li>• Attitude toward learning</li> <li>• Employment</li> <li>• Literacy at work</li> <li>• Activities outside of work and school</li> <li>• Activity limitations</li> <li>• Education and training history</li> <li>• Family background</li> <li>• Computer use</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of ACE programs</li> <li>• Employment</li> <li>• Literacy at work</li> <li>• Activities outside of work and school</li> <li>• Skills and learning attitudes</li> <li>• Education and training aspirations</li> </ul>	<ul style="list-style-type: none"> <li>• No survey</li> </ul>

## Results

ACE programs include Credit, GED and Levels. Credit programs offer high school courses equivalent to the public secondary system for those learners who are missing specific credits or wish to continue in credits to complete their high school diploma. GED is the preparation class for the General Education Development exam. The GED classes prepare the learners in five subject areas including; science, math, reading, writing, and social studies. Once successfully completed a GED certificate is considered the equivalent of a high school diploma. Levels classes are designed for learners who are not yet ready for a GED preparation class, and who may need additional literacy, quantitative, and document use skills to build a strong foundation for their future learning.

### Question 1 Which socio-demographic characteristics were positively linked to performance and learning gains in ACE programs?

- a Which learner socio-demographic characteristics were associated with successful performance on standardized measures, (including the influence of literacy practices, continued formal education and/or altered work environment) of learning and retention of skills?
- b Which learner socio-demographic characteristics are significant for discontinuation in the adult learning programs?

The socio-demographic characteristics of the study population were first assessed and compared to previous academic years to establish typical program demand and population characteristics. The learners for the academic year 2008–2009 showed a similar distribution to previous populations for the three programs Credit, GED, and Levels (Institutional Research, Holland College, 2008).

With 62% female and 38% male, the balance of females to males remained within the range of the past five years of data (58%–70% female). Gender balance in this distribution showed more females than males in Credit programs than previous years, but more males than females in GED, with equal numbers in the Levels program. Enrolment by program showed an increase in Credit learners compared to GED, however, the day/night ratio of learners showed a similar pattern to other years. Employment statistics had not previously been gathered, so it is unknown if employment distribution was typical compared to previous years.

Table 4 shows the learners distribution by program, gender, age, day/night enrolment, education, and employment status.

The average age of this population was 28, typical of previous years, however, when assessing the percentage of learners under age 25 in all programs this group represented fifty eight per cent of the total population, an atypical distribution (Institutional Research, Holland College, 2005, 2006, 2007, and 2008). The demand within this population for adult upgrading was from learners under the age of 25 and those who were working either full or part time. Sixty four percent of those working

full time and 75% of those working part time were in credit programs, which also represented the largest percentage of learners.

One hundred and seventy-six learners in this population already had a high school credential and were under the age of 25 which represented 36.5% of the total population. This education level was atypical and created a subpopulation of youth with a high school diploma over represented within the research participants. While learners in the credit program tended to be young, have a high school diploma and working, learners in the GED program were predominantly male, older and represented only one third of learners who were working full time.

Learner distribution across ACE learning centers was typical of previous years (see Table 5). To assure anonymity, sites were assigned a number, Sites 1 and 4 were urban and represented over 64% of the participant population, all other sites were rural locations on P.E.I..

Performance on standard measures became more difficult to assess with a decline of 50% of participants in the study at post intervention. Factors affecting discontinuation in the study were assessed from baseline, this analysis compared learners who participated in post tests with those who did not. The unit of analysis to answer this question was attrition or retention of the learner at post intervention. Additional sub questions were developed for this analysis:

- **What were the demographic characteristics of the attrition group?**
- **How do the demographic characteristic compare with those of the retained group?**



TABLE 4				
Socio-demographics of Learner Population				
	Credit n = 298	GED n = 159	Levels n = 31	Total N = 488
<b>Gender</b>				
Males	54%	41%	5%	100%
Females	67%	28%	5%	100%
<b>Age</b>				
16–25	71%	27%	3%	100%
26–35	73%	24%	3%	100%
36–45	39%	50%	11%	100%
46–55	26%	61%	13%	100%
56–65	0%	86%	14%	100%
<b>Day/night</b>				
Night	62%	33%	5%	100%
Day	62%	33%	5%	100%
<b>High school diploma</b>				
No	24%	68%	9%	100%
Yes	94%*	4%	2%	100%
<b>Employment</b>				
Full time	64%	34%	2%	100%
Part time	75%	22%	3%	100%
Not employed	58%	37%	5%	100%
Student/retired, etc.	54%	34%	12%	100%
* An atypical percentage of learners with a high school diploma.				

TABLE 5				
Program of Study by Urban/Rural Location				
Location of study	Credit	GED	Levels	Total
Urban	197	98	14	309
Rural	103	61	10	174
<b>Total</b>	<b>300</b>	<b>159</b>	<b>24</b>	<b>483*</b>
* Not all learners were coded by geographic site resulting in a lower total than the previous table.				

- **What were the demographic predictors for attrition/retention in an adult education program?**
- **Was the CLE score a predictor of attrition/retention in an adult education program?**
- **What were possible additional barriers to retention?**

The socio demographic characteristics when sorted by gender, type of program, high school

diploma, full time or part time employment, presented in Table 6 show more persistence for learners in the day program compared with nights, and learners who were not working compared to those who were. The highest percentage of those who were likely to leave the study were younger learners, in the night program, and those who were working full or part time. Those who stayed in the study were more likely to be older, not working, and enrolled full time in the day program.

**TABLE 6**  
**Study Attrition by Demographic Characteristics**

	<b>Stayed (n = 257)</b>	<b>Left (n = 227)</b>	<b>Total (N = 484)</b>
<b>Gender</b>			
Male	54%	46%	100%
Female	51%	49%	100%
<b>Age</b>			
16–25	41%	59%	100%
26–35	60%	40%	100%
36–45	72%	28%	100%
46–55	68%	32%	100%
56–65	86%	14%	100%
<b>Day/night</b>			
Night	32%	68%	100%
Day	62%	38%	100%
<b>Program</b>			
Credits	52%	48%	100%
GED	52%	48%	100%
Levels	50%	50%	100%
<b>Education</b>			
No diploma	52%	48%	100%
High school diploma	52%	48%	100%
<b>Employment</b>			
Full time	39%	61%	100%
Part time	47%	53%	100%
Not employed	59%	41%	100%
Student/retired	68%	32%	100%

A probit regression (probability analysis) was used to determine marginal effects of program and learner characteristics on study attrition. Gender, type of program, urban/rural location, having a high school diploma, CLE scores, teaching modality and returning student status were not factors that influenced attrition (See Appendix D Regression Table 16). The youngest cohort (16–25) did show a 25% greater chance of attrition from the study than all other age cohorts. The type of program enrolment was also statistically significant with night learners having a 22% greater chance of attrition from the study. Although, employment appeared to be a factor when looking at the percentage of people who stayed or left, it was not statistically significant.

Additional barriers to retention such as activity limitations including visual, hearing, learning disabilities, and mobility limitations were examined using data obtained from the first questionnaire in the study. These responses were compared to the outcome of the CLE prose scores to determine if limitations may have influenced lower scores and/or contributed to attrition from the study. When analyzed, none of the activity limitations identified in the surveys influenced attrition.

Reasons for leaving varied between the group retained in the study and those who left. Two hundred and thirty three of those who stayed in the study completed their program which represented 93% compared with a 38% program completion rate for those who left the study. Reasons why

the non-retained group left the study were various with the most common reason “Attendance<sup>2</sup>” followed by “Medical reasons” (See Figure 1). As the youngest cohort had a greater chance of leaving the study, comparing this group with the other age cohorts for completion rates was done using a t test that confirmed, older cohorts had better completion rates than those under age 25.<sup>3</sup> Completion of the program was a major outcome variable and examining discontinuation in the study was not the same as examining program completion. Therefore, to determine positive links to performance and learning gains analysis of factors influencing program completion was required.

Program completion as a measure of success was determined using the data provided when students left the program. Regardless of whether they stayed in the study, completion information was attained. Table 7 presents the completion data of all participants along with the various reasons for leaving.

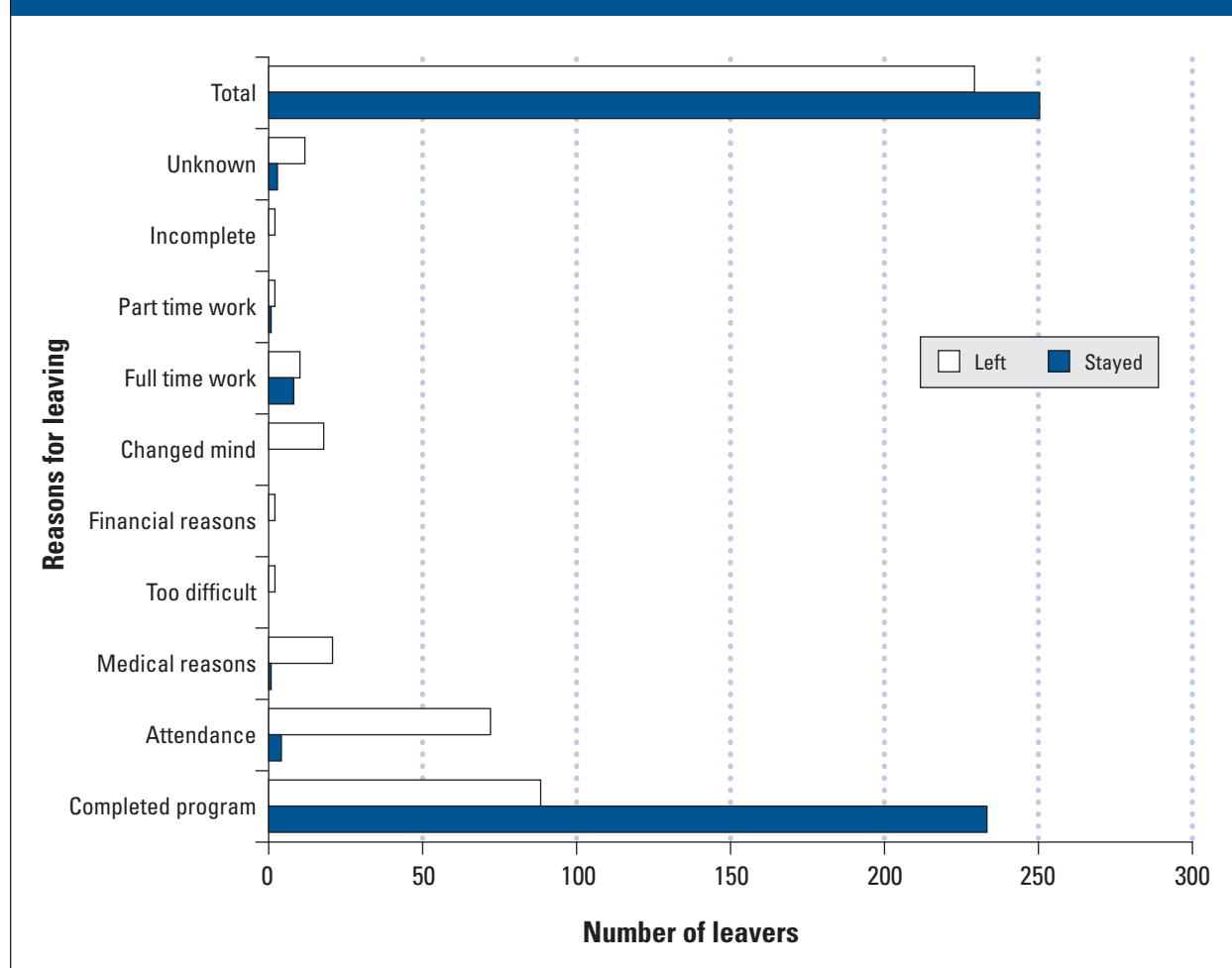
To measure any marginal effects on program completion, gender, urban/rural location, instructor, teaching modality, type of program, returning student, high school diploma, employment status, and enrolment types a probit regression was used. These factors did not demonstrate an influence on program completion. Similar to the attrition results however, the 16–25 age cohort was 16.7% less likely to complete a program of study than all other age groups. The CLE prose scores also showed a marginal effect on completion of the program, with

<sup>2</sup> ACE Attendance policies require learners be in attendance 80% of time, when this is not attained the learner is exited for “attendance”. A learner may also exit due to health issues that have not previously caused attendance issues, hence a different classification for the exit reason.

<sup>3</sup>  $t = 3.25 (477)$ ,  $p < 0.001$

FIGURE 1

## Comparison of Reasons for Leaving Between Retained and Attrition Groups



lower scores negatively influencing completion by a factor of .1 (See Appendix D Regression Table 17). Location also influenced completion with learners at urban sites 12.9% less likely to complete a course of study.

## Question 2 Which adult training factors were positively linked to adult learning gains?

- a** How much learning gain/loss was observed?

- b** Does the amount of time attended have an impact on learning gain?
- c** Which other program factors influence learning gains?

Learner outcomes based upon CLE scores, GED practice tests, GED tests, and credit marks were analyzed for the impact of socio-demographic variables and other survey responses. Due to attrition, the number of observations at post intervention and 6 month follow up were greatly reduced with random results on loss and gain, therefore

**TABLE 7**  
**Completion or Reason for Leaving by Program**

	Credit	GED	Levels	Total
<b>Completed program</b>	211	98	12	321
<b>Attendance</b>	43	31	2	76
<b>Left for medical reasons</b>	8	8	6	22
<b>Too difficult</b>	2	0	0	2
<b>Financial</b>	2	0	0	2
<b>Changed mind</b>	11	7	0	18
<b>Full time work</b>	10	5	3	18
<b>Part time work</b>	3	0	0	3
<b>Incomplete</b>	1	0	1	2
<b>Other</b>	7	8	0	15
<b>Total</b>	<b>298</b>	<b>157</b>	<b>24</b>	<b>479</b>

further analysis of CLE scores compared to other variables was limited.

Baseline data from CLE scores showed a majority of learners functioned at the International Adult Literacy Skills Survey (IALSS) Level 3 in all measured domains. The CLE scores, GED pre test, and first credit mark at baseline, post intervention, and 6 month follow up, were compared using a Pearson's correlation to determine if a linear relationship existed. The null hypothesis was CLE scores had no relationship to other baseline scores. Statistically significant correlations were found at baseline

between GED Math and all CLE domains,<sup>4</sup> between GED Social Studies and Prose,<sup>5</sup> Quantitative,<sup>6</sup> and Document.<sup>7</sup> A strong correlation was also found between GED Reading and all CLE domains,<sup>8</sup> between GED Writing and all CLE domains,<sup>9</sup> and first credit mark with all CLE domains.<sup>10</sup> However at 6 month follow up, CLE scores showed no statistically significant correlation with GED scores, or credit marks.

A multivariate regression was used to further explore relationships between CLE scores and socio-demographic characteristics. Returning

<sup>4</sup> Prose  $r = 0.050$ ,  $p < 0.000$ ; Quantitative  $r = 0.42$ ,  $p < 0.000$ ; Document  $r = 0.47$ ,  $p < 0.000$

<sup>5</sup>  $r = 0.40$   $p < 0.000$

<sup>6</sup>  $r = 0.25$ ,  $p < 0.005$

<sup>7</sup>  $r = 0.28$   $p < 0.002$

<sup>8</sup> Prose  $r = 0.43$ ,  $p < 0.000$ ; Quantitative  $r = 0.56$ ,  $p < 0.000$ ; Document  $r = 0.53$ ,  $p < 0.000$

<sup>9</sup> Prose  $r = 0.45$ ,  $p < 0.000$ ; Quantitative  $r = 0.35$ ,  $p < 0.003$ ; Document  $r = 0.32$ ,  $p < 0.001$

<sup>10</sup> Prose  $r = 0.39$ ,  $p < 0.000$ ; Quantitative  $r = 0.36$ ,  $p < 0.000$ ; Document  $r = 0.39$ ,  $p < 0.000$

student was an influence on CLE scores if measured at a 90% confidence interval. At a 95% confidence level there was no influence by gender, urban/rural location, instructor, type of program, age, day/night enrolment, high school diploma, and employment status on the outcomes of the CLE scores at baseline, post intervention, or 6 month follow up (See Appendix D Regression Table 18). There was also no relationship established between learning attitudes, aspirations for further education, or literacy practices and the CLE scores. The sub-population of youth with a high school diploma demonstrated a pattern of underperformance in CLE means when compared to other learners, this was statistically significant in all domains of the CLE when compared to all other age groups.<sup>11</sup> This finding is discussed in more detail at a later point in this report (See Figure 2 and accompanying text).

Learning gain was established from baseline data (See Table 8). Baseline for GED learners was their GED practice test mark. Baseline for Credit program learners was their English and Math marks averaged from their official transcript. Not all Credit learners provided an official high school transcript, therefore, some learners had no baseline data.

Two hundred and ten learners (70%) completed at least one credit, during the time frame of the study. In lieu of standardized credit tests, learning gain in the credits program was compared to baseline high school marks of English and Math, with an average of 59.8%. The average learning gain was 21 marks based upon the difference between final mark obtained in their first credit and baseline credit average (See Table 9 for explanation of learning gain determination).

The range of individual learning gain was from 3 to 44 marks. Many learners in Credit programs completed more than one credit course, however, comparisons in this study are based solely upon the mark achieved in the *first* credit completed, as not all learners took more than one credit course.

To determine factors influencing credit learning gain, a multivariate regression using independent variables of age, gender, day/night enrolment, age, employment status, urban/rural location, instructor, high school average, and attendance was applied to the learning outcome of the first credit mark, with no statistically significant results.

**TABLE 8**  
**Learning Outcome Measurements**

	Credits	GED
<b>Baseline marks</b>	HS math English averages	Pre GED practice test scores
<b>Post intervention marks</b>	First credit mark	GED final exam mark
<b>Gain</b>	Post intervention scores – Baseline scores = Learning gain	
<b>Length</b>	Time in program (Total # of hours/6 = days)	
<b>Daily learning gain</b>	Learning gain divided by time in program	

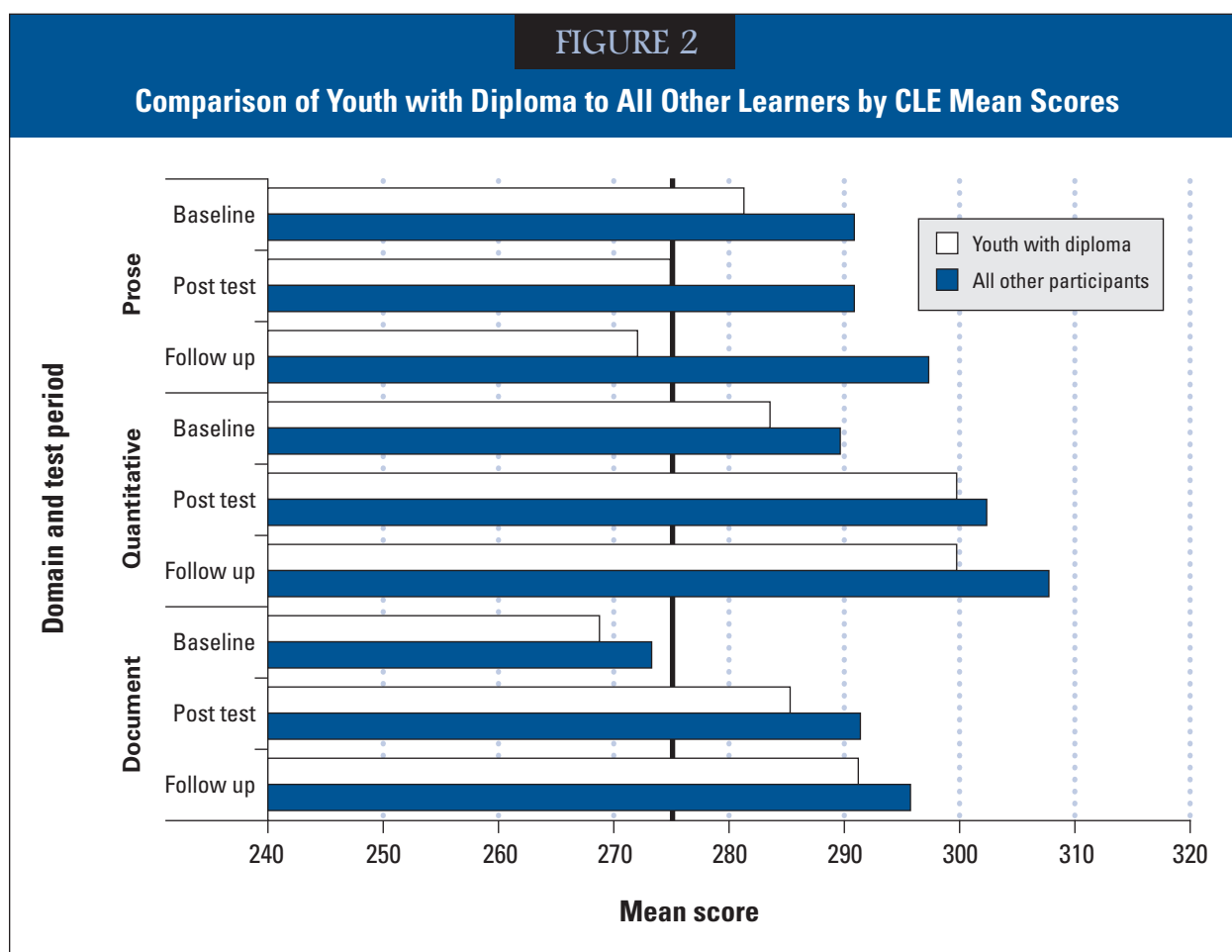
<sup>11</sup>Prose  $t = 4.1836$  (480),  $p < 0.00$ ; Quantitative  $t = 3.7270$  (480),  $p < 0.01$ ; Document  $t = 2.06$  (480),  $p < 0.04$



The learning gain of day credit students compared to night students showed more gain in the day program with an average first credit mark of 83.4 compared with the first credit mark for night learners of 81.3. The subpopulation of youth with a high school diploma comprised the largest group of credit learners. Using a t test and comparing this group with other credit learners, the youth with a high school diploma were confirmed to have lower final marks.<sup>12</sup>

Underperformance in CLE scores has already been mentioned for this subpopulation, therefore youth

with high school diploma group were compared to all other learners exclusively on CLE performance (See Figure 2). To test the null hypothesis of no difference between the means of the two groups, a t test of means was used for comparison. Comparison at baseline, post intervention and 6 month follow up, showed youth with high school diplomas had lower CLE scores, statistically significant at a 95% confidence level<sup>13</sup> for all domains and all testing times with only two exceptions, post intervention Quantitative scores and at the 6 month follow up for Document scores.



<sup>12</sup>  $t = -2.16$  (130)  $p < 0.032$

<sup>13</sup> Prose Baseline  $t = -4.2764$  (129),  $p < 0.000$ ; post intervention,  $t = -2.06$ , (88),  $p < 0.004$ ; 6 month follow up  $t = -3.0387$  (54),  $p < 0.002$ ; Quantitative Baseline  $t = -3.59$  (129),  $p < 0.001$ ; 6 month follow up  $t = -1.93$ , (54),  $p < 0.03$ ; Document Baseline  $t = -3.53$ , (129),  $p < 0.003$ ; post intervention  $t = -2.22$ , (88),  $p < 0.01$

Scores were consistent across all domains of the CLE and were above the Level 3 baseline, and indicate retention after six months. However, learning gains and retention for this subpopulation were consistently lower than all other participants. Mean scores improved over time in Quantitative and Document but the youth with high school diploma group had Prose scores that declined at each test interval. Average means overall were clearly in Level 3 in Prose and Quantitative at baseline, indicating the needs of this study population were less about literacy acquisition and more about credential attainment.

Learning gains for GED learners showed completion rates of 61%, however, this does not include returning learners continuing in the GED program the next academic year. For the purposes of this study, completion was considered within the context of the continuous intake and exit model. Learners who started later in the year, and had not completed when the academic year ended were classified as returning students. This classification is unique to the continuous intake system at ACE. Not all learners in the GED preparation program were enrolled for all subject areas of GED, therefore, different subject areas have different numbers of observations resulting in variation on learning gain.

GED average scores were Science 473, Math 460, Social Studies 496, Reading 429.5, Writing 463.75 for a total score of 2,310.9, at baseline (See Appendix B for information on GED as a standardized test). Final scores used in analysis were GED results as scored by Educational Testing Services (ETS). Results were obtained from 66 learners, thus limiting analysis.

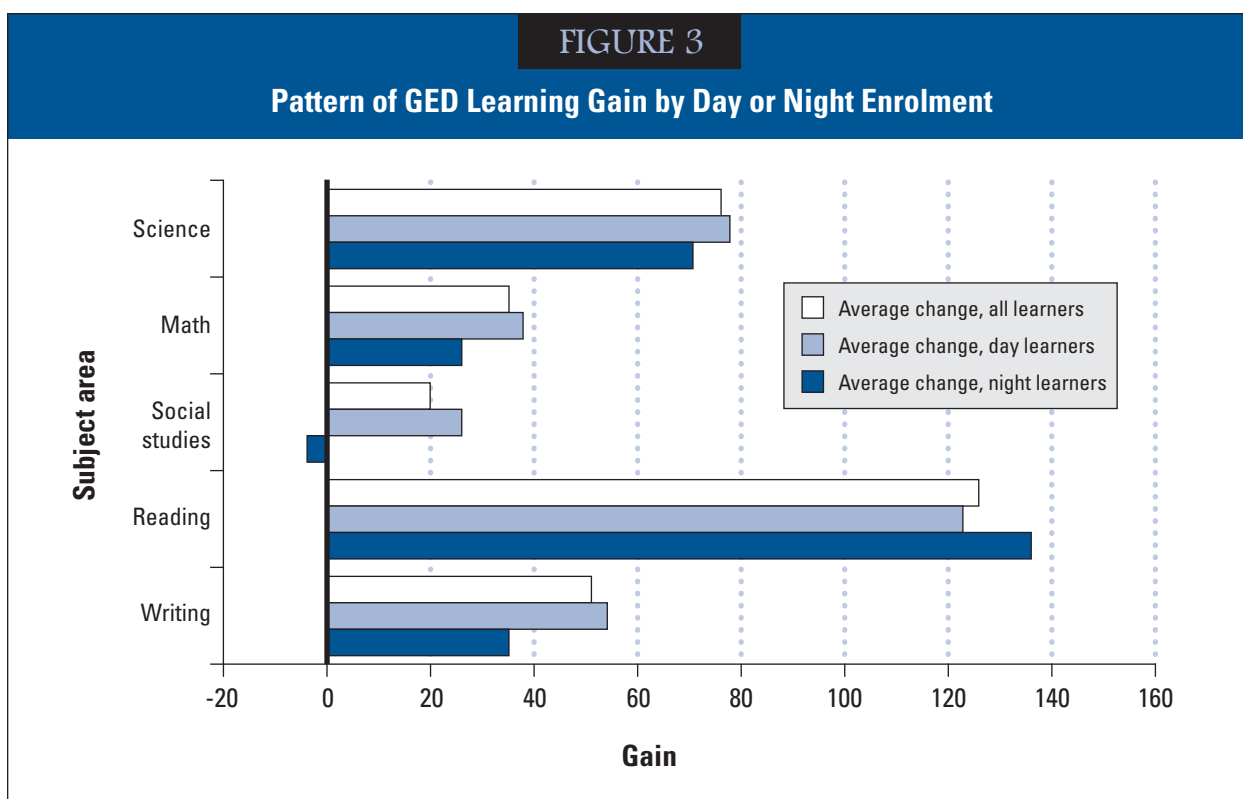
Means of final scores were Science 548.8, Math 495, Social Studies 516, Reading 555.6, Writing 514 and Final total scores 2,624.

Multivariate regression using the GED final score as a dependent outcome variable with independent variables of gender, age, day/night enrolment, employment status, returning student status, urban/rural location, instructor teaching modality, and instructor showed none of these factors influenced the final GED scores, at a 95% confidence interval. However, when measured at the 90% confidence level, the returning student variable had a positive influence.

A different pattern of GED learning gain emerged between day and night students where the pattern of learning gain was consistently higher for learners in the day program with the exception of Reading (See Figure 3). However, the difference was not statistically significant when subjected to a t test. The small loss in the Social Studies for night learners was within the standard deviation of the GED test.

Levels learners had no standardized baseline measures other than CLE scores to identify learning gain. Means scores for these learners were 216 for Prose, for 224.6 Quantitative and 197.7 for Document domains at baseline. Levels learners were in IALSS Level 2 in all domains. At 6 month follow up, means for this group of learners rose to 222 for Prose, 227 for Quantitative and 208 for Document. The number of Levels learners was too small for further statistical comparison.

Random results of gain and loss across groups indicated some learners may not have taken the CLE test seriously. The CLE scores were not tied



directly to credential attainment or credit marks, and thus offered no incentive for learners to improve CLE scores beyond personal goals. Within the Prose domain, only 33.4% scored below the Level 3 benchmark of 276 while in Quantitative and Document domains, 32.5% and 46.8%, respectively scored below that benchmark. Given the random distribution of CLE scores, already in IALSS Level 3 in addition to the sample attrition, the CLE score analysis reports means and distributions as well. To accomplish this, CLE scores were separated into quartiles in each domain. This provided an even distribution of scores rather than separation by IALSS Levels, which were predominantly in IALSS Level 3. Range for the 1<sup>st</sup> Quartile was: Prose and Quantitative 80–260, Document 55–245; 2<sup>nd</sup> Quartile- Prose and Quantitative, 265–290, Document, 250–275; 3<sup>rd</sup> Quartile- Prose and Quantitative, 295–315;

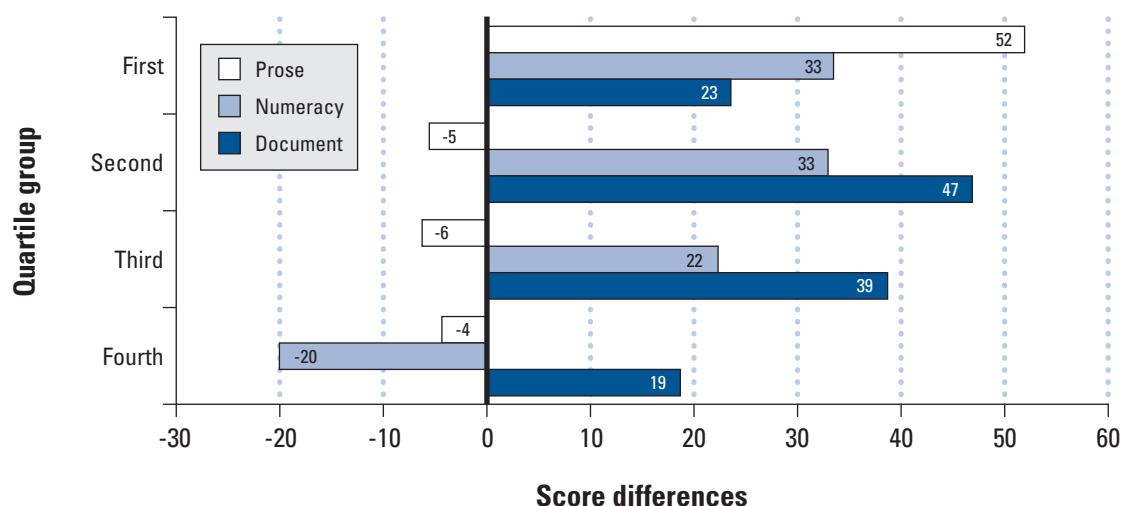
and Document, 280–305; 4<sup>th</sup> Quartile- Prose and Quantitative, 320–425 and Document, 310–405.

Individual differences between scores at baseline, post intervention, and 6 month follow up were totalled for each quartile group. This sum of differences between scores was compared by quartile group (See Figure 4). The gain in Prose and Quantitative scores were highest where the learners baseline scores were in the 1<sup>st</sup> or lowest Quartile. Learners in the 2<sup>nd</sup> Quartile showed higher gains in Document scores, compared with the other three quartiles. For learners in the 3<sup>rd</sup> and 4<sup>th</sup> quartiles, total learning gain was lower than the 1<sup>st</sup> and 2<sup>nd</sup> Quartile, in all three domains, and in fact learning “loss” is recorded. Those who had the greatest need to improve, gained the most.

Average learning gain for Credit learners in night classes was 19.87 marks, and for day

FIGURE 4

## Sum of CLE Score Differences in All Domains Compared by Quartile Group



classes 24.38 marks. Dividing this gain by days in the program, established an average learning gain per day (total attendance hours divided by 6 equals number of days). GED learning gain is presented for each of the five subject areas. There were few final scores from the night GED participants which may account for a difference in learning gain between day and night GED enrolments. The average gain is expressed as mark per day for Credit learners and point per day per subject for GED learners is shown in Table 9.

For those who passed the GED exam, the pattern of gain shows a starting point of 450 points or higher, with learning gains in excess of 60 points. The only exception was Reading with a starting point of 433 points (See Table 10). For those who did not pass the GED, the pattern of learning showed a loss, means associated with this group improved in only two categories while declining in three subject areas.

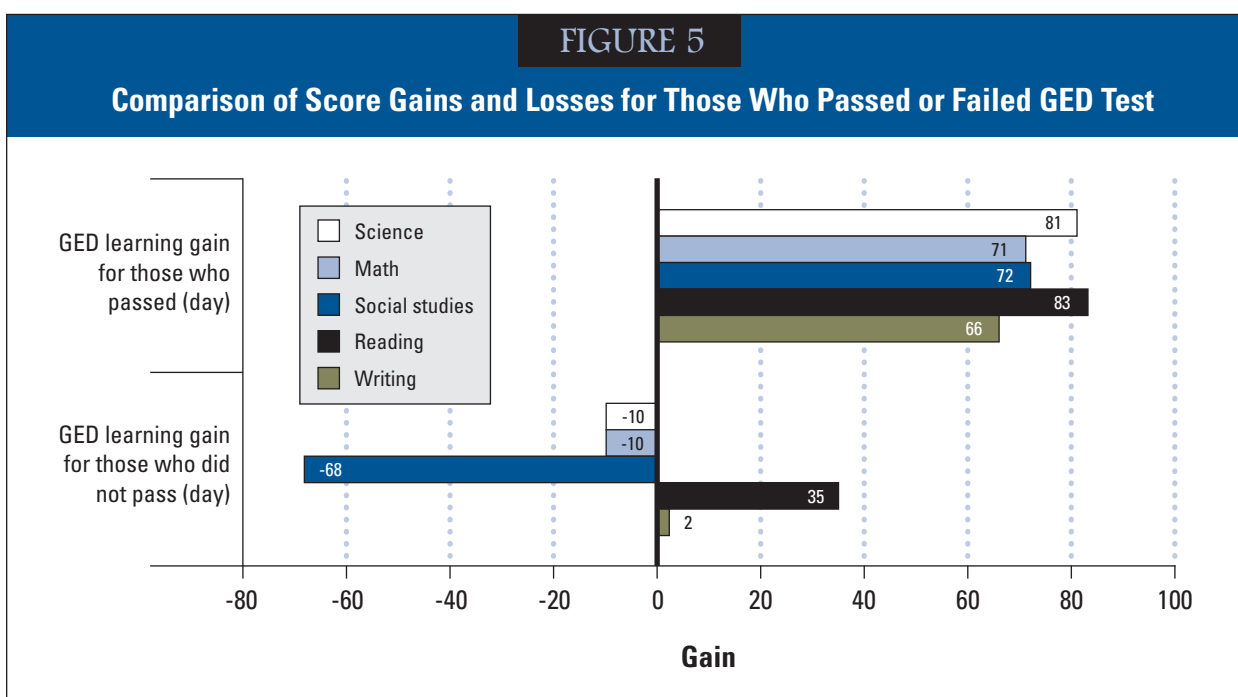
Final means in the passed group were above 500, well over the required pass mark of 450, while those who did not pass had final scores 40 to 70 points below the 450 mark. The differences in gains/losses for the GED learners who passed and did not pass are shown in Figure 5.

TABLE 9

## Daily Learning Gain Averages by Enrolment Type

	Day	Night
<b>Enrolment</b>		
Credits	0.78	1.5
<b>GED</b>		
Science	3.1	7.6
Math	2.79	6.7
Social studies	2.83	6.7
Reading	3.25	7.8
Writing	2.5	6.21

TABLE 10				
Comparison of GED Means by Pass Rates				
	Pass		Did not pass	
	Pre test	Final	Pre test	Final
Science	476.1	558	385	375
Math	469	526	415	405
Social studies	502	553	476.6	408
Reading	435	562	370	405
Writing	468	530	403	380



To determine if the amount of time spent in program had an impact on learning gain, the time attended for day and night credit learners was assessed based upon completion status (See Table 11). Times shown in this table are actual attendance hours, as tracked by the attendance program in use at ACE, but does not represent start and end date for learners. While the number of hours to completion is lower for learners in night classes in all the programs, the enrolment in the night program was

TABLE 11			
Attendance to Completion in Hours			
	Credit	GED	Levels
<b>Day</b>			
Full time	191 (n = 127)	154.7 (n = 58)	211.9 (n = 7)
Part time	160 (n = 32)	130.75 (n = 6)	
<b>Night</b>	76.47 (n = 57)	63.75 (n = 28)	164.4 (n = 5)

shown to have a negative influence on completion. While time spent in the night classes on average was less, the ultimate goal of learning is compromised by the increased risk of non completion when enrolled at night. Learners in Credit programs take longer to complete than learners in GED programs. Levels learners take the longest to complete regardless of day or night enrolment.

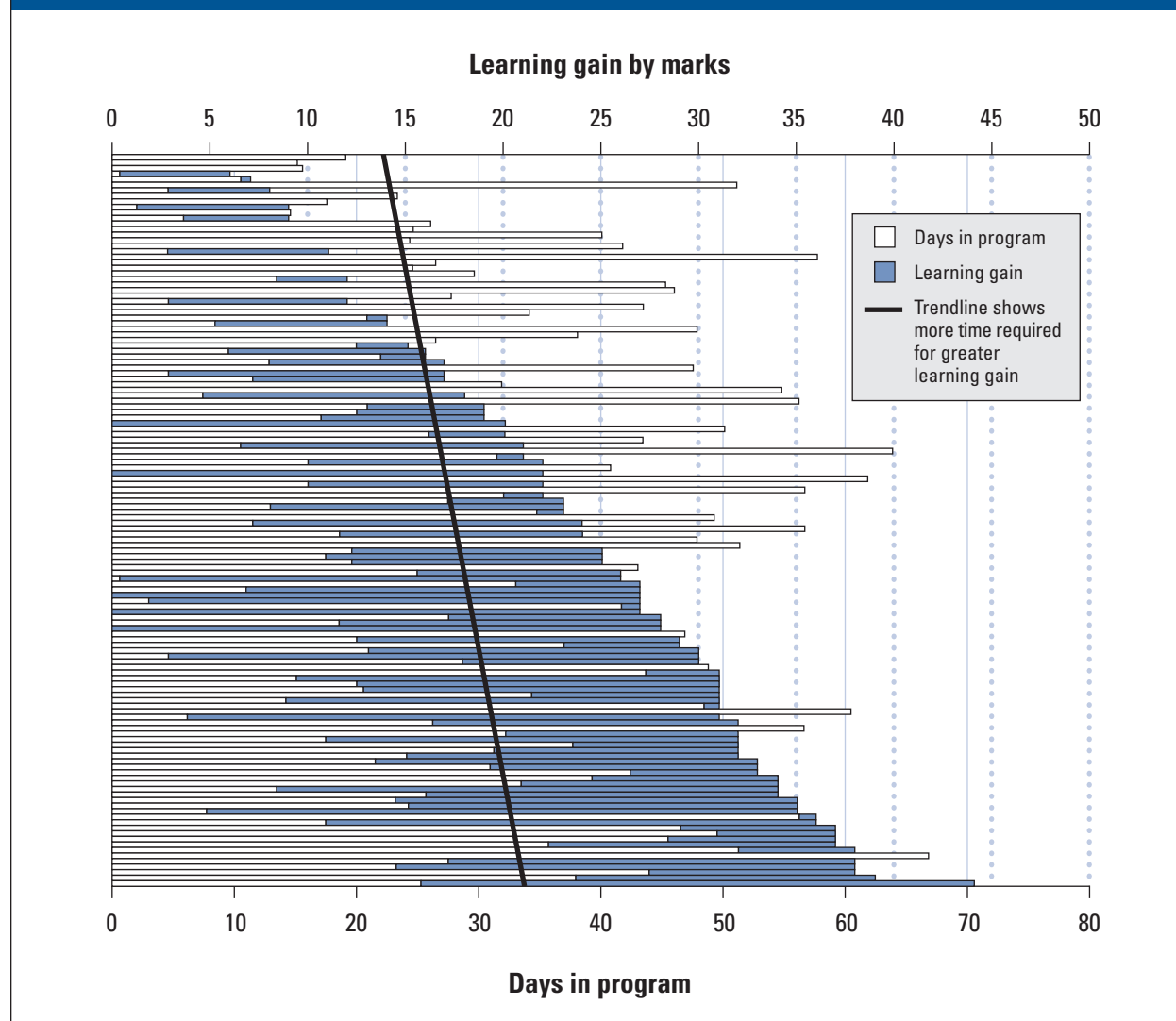
Learning gain for Credit learners was measured using marks from 1 – 100 compared to learning

gain in the GED program where scores range from 0–800 for each subject. The range of marks gained compared to time in the program, shows a trend towards more time to achieve greater learning gains. Figure 6 demonstrates this trend with the top axis showing gain in marks and the bottom axis with the number of days in the program.

For GED learners, time in program showed a similar pattern to the time for Credit learning gain.

FIGURE 6

### Credit Mark Gain Compared to High School Averages by Days in Program





Learners who did not pass the GED had average starting points below 425, while learners who did pass the GED had average starting points of 450 or higher. Thus those with averages below 425 took longer in the program, this pattern occurred for each subject area. The number of final GED marks in the “Did not pass” group was too small for further comparison purposes, however, a pattern of length of time in program as a function of ‘starting point’ was demonstrated for the GED learning gain as well as for Credit learning gain (See Figure 7).

The starting point appears to influence the amount of time in program and learning trajectory for GED testing (See Figure 8). Baseline marks for Math were used to determine the relationship to length of time in the program. Higher baseline scores tended to mean fewer days in the program while lower

baseline scores tended to mean more days in the program. This trend line is shown in Figure 8 and was similar for all GED subject areas.

Program characteristics were examined to see which, if any influenced learning gain, for example class size, class composition, instructor teaching modality, location and the instructor’s perceived level of learner need. While there were differences between instructors in terms of learning gain and time to completion, none of these differences were statistically significant. Minor variations in learning gain were also seen at various delivery sites however, numbers were too small for statistical comparison. Enrolment as a day or night learner remained the characteristic influencing program completion and therefore, learning outcomes.

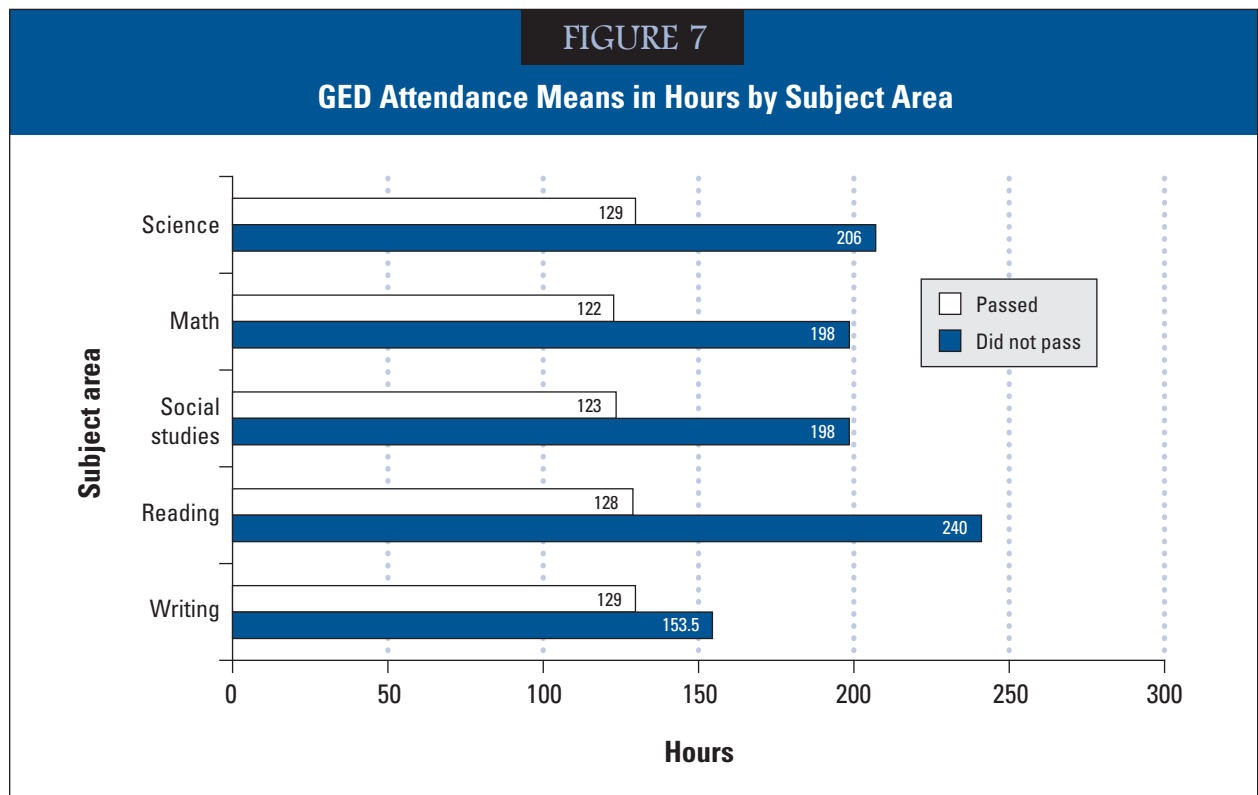
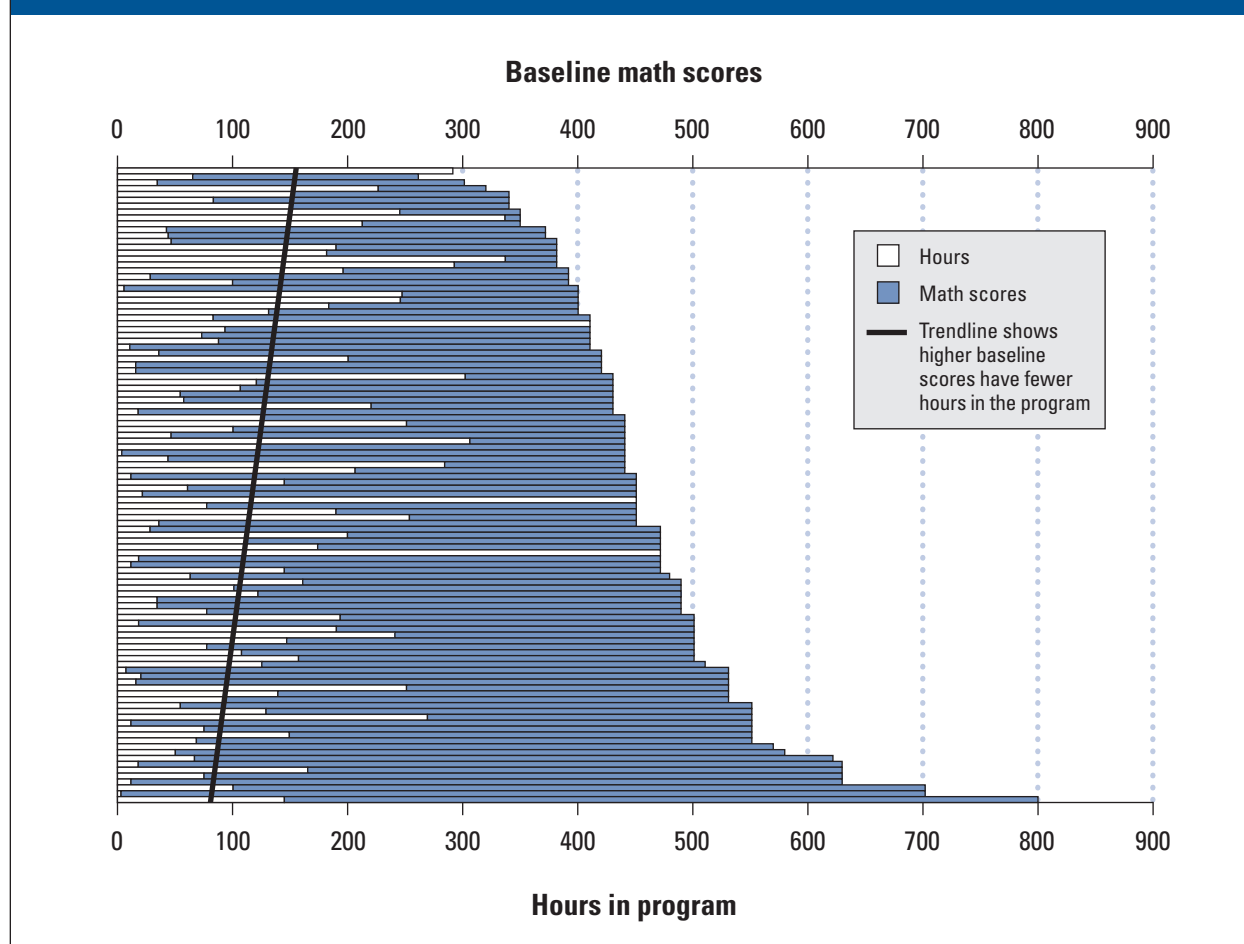


FIGURE 8

## GED Math Scores by Hours in Program



**Question 3 What was the cost of learning gain and how did costs relate to learner and training characteristics?**

The costs of program delivery, direct and indirect were taken from the budget actual for the academic year of this study and were used as the basis for determination of cost of learning gain. Direct costs were instructors' salaries, resources, materials and supplies, while indirect costs were rent, professional development, photocopying, and travel. Learning gain was assessed from the starting points (baseline) to post intervention and six month follow

up for Credit marks, GED and CLE scores. A simple way to establish cost per learner is to divide the total budget by the number of learners

$$\text{\$1,100,970/488} = \text{\$2,256 per person.}$$

However, while this amount gives an overall aggregate cost per person and is useful to project certain types of scenarios for adult education delivery, it does not determine the precise cost of learning gain per person given the various amounts of time learners spent in the program. It also does not factor in those who did not complete some academic activity during the year. However,

using completion rate data from Table 7, 158 learners who did not complete at \$2,256 per day, cost the program  $\$2,256 \times 158 = \$356,448$ .

The daily cost of learning in the program was determined based upon the formula shown in Table 12, a per person per day cost of \$22.29 for GED or Credit learners, and \$39.01 for Levels learners.

The cost of learning was higher for Levels learners due to a student teacher ratio of 8 to 1 as outlined in the contract for adult education delivery between the province of Prince Edward Island and the Institute for Adult and Community Education. The ratio of direct to indirect costs shows 80% of costs were expended on direct delivery.

The cost of learning gain was tabulated by dividing 'per day costs' by 'per day learning gain' to establish a cost of "learning gain" ratio, which

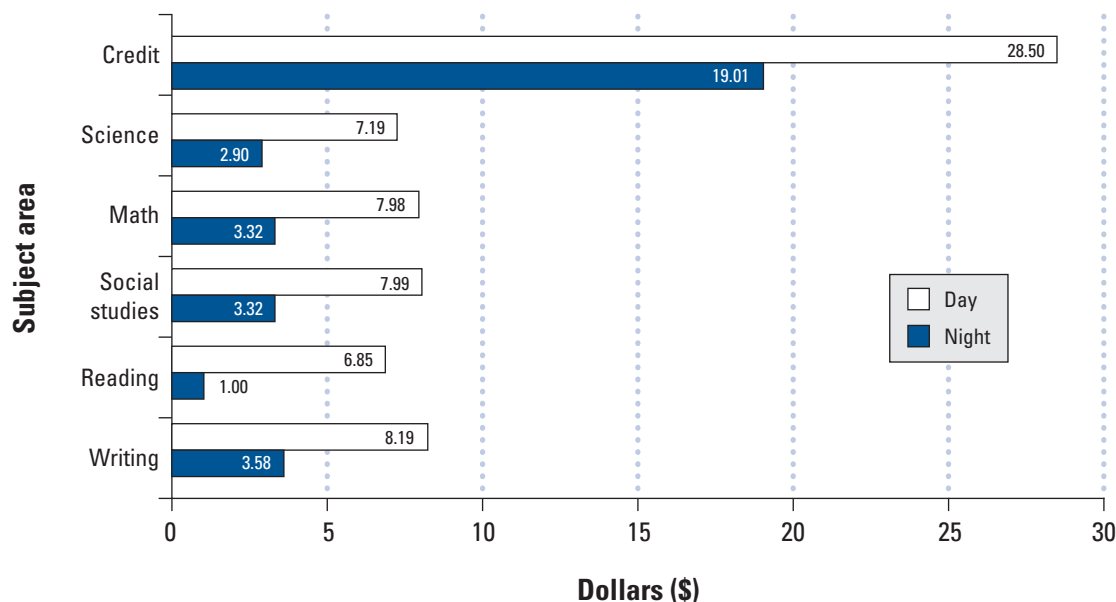
is a function of accomplishment, not time. This cost of learning gain ratio varies dependent upon the type of learning gain, Credit mark or GED point gain was different as measurement for these two categories differed (See Figure 9).

The cost of learning gain ratio was highest for Credit learners, who took longer to complete. Ratios for the five subject areas of the GED vary, for example Math can be more difficult for many people requiring more time to complete. The lowest cost/learning ratio was Reading at \$1.00 per point if taken in the night program, while the most expensive is attaining Credit points at \$28.50 per 1% mark increase in the day program.

TABLE 12 Costs of Training			
	Total direct	Total indirect	Total direct and indirect
	\$906,597.00	\$194,373.00	\$1,100,970.00
<b>Cost per class</b>	\$32,378.46	\$6,941.89	\$39,320.36
<b>Cost per class per day</b>	\$256.97	\$55.09	\$312.07
<b>Cost per student per class per day (GED/credit ratio 14–1)</b>	\$18.36	\$3.94	\$22.29
<b>Cost per learner per class per day (levels ratio 8–1)</b>	\$32.12	\$6.89	\$39.01
<b>Percentage total costs</b>	<b>82%</b>	<b>18%</b>	<b>100%</b>

FIGURE 9

### Cost of Learning Gain by Category and Subject Area for Each 1 Point Increase per Day



#### Question 4 What is the employment and earnings outcomes of learners before and after participation in adult training?

Previous information about labour force activity has not been collected by ACE. However, this labour force activity helps to define adult education impact. Within this study baseline data is collected on this topic. Forty-six percent of participants indicated they were working full or part time when asked at baseline, with more females than males working in both full and part time categories. Twice as many females as males indicated they had worked since 2007 (See Table 13). It is important to continue gathering this data in future studies to further define the profile of adult learners and impacts of their educational endeavours.

TABLE 13

#### Employment Status by Gender at Baseline

	Male no.	Female no.	Total no.
<b>Employment</b>			
Full time	39%	61%	100%
Part time	26%	74%	100%
Not employed	42.5%	57.5%	100%
Student	30%	70%	100%
<b>Since September 2007</b>			
Worked since 2007	36%	64%	100%
Not worked since 2007	33%	67%	100%
Never worked	28.5%	71.5%	100%
<b>Total</b>	<b>142</b>	<b>251</b>	<b>393</b>

Learners were asked where they were working both at baseline and at post intervention (See Table 14). However, given the high non response rate, results are inconclusive as to definitive trends or changes in employment diversification.

Information participants supplied on wages showed a modest increase in the average salary for women at post intervention. With average earnings higher for males than females, a t test was used to determine male earnings were higher and statistically significant compared to female earnings<sup>14</sup> at baseline however, at post intervention there was no statistically significant difference.

### Question 5 How did learner attitudes and aspirations about education change at time of leaving?

Learner attitudes about the program and education are important considerations in adult education. At post intervention, learners completed a questionnaire to determine overall attitudes towards the education they had received and their educational aspirations. These baseline responses were compared by program in Table 15. Positive attitudes prevailed throughout with learners in all programs agreeing that “Learning gives you more

TABLE 14				
Employment at Baseline and Post Intervention by Gender				
Sector	Male		Female	
	Baseline (n = 101)	Post (n = 89)	Baseline (n = 161)	Post (n = 146)
Business	2%	0%	9%	2%
Natural and applied sciences	0%	1%	1%	0%
Health	3%	2%	10%	6%
Social science, education or religion	4%	0%	4%	1%
Art, culture, recreation, sport	4%	1%	2%	0%
Sales and service	25%	9%	64%	15%
Trades, transport, heavy equipment	42%	13%	6%	3%
Primary industry	9%	2%	1%	1%
Secondary industry	12%	2%	4%	5%
Other	0%	21%	0%	23%
No response	0%	47%	0%	45%
Total	100%	100%	100%	100%

<sup>14</sup>  $t = 6.33$  (346),  $p < 0.0001$

**TABLE 15**  
**Pre and Post Attitudes (Percent)**

	Credit		GED		Levels	
	Pre (n = 286)	Post (n = 146)	Pre (n = 153)	Post (n = 77)	Pre (n = 15)	Post (n = 12)
<b>The skills you need to do a job cannot be learned in a classroom</b>						
Agree	44%	59%	53%	61%	68%	83%
Disagree	56%	41%	47%	29%	32%	17%
<b>Education and Training can help you manage your life better</b>						
Agree	96%	97%	97%	87%	91%	100%
Disagree	4%	3%	3%	13%	9%	0%
<b>Learning new things is fun</b>						
Agree	93%	95%	95%	91%	95%	100%
Disagree	7%	5%	5%	9%	5%	0%
<b>Learning gives you more self-confidence</b>						
Agree	99%	99%	99%	87%	100%	100%
Disagree	1%	1%	1%	13%	0%	0%

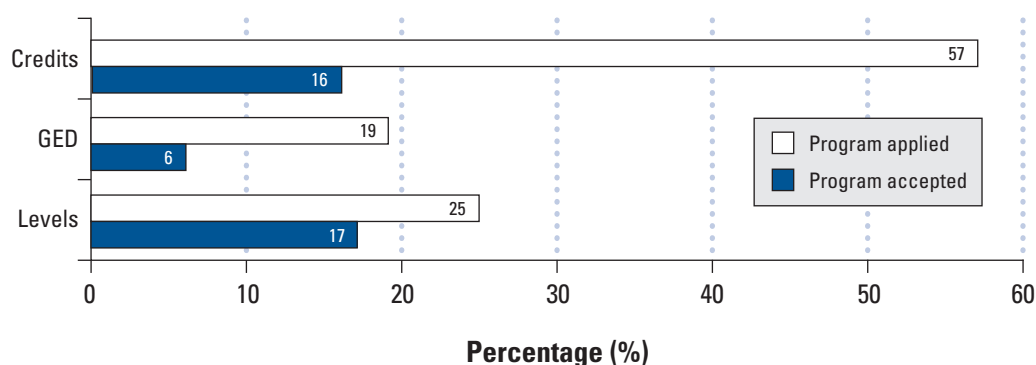
self-confidence”, “Learning new things is fun” and “Education and Training can help you manage your life better”. Where learner profiles differed was in relation to the statement “Skills you need to do a job cannot be learned in a classroom”. Higher percentages in each program agreed with this statement after the intervention than before, but there was no statistical significance to this finding.

Future aspirations were examined at post intervention. Learners from all three program areas indicated they had applied to a postsecondary

program. The percentage of accepted compared to those who applied is shown in Figure 10. While many apply, in the cases of Credit learners and GED graduates, approximately one third were accepted. While percentages of Levels learners who applied and accepted appear closer, these percentages were based upon small numbers. The gap between applications and acceptance indicates a three to one ratio. Reasons for non acceptance were not gathered in this study, limited access may have been a factor.



FIGURE 10

**Comparison of Applications to Acceptance by Program**

## Discussion

### Key Highlights and Program Implications from the Research Questions

The number of youth with high school diploma created a subpopulation within this study, that was atypical compared to previous student populations. Already in possession of a high school diploma, their reasons for coming to ACE may have been either to obtain a specific credit for a particular university or college program, or to raise existing high school marks to be more competitive in the postsecondary application process. The youth with a high school diploma group underperformed on CLE prose measures and outcome credit marks. The reasons this group underperformed in obtaining educational outcomes are unclear, it could be an issue of ability, attitude, or both. However, CLE scores were strong indicators of final credit mark scores, and could serve as a baseline indicator to determine if additional literacy support is required when working with this subpopulation.

This youth with a high school diploma group is not typically thought to be an adult upgrading client. However, risk of non-completion was higher for this age group 16–25, further compounding performance issues within this subpopulation. This group is representative of the Millennial learner, who may have very different learning needs than typical adult learners in ACE programs (Bauleke, 2010). More digital delivery methods may be helpful, the use of Youtube and social networking sites as part of program delivery may be of value in supporting Millennial learning styles (Kattner, 2009; Koc, 2008), however, the lower CLE scores indicate foundation work with this group has to be done.

Given Millennial learners have challenges with a self paced and individualized learning pathway, this may account for performance issues seen in younger learners (Oblinger, 2003). Learners need a level of self-efficacy (Leeder, 2008) to be successful in an individualized learning pathway something younger learners in the ACE programs may not have developed. Supports for these learners need to be

identified and resourced. It remains to be seen whether or not this subpopulation is growing within the Island workforce, which affects the demands placed upon adult education support.

The selection of night classes as opposed to day is a personal option for learners. However, given the higher risk of non-completion in night enrolment, options for day enrolment whenever possible should be promoted. Traditionally, younger learners have opted for the night program (Institutional Research, Holland College 2008; Institutional Research, Holland College 2007). However, it is this younger cohort who is at greatest risk of non-completion. Night classes offer exposure to a learning environment 6 hours per week, perhaps insufficient time to stimulate and motivate learner engagement. Additional supports such as counselling, tutoring, and mentoring for learners in night classes could help identify learning needs required to assist in raising completion rates.

While completion rates were lower in the night program, it is not clear whether or not night enrolment may serve as a precursor to day enrolment. Anecdotal information indicates learners may start in the night program but switch to day to complete programs more quickly, or to achieve a more intense learning experience. Tracking this may be necessary to determine learner flow and pathway to completion.

While average daily gain appears higher at night, learners attend class only two nights per week for a total of six hours. Six hours is equal to one day of day program learning. In real time, day learners have completed five program days during the same time frame night learners have completed one 'day'. Ratios of learning gain at night were approximately double those of day learners, however, real time

equivalent is five days, day learners are gaining more in one week of learning compared to night learners. This intensity of learning gain may in part account for higher retention rates with day program learners.

Learners' positive attitudes were clearly shown in the surveys. Findings in this study were similar to Engstrom and Tinto (2009) where persistence was enhanced when learners had a positive attitude. Learners' perceptions about learning from this study also mirrored Engstrom and Tinto's (2009) findings, that learning and education are life management assets. Adult developmental learning for them was a progression of learning, not a daunting task. These positive attitudes are indicators of commitment to lifelong learning, a core competency in the 21<sup>st</sup> century (Field et al., 2009). Learners clearly indicated a wish to carry on to postsecondary programming however, the rate of application to acceptance is three to one. This confirms statistics from the ACE follow up surveys (2007) where only 9% of learners went on to college, and 3% to university (Institutional Research, Holland College, 2008). The gap between those who indicated they wanted to go on and those who actually applied needs to be addressed, as well as the gap between those who applied and those who were accepted. Career counselling focused on preparation and program selection may benefit learners to help them in the application process. Additional tutoring support may also be beneficial to help raise marks to more competitive levels. The transition in work environments experienced by learners may also be a factor in the ongoing education process. If improvement in work has been found, than aspirations for more education could be put on hold.

Reasons for not going on to postsecondary education could be simple, however, low numbers of applications require further study and policy development that supports transition to further education.

The GED learning gain showed those who started with scores above 450 moved through preparation quickly and were more successful with the GED final exam. However, those that started with baseline scores below 425 were less likely to achieve success on the GED exam in the same time frame. This is logical, as learners with lower scores had further to go, different starting points dictate different length of time for learning gain. However, there may be an additional time lag for learning gain between 425 and 450, those 25 points may require a steeper learning trajectory and have a different learning gain ratio. Numbers of GED in this category were too small for further statistical analysis however, from a programming perspective, learners who start with pre test scores below 425 can be expected to be in the GED preparation program for an extended period of time. These learners did not pass the GED, and the amount of time spent in preparation was insufficient, making future predictions for the time required difficult. How much time it takes to gain these 25 points and specific learning supports required to boost learners in this range needs further exploration.

Past studies (Mckenna *et al.*, 2008) indicated baseline GED scores at 425 or below were correlated with low literacy. As a policy ACE programs could implement literacy upgrading for all learners who enter the GED program with scores below the 450 benchmark in any subject area. GED instructors

have long used a score of 500 on the GED practice tests as an indicator the learner is ready to write the GED exam, while suggesting learners below 450 are not yet ready to attempt the final test. This study validates that cautious approach.

Rural learners were more likely to stay in programs compared to urban learners, yet rural sites had fewer learners and services compared to urban sites. The flexibility and closely knit community nature in rural environments may influence program persistence. Outreach to these sites with additional service options such as weekend programming may increase the number of rural participants thus increasing engagement along with capacity. This same flexibility in weekend delivery may enhance uptake in urban sites and encourage retention.

While night classes had higher incidences of attrition and lower completion similar to Porter's (2006) study, a change in thinking for these classes may be needed. Learners who do stay in night programs ultimately do well. The night programs may serve learner needs better as a feeder for day programs to support those learners at risk of dropping out. Options for evening classes could be expanded to include a 4:30 to 6:30 pm time slot three nights a week, which would allow learners to come directly from work. The current time slots of 6:30 to 9:30 pm two nights per week may be blocks of time that are too long or too late for many learners.

At home learning is another option for outreach, where learners are registered with the ACE program but work either online or with distance support of an adult education instructor. These ideas for expansions and greater flexibility require accountability

mechanisms to meet the needs of funding partner and learner. This could only be achieved with the full support of funding agencies involved with adult education programming.

## **Key Highlights and Policy Implications for Island Prosperity, the Province and Holland College from the Research Questions**

The potential for learning gain is clearly demonstrated within this study. Although literacy was less of an issue than anticipated, the need for credentialing and lack of preparedness of youth with a high school diploma were apparent. Learning gain did occur and associated cost of learning gain ratios was established. Given the number of workers estimated required to meet the Island prosperity vision, the cost of learning gain for adults requiring developmental learning can be tabulated to determine investment needs for the future.

The cost of learning per student was determined to be \$2,256, with the total cost of learning gain in this study \$583,834. The cost of learning gain ratio was dependent upon the type of program and length of time to achieve learning gain. The value for money gained from these costs incurred were increased levels of literacy and retention after six months in Prose, Quantitative, and Document domains for all program types. In addition, 210 learners received credits, 98 learners completed GED preparation, and learners in the Levels program had higher average learning gain in all IALSS domains. Employment outcomes included diversification from low wage sectors such as Sales and Service to broader ranges

of employment. These learners did not yet have a postsecondary diploma, but movement into knowledge based industries and participation in jobs of the future are now more viable options given the learning gain achieved. The aspirations to continue learning are reflected in their positive attitudes and increased level of awareness that education will improve their life. The fact that day program learners had higher completion rates echoes similar findings to Porter's (2006) study on student engagement.

To meet the anticipated need for 1,200 workers per year, as outlined in the Island prosperity vision, an increase in adult learners is needed. With 13,585 workers on P.E.I. without a high school diploma, the need to move this undereducated segment of the population to higher learning proficiencies is necessary to meet human capital demand raised by the Island prosperity vision. If 1,000 more learners opted to take GED preparation to move on to postsecondary education, an aggregate investment of \$2,256,000 would support these learners ( $1,000 \times \$2,256$ ). If however, projections are based on the cost of learning gain per day, then a scenario where those 1,000 GED learners required a gain of 50 points in reading to achieve their GED, then a \$50 per learner per day investment is required. If a different 1,000 GED learners needed to raise their reading levels by 75 points the investment for learning gain would increase to \$75 per learner per day. Another scenario could be 1,000 learners who wish to obtain one credit or raise an existing credit mark for application to a postsecondary program. Without knowing where the starting point is for learners in Credit programs, a cost of \$28.50 per point per day is required for each 1% point learning gain. Cost of learning gain is not

an easy ratio to determine or predict, however, this study does show cost of learning gain associated with value for money.

CLE scores obtained in this study showed a strong correlation to educational outcomes in the credit program. The youth with a high school diploma also showed statistically significant performance gaps on all three of CLE prose measures. Credit learners could benefit from pre-screening using CLE to determine if specific literacy support is required.

As a policy issue, support for the CLE as a measure to target more vulnerable learners, would assist in identifying where additional learning supports are needed. Targeting vulnerable learners with lower literacy levels can give them the required foundation skills to move through the GED or Credit programs more quickly.

## Conclusions

This study has established learning gains across a variety of learning environments, and an important policy issue that arises are those learners who need this upgrading but do not access the education. The majority of learners in this study did not have literacy issues, however, the results of IALSS 2003 clearly show that many Islanders do. With 13,585 Islanders lacking a high school diploma, and only 159 learners enrolled in GED preparation, the ratio of educational demand to educational supply shows excess supply while human capital demand is high. Balancing the supply demand ratio for education and workforce development is critical for the province of Prince Edward Island to achieve Island prosperity.

Why people are not engaged in adult upgrading opportunities, and what barriers exist that may prevent adults from continuing with upgrading or developmental education are unknown but need to be explored based upon the results of this study. The pool of human capital languishing on P.E.I. is a potential barrier to economic prosperity. Policy development that supports adult upgrading as a foundation trajectory to postsecondary education is needed to support adult learner engagement.

In addition to those who do not have a high school diploma, this study had participants with a high school diploma who had lower literacy scores than non diploma learners. The high school diploma group also did not perform as well on educational outcomes compared to their adult learning peers. These learners are also in the age group at risk for non-completion. Supports for these learners could take the form of an entry assessment to determine literacy and ability levels, with targeted literacy training or upgrading provided. Younger learners were the most likely to be incomplete in their program of study, therefore in addition to targeting academic resources, counselling for these learners to manage the educational process and set educational goals would be helpful.

Policy issues identified at the beginning of this study were the need for a highly skilled workforce to meet labour force demand for jobs of the future on Prince Edward Island. From a policy perspective, supporting adult learners in the process of upgrading is important for financial and educational reasons but ultimately support for these learners addresses the larger process of skill development.

Programs which support the return of adults to a learning environment should understand the challenges an adult learner faces both in learning and sustaining quality of life. Adult upgrading is one stop on a lifelong learning trajectory that requires support to become attached permanently to the labour market. As seen in the literature, a high school diploma is the starting point for education in the new economy therefore, programs that support GED attainment as end educational outcomes are not viable in today's world. The GED is considered an equivalent to high school diploma, however, it is an entry point for postsecondary education which is a requirement for ongoing employment.

Learners need greater awareness of labour market outcomes which could be provided through public education programs. Policies which support career awareness and assist selection will lead to informed adult choices about upgrading, postsecondary education, and training. Learners at the start of this study had an employment distribution focused in sectors where growth is not envisioned or predicted, however, with diversification from those sectors potential long term sustainable employment is a possibility. Whether or not this happened within this study is inconclusive.

The cost of learning gain was tabulated in this study in a two different ways, as total cost per learner, and as learning gain per point per day. For 13,585 Islanders with no high school diploma, providing opportunities to attain their GED requires investment. Program completion in this study showed 210 credit and 98 GED learners ready to bridge to postsecondary training and/or enter the workforce directly. Completion rates and learning gains are

well documented in this study, but there is always room for improvement. Supporting learner retention in the part time programs is a start. Teaching support such as teachers' assistants could help learners in the compressed time frame of night class study. As a policy issue, how to support specific career paths for adult learners to encourage postsecondary engagement needs clearer definition and refinement. Increasing the number of applications to postsecondary program would be a measure of success in encouraging this engagement. Current skills development programs for adults are focused on how those adults are tied to the labour market, however, expansion of focus to include those adults who have no current ties to the labour market may be one way to engage more Islanders in adult education on Prince Edward Island.

Young learners are performing at lower levels and are at higher risk for non-completion than older learners. Policy focused on youth strategies need to be aware of specific vulnerabilities of these young learners in this province along with the need to support foundation learning regardless of current diploma status. Policies that encourage identification of and targeting specific literacy development needs would support this group at risk. Transitioning from high school to the workforce may now require adult upgrading as part of the traditional learning trajectory for high school graduates who lack foundation skills.

The learning gains documented in this study demonstrate a collaborative effort between program delivery, learner, and instructor. The learning gains represent a collaborative partnership between the province and the Adult and Community Education



system at Holland College, to work towards improved labour force outcomes. Further investment in that system is necessary to expand adult learning and light the fire of human capital in this province for the vision for Island prosperity.

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# Appendix A

## Explanation of IALSS and literacy domains

**T**he International Adult Literacy Skills Survey (IALSS) is an established standardized test and the Canadian component of the Adult Literacy and Life Skills Survey (ALL). This survey measures how adults utilize information. ALL was utilized in seven countries in 2003. It is

comprised of four domain measures, prose, document, quantitative, and problem solving. These measures assess a person's ability to understand written information, perform tasks involving math functions, and draw information from tables, graphs and charts. For the purpose of this study, three domains were measured, prose, document and quantitative. Each domain is divided into four levels with specific criteria as shown in the table below.

	Prose	Document	Quantitative
<b>Level 1 (0–225)</b>	Most of the tasks in this level require the respondent to read relatively short text to locate a single piece of information which is identical to or synonymous with the information given in the question or directive. If plausible but incorrect information is present in the text, it tends not to be located near the correct information.	Tasks in this level tend to require the respondent either to locate a piece of information based on a literal match or to enter information from personal Knowledge onto a document. Little, if any, distracting information is present.	Tasks in this level require the respondent to show an understanding of basic numerical ideas by completing simple tasks in concrete, familiar contexts where the mathematical content is explicit with little text. Tasks consist of simple, one-step operations such as counting, sorting dates, performing simple arithmetic operations or understanding common and simple percents such as 50%.
<b>Level 2 (226–275)</b>	Some tasks in this level require respondents to locate a single piece of information in the text; however, several distractors or plausible but incorrect pieces of information may be present, or low-level inferences may be required. Other tasks require the respondent to integrate two or more pieces of information or to compare and contrast easily identifiable information based on a criterion provided in the question or directive.	Tasks in this level are more varied than those in Level 1. Some require the respondents to match a single piece of information; however, several distractors may be present, or the match may require low-level inferences. Tasks in this level may also ask the respondent to cycle through information in a document or to integrate information from various parts of a document.	Tasks in this level are fairly simple and relate to identifying and understanding basic mathematical concepts embedded in a range of familiar contexts where the mathematical content is quite explicit and visual with few distractors. Tasks tend to include one-step or two-step processes and estimations involving whole numbers, benchmark percents and fractions, interpreting simple graphical or spatial representations, and performing simple measurements.

(Continued)

(Concluded)

	Prose	Document	Quantitative
<b>Level 3 (276–325)</b>	Tasks in this level tend to require respondents to make literal or synonymous matches between the text and information given in the task, or to make matches that require low-level inferences. Other tasks ask respondents to integrate information from dense or lengthy text that contains no organizational aids such as headings. Respondents may also be asked to generate a response based on information that can be easily identified in the text. Distracting information is present, but is not located near the correct information.	Some tasks in this level require the respondent to integrate multiple pieces of information from one or more documents. Others ask respondents to cycle through rather complex tables or graphs which contain information that is irrelevant or inappropriate to the task.	Tasks in this level require the respondent to demonstrate understanding of mathematical information represented in a range of different forms, such as in numbers, symbols, maps, graphs, texts, and drawings. Skills required involve number and spatial sense, knowledge of mathematical patterns and relationships and the ability to interpret proportions, data and statistics embedded in relatively simple texts where there may be distractors. Tasks commonly involve undertaking a number of processes to solve problems.
<b>Level 4 (326–375)</b>	These tasks require respondents to perform multiple-feature matches and to integrate or synthesize information from complex or lengthy passages. More complex inferences are needed to perform successfully. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent.	Tasks in this level, like those at the previous levels, ask respondents to perform multiple-feature matches, cycle through documents, and integrate information; however, they require a greater degree of inferencing. Many of these tasks require respondents to provide numerous responses but do not designate how many responses are needed. Conditional information is also present in the document tasks at this level and must be taken into account by the respondent.	Tasks at this level require respondents to understand a broad range of mathematical information of a more abstract nature represented in diverse ways, including in texts of increasing complexity or in unfamiliar contexts. These tasks involve undertaking multiple steps to find solutions to problems and require more complex reasoning and interpretation skills, including comprehending and working with proportions and formulas or offering explanations for answers.
<b>Level 5 (376–500)</b>	Some tasks in this level require the respondent to search for information in dense text which contains a number of plausible distractors. Others ask respondents to make high-level inferences or use specialized background knowledge. Some tasks ask respondents to contrast complex information.	Tasks in this level require the respondent to search through complex displays that contain multiple distractors, to make high-level text-based inferences, and to use specialized knowledge.	Tasks in this level require respondents to understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. Respondents may have to integrate multiple types of mathematical information, draw inferences, or generate mathematical justification for answers.

\* Source: Statistics Canada and OECD 2005 <http://www.statcan.gc.ca/pub/89-603-x/2005001/pdf/4200878-eng.pdf>



# Appendix B

## Standardized Measures; CLE and GED Preparation

### CLE As a Standardized Test

**T**he CLE is a measure of literacy skills. It is based upon tests used as part of IALSS and as such scores are comparable to regional, national and international data. Results are provided for three types of literacy, Prose – reading connected text, Document – reading charts, graphs, etc., and Quantitative – word based mathematical problems. Scores are expressed in raw numbers and classified as Level 1, lowest level of performance, through Level 4/5. Level 3 with a score range from 276–325 in each domain, is considered minimal level for functionality in a knowledge based society.

**Test variance 13.6**

### GED as a standardized test

Two types of GED as a standardized test were used in this study, the GEDP designed to evaluate a candidate's readiness to write the full GED examination, and the final GED examination as developed through Educational Testing Services. The GEDP was developed using the same criteria as the full GED examination (GED Testing Service, 2002).

Created in 1942 to support World War II soldiers, the GED Tests offered thousands of veterans a chance at assimilating back into civilian life and an opportunity to attend a college or university. First accepted as a high school equivalency credential in New York State, credentials are now awarded in all 50 U.S. states, the District of Columbia, U.S. territories and insular areas, Canada and internationally. The GED credential-whether called a diploma, certificate, or degree-is the most widely accepted and respected high school equivalency credential. Standard deviation across subject areas range from 103 to 119, with an SEM range of 24.9–33.

**Source:** [http://www.acenet.edu/Content/NavigationMenu/ged/about/About\\_GED\\_Testing.htm](http://www.acenet.edu/Content/NavigationMenu/ged/about/About_GED_Testing.htm)

### Credit mark comparisons

These comparisons were based upon an average of English and Math marks compiled from official high school transcripts. No standard deviation or measurement error was developed as these marks were obtained from a variety of different high schools. Not all learners were able to provide marks.





# Appendix C

## Description of Research Phases, Program Delivery and Project Implementation

### Pretest/Post-test/Post Post-test Design

**A**t baseline in the fall of 2008, 484 participants were pre tested with the CLE. These participants started the program at various times, so pre testing phase took place over several months, province wide, at various ACE sites. At post intervention, post test measures were collected on 274 participants with 223 complete data sets of information for analysis. The 6–8 month follow up involved 166 participants. While attrition from any study sample is expected, the rate of attrition from this study was 53% from baseline to post intervention, and 28% from post intervention to follow up. The loss of participants over the course of the study was analyzed and reported on.

All learners were pre tested at baseline, as a program requirement of ACE. This facilitated baseline data gathering on literacy, document and quantitative levels of learners. Testing at post intervention and 6 month follow up was voluntary. For tests at post intervention, the identification of who needed to be tested and when, was a joint

effort between the Project Manager and ACE instructors. With a continuous intake and exit model, this process was dynamic requiring weekly attention to registration and exit information. Follow up was 6–8 months after participants had completed ACE programs and to increase response rate, a fifty dollar incentive was offered to participants, as these participants were no longer registered ACE learners.

A Project Manager was hired for overall coordination of testing, tracking and follow up for participants. The primary responsibility for data gathering rested with the Project Manager. Assigning codes, assuring data was tracked in relation to individual characteristics was completed through use of Excel spreadsheets. The Project Manager also worked closely with the ACE Information Technology program support personnel to assist with electronic data gathering, storage and secure transmission.

### Program characteristics

The Project Manager had primary responsibility for tracking data related to program characteristics specific to the learner. Those characteristics included the participant's instructor, class composition (mixed classes or one subject), instructor's teaching modality (small group or larger class grouping), class size, learner category of full time/part time (part time is defined as less than 4 days/week) or day/night student.

Other information included the learner's perceived level of neediness, as rated by the participant's instructor, number of hours in attendance, start and end date, reason for leaving, and whether or not they were a returning student from a previous academic year. All data was kept on a secure server with the participant's ACE registration number as the unique identifier.

The general categories of programming at ACE are:

- Credits = those attempting to attain particular high school credits
- GED = those preparing to write the GED examination
- Levels 1A = lower elementary school
- Levels 1B = upper elementary school
- Levels 2 = junior high school

Despite the sub-dividing of the Levels groups for administration purposes, they can for this project be considered a unitary cluster, referred to as Levels. Though a generalization, it would be typical for those in all categories of programming, with the exception of credits, to be exposed to material designed to enhance reading and quantitative skills.

Program entry performance was determined through a pre-GED test, if the participant was seeking a GED credential. For credit learners, performance entry data was determined by high school transcript. An unusually high number of credit learners had a high school diploma, these participants were enrolled in specific credit course that suited their unique learning needs. For example, a participant may already have a high school diploma but be missing a biology credit required to apply to a nursing

program. This participant would select the credit he/she wished to take, and enrol specifically for that credit, only. Level learners had no entry performance measure.

In the classrooms, learners' were self directed and self paced with an instructor/ facilitator present as a content expert in that credit field of study. As such, the content and pace differs from learner to learner. This results in participants having different times-on-task with respect to learning outcomes. The learner determines when he/she is ready to take the final examination in a credit. All credit courses are based upon P.E.I. high school curriculum outcomes as defined by the P.E.I. Department of Education. Standards for final examinations for credit courses mirror standards in the P.E.I .public school system.

### **Sample size**

- Baseline: 484
- Post intervention: 274
- 6 month follow up: 166

### **Data Gathering and Storage**

To assure participant anonymity, learners were assigned an identifier number by the Project Manager. Program characteristic information on that learner was compiled by the Project Manager, in conjunction with the faculty and the registration clerk. A separate electronic file was maintained with access restricted to the Project Manager and the principal researchers. Storage was maintained on a secure server. When data was transmitted electronically, it was stripped of personal identifiers using only the assigned id number. The Project

Manager controlled consent forms which were stored in a locked filing cabinet.

## Program Costs and Determination of Cost Formulas

Adult education on Prince Edward Island is sponsored through the combined contributions of the Labour Market Development agreement and provincial government, no tuition revenue is generated directly from students. There are a variety of costs associated with any program delivery, Adult Education on Prince Edward Island is no exception. Program costs include salaries/benefits, materials and supplies, resources, professional development, photocopying, phone, lights, heat and rental costs. Given the variety of costs, and number of students utilizing a continuous intake/exit model determining dollar value required a standardized approach. A simple methodology would be to divide total budget by total number of students to determine a per student cost, however, with a continuous intake/exit model, students attend for different lengths of time. This simplistic formula would not capture costs per day, important to determine the cost of literacy gain per student. A more consistent approach was to determine cost per class, as the number of physical classrooms remains consistent throughout the year.

With a budget of over \$1,000,000 annually, the starting point was to determine dollar value per class. To assure cost consistency, the determination of a dollar value began with division of overall

budget by number of classes (28) throughout the Island, through a simple formula.

$$\text{Cost/class} = \text{total budget} \div \text{total number of classrooms.}$$

The continuous intake/exit of students made defining how many students were in the class on any given day, difficult to determine cost per student per day. The maximum mandated class sizes as defined by the agreement between the Department of Innovation and Advanced Education and the Institute for Adult and Community Education was used for this formula as it defines the delivery model, creating a consistent measure to generate a cost per student. To determine cost per student per day, the cost per class was further divided by the total number of program days; then by the maximum number of students mandated to be in a Levels class (8), or the maximum number of students mandated to be in a GED or Credits class (14).

$$\text{Cost/student/day (Levels)} = [\text{cost/class} \div \text{number of days}] \div 8$$

$$\text{Cost/student/day (GED or Credits)} = [\text{cost/class} \div \text{number of days}] \div 14$$

Budget costs represented direct and indirect costs. For example, direct costs are those items which the student interacted with such as the teacher, the resources and the materials and supplies. For the purposes of this analysis, direct costs were then defined as teachers' salaries/benefits, materials and supplies, and resources. The Indirect costs were those costs which the student did not interact with, but were necessary to support program delivery. Indirect costs included all other costs such as heat, light, rental, professional

development etc. The direct and indirect cost/student/day was determined by substituting indirect or direct costs figures for total costs in the original formula.

The ratio of indirect to direct costs was 1:4.66, direct costs totalled 82.35%, rounded to 82%, while Indirect costs were 17.65%, rounded to 18%. The direct to indirect cost ratio remained constant within all sub-categories of direct and indirect costs. The majority

of costs were allocated directly, for example the teacher in the classroom. It should also be noted that resources required are textbooks. One of the terms of the contract between the Department of Innovation and Advanced Education and the Institute for Adult and Community Education, requires all textbooks be supplied to students while in the adult education programs. Materials and supplies refer to traditional classroom supplies.

# Appendix D

## Regression Tables

TABLE 16		
Probit Regression Attrition from Study		
	DF/dx	Std Dev
Age	-0.251**	0.053
Gender	0.048	0.054
Urban/rural	0.008	0.061
Instructor	-0.0043	0.002
Credit	0.06	0.087
GED	0.159	0.134
Levels*	NA	NA
Returning	-0.037	0.061
Day/night	-0.255**	0.064
High school diploma	-0.016	0.077
Work full time	-0.097	0.066
CLE prose scores	-0.0612	0.001
Teaching modality 1	-0.07	0.063
Teaching modality 2	-0.125	0.087
Teaching modality 3	0.046	0.146
Teaching modality 4	2.162	0.188
Teaching modality 5	-0.061	0.147
Number of observations 472	pseudo R > = 0.1296	
* Dropped due to collinearity		

TABLE 17		
Probit Regression Program Completion		
Complete dependent variables	Coef	SE
Age	-0.474***	0.150
Gender	0.228	0.143
Urban/rural location	-0.374**	0.163
Credit	-0.329	0.358
GED	-0.432	0.330
Returning student	-0.192	0.165
Day/night enrolment	-0.092	0.173
High school diploma	-0.221	0.207
Work full time	-0.321*	0.165
Instructor	-0.005	0.005
Teaching modality 1	0.023	0.169
Teaching modality 2	0.429*	0.240
Teaching modality 3	0.298	0.351
Teaching modality 4	0.834*	0.450
CLE prose scores	-0.003**	0.001
Cons	1.389***	0.496
Number of observations	410	
Pseudo R2	0.097	
Note: *** p<0.01, ** p<0.05, * p<0.1		

TABLE 18

**Multivariate Regression CLE Scores**

Independent variables	Coef	Std Dev
Gender	-4.625	114
Day/night enrolment	-72.29	285
Age	28.555	53.6
Employment	3.19	62
Returning student	-284.07*	146
Class composition	269.62	197
Urban/rural location	99.84	167
Instructor modality	-27.84	83.1
Instructor	-2.84	7

\* Significant at a 90% confidence interval  $r^2 = 0.15$