

Replacing the GED: A Concept note



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1. Introduction

The attached report has been drafted by T. Scott Murray, DataAngel Policy Research Incorporated on behalf of Literacy Partners of Manitoba. Interested readers may contact the author at the following coordinates:

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2. Background

The General Education Development (GED) test has been widely used in Canada over the past 25 years as a means of conferring a qualification purported to be equivalent to a high school diploma.

The purposes served by the GED

The GED has been used to serve several purposes as outlined below:

As a prerequisite for study at the post-secondary level

As a prerequisite for application for employment

For personal reasons

To serve these purposes the skills and knowledge assessed in the GED must have a positive impact on important measures of success in each of these settings. More specifically, the GED must assess skills and knowledge that increase the amount learned during post-secondary education and the rate of persistence to graduation or must improve the level of a worker's productivity or increases levels of learner satisfaction.

Each of these purposes is explored in more depth below. A key question underlying the current evaluation is whether the GED has a material impact on any or all of these outcomes.

The GED as a prerequisite for study at the post-secondary level

Many post-secondary programs offered by Canadian institutions require applicants to have a high school diploma. Adults and youth who left the primary or secondary system without obtaining a diploma who wish to pursue studies at the post-secondary level often take a GED prep course and then take the GED.

It is important to note that in this case the GED is meant to signal that the prospective learner has the skills and knowledge to take full advantage of their investment of money, time and effort and the public's investment in subsidizing provision.

The skills involved are of two sorts – a body of knowledge related to language, mathematics, science and social studies and a set of cognitive skills that allow an individual to acquire new knowledge rapidly, to solve problems and to apply what they know efficiently.

The GED as a prerequisite for application for employment

Employers use education credentials as a low cost way to reduce recruitment costs. The overwhelming proportion of Canadian occupations now require a minimum of a high school diploma to be considered for employment. Thus, the Canadian labour market creates powerful economic incentives for those without a high school diploma to obtain one.

It is important to note, however, that employers assume that a high school diploma is a reliable indication of the skills that are needed to support occupation performance. A key question underlying this evaluation is whether a high school diploma serves this purpose.

The GED as means for personal satisfaction

The GED also serves as a means to confer a credential to adults and youth who simply want to improve themselves.

Research questions

The purposes served by the GED may be re-framed as an ordered set of research questions as set out below.

Is a high school diploma a reliable indicator of skill?

Is a high school diploma a reliable predictor of post-secondary access and success? Does the GED serve a similar purpose? If not what does this imply?

Is a high school diploma a reliable signal of employability? Does the GED serve a similar purpose? If not what does this imply?

Does a high school diploma serve a social function?

3. What the data say

This chapter addresses each of the research questions set out above.

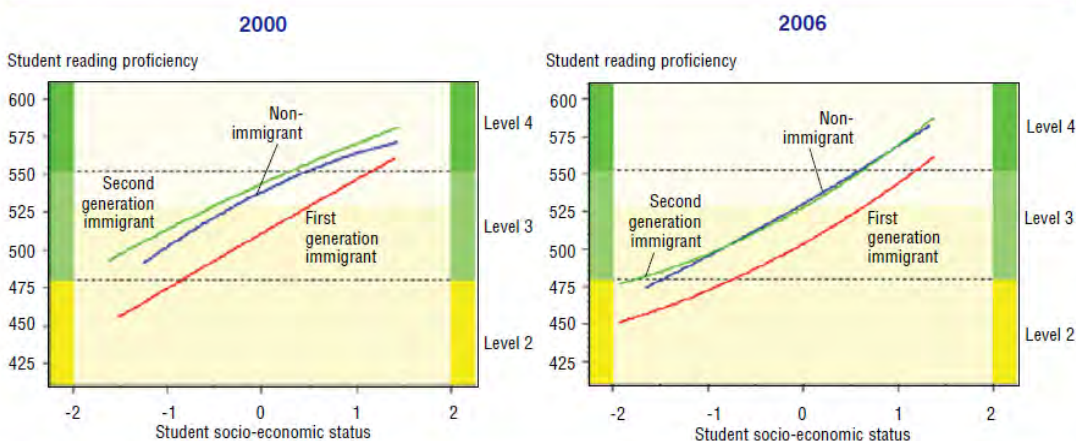
Is a high school diploma a reliable indicator of skill?

Data from Statistics Canada's International Adult Literacy and Skills Survey (IALSS) shows that those without a high school diploma is very heterogeneous. To begin with they vary widely in age, from recent drop-outs to senior citizens. They also vary greatly in their education levels and demographic characteristics.

Research suggests that success in both the post-secondary system and in employment require Level 3 prose literacy skills.

Data from the PISA assessment of 15 year old students reveals that an average of 43% of those near the end of secondary studies obtain reading scores below 529, the PISA equivalent of IALSS Level 3. The following chart uses PISA data for Ontario to illustrate the magnitude of the problem and the fact that the proportion of students was stable between 2000 and 2006.

Gradients in average literacy scores by socio-economic status, selected groups of Ontario students aged 15 in 2000 and 2006

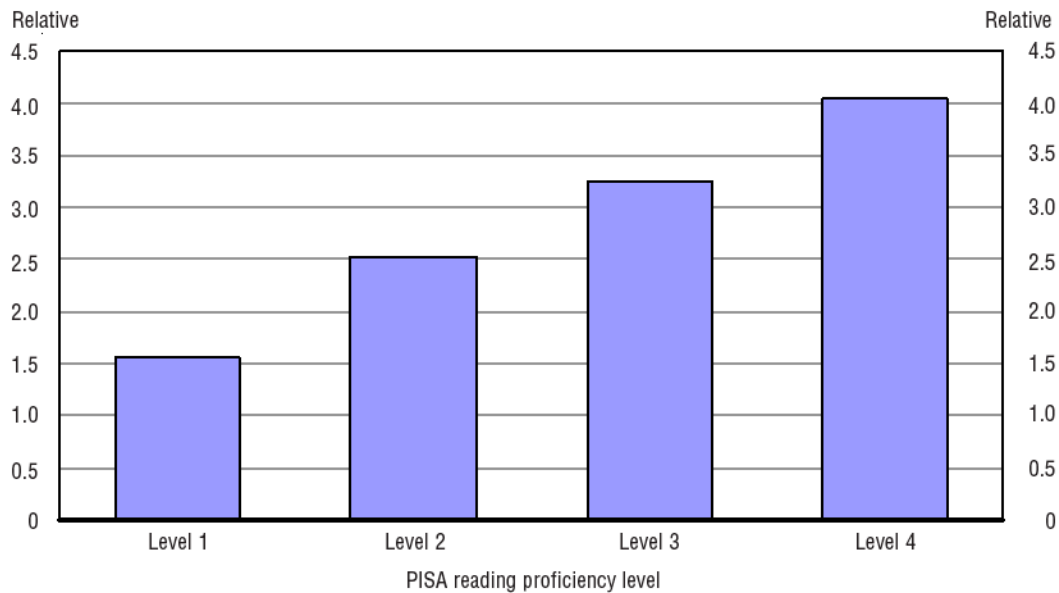


Source: Special analyses undertaken by Doug Willms, KSI Research International.

4. The estimates are thus relatively free of the statistical bias introduced by differences in cohort coverage that afflict comparisons of students at older ages when significant proportions of low skilled youth have

The following chart uses PISA data for Ontario to show that, while the probability of receiving a high school diploma is highly conditioned by literacy skill, low skilled youth have a non-negligible probability of obtaining a diploma by age 21.

The likelihood of completing high school by age 21 by reading proficiency levels at age 15, Ontario 2006



Source: Special analyses of the Youth in Transition Survey, 2000 cohort.

Importantly for the current analysis, data from Statistics Canada School Leavers and Youth in Transition Surveys show that recent school leavers vary enormously in their skill levels, much more, in fact, than implied by differences in their education levels. A significant proportion of recent school leavers are very skilled, much more skilled, in fact, than many high school graduates. This seemingly anomalous fact may be traced back to the underlying causes of school leaving. Significant proportions of students drop out of school for reasons that are unrelated to their academic performance – due to boredom, pregnancy, having to go work to support family, to work in a family business. This heterogeneity carries implications for the current analysis. It implies that the GED process is actually serving two distinct purposes for this group:

As a process to impart skills that are then confirmed through testing

As confirmation of pre-existing skills

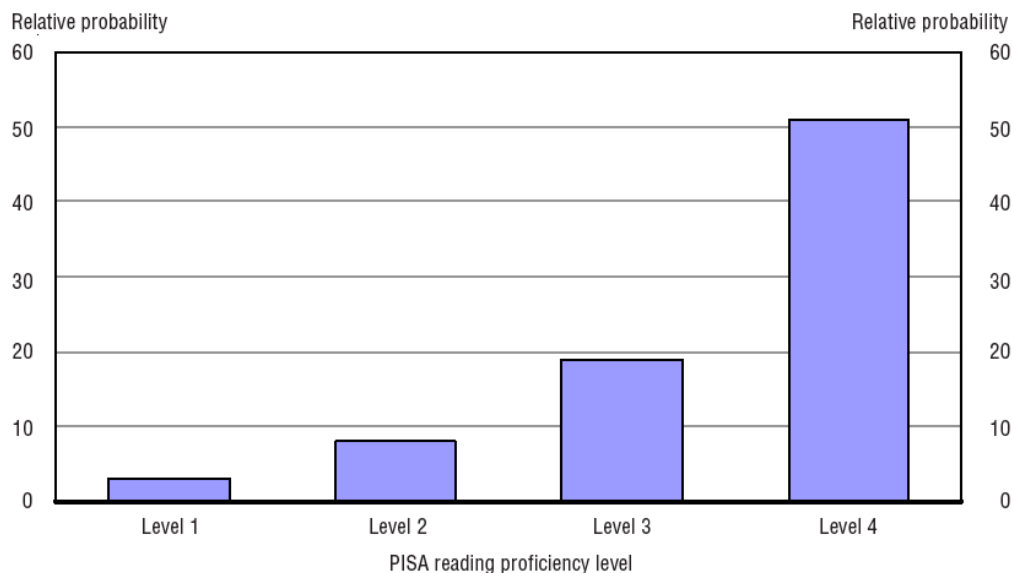
The bottom line is that a high school diploma is a poor indicator of the skill levels needed to succeed in the post-secondary system or the labour market. A large proportion of the students that leave the secondary system with a diploma lack

the Essential Skill levels needed to take full advantage of education at the post-secondary level. A small but significant proportion of youth that leave the secondary system without a diploma have high skills levels.

Is a high school diploma a reliable predictor of post-secondary access and success? Does the GED serve a similar purpose? If not what does this imply?

The available data, plotted in the following chart, suggests that the probability of post-secondary participation is even more highly conditioned on cognitive skills.

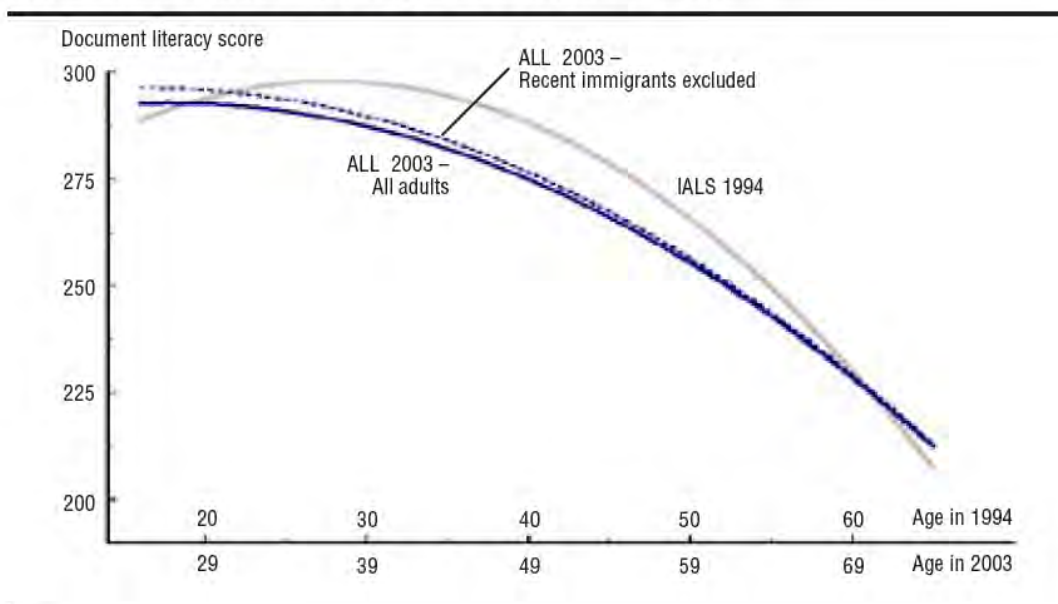
The likelihood of post-secondary participation by age 21 by reading proficiency levels at age 15, Ontario, 2006



Source: Special analyses of the Youth in Transition Survey, 2000 cohort.

A significant proportion of adults with a high school diploma do not have the skills associated with a high school diploma either because they never had the skills or have lost them through lack of use. The following chart reveals the magnitude of skill loss in the adult population observed between 1994 and 2003.

Document literacy scores versus age for Canada, 1994 and 2003



On average adults lost an amount of literacy skill equivalent to 7 months of formal education. Although most of this skill was lost by relatively skilled post-secondary graduates it is reasonable to assume that adults with only a high school diploma and those without a high school diploma lost some of the skill they once had with the passage of time. This effect erodes the reliability of a high school diploma as a signal of skill to the labour market.

The following table confirms that the Ontario post-secondary system admits large numbers of low skilled youth, particularly at the college level.

The likelihood of completing high school by age 21 by reading proficiency levels at age 15, Ontario 2006

Odds ratio relative to reference group	Odds-ratios of completing high school by age 21 by reading proficiency levels at age 15	
	Reading literacy level used as reference group in logistic model	
Level 1 and below
Level 2	1.58	
Level 3	2.52*	
Level 4	3.25*	
Level 5	4.04*	

... Not applicable.

* Significant at $P \leq .05$.

Source: Special analyses of the Youth in Transition Survey, 2000 cohort

Proportions of the 2000 cohort of 15 year olds participating in post-secondary education by age 21 by reading proficiency at age 15, for Ontario

Population counts and percentages by reading literacy proficiency level	University	College	Employed	Other	Total
Reading literacy proficiency					
PISA reading score below 529					
Population Counts	11,716	27,855	13,226	3,250	56,048
Standard error	3,338	4,730	4,003	1,769	7,264
Percentage	9.3	22.1	10.5	2.6	44.4
Standard error ¹	2.6	3.53	3.14	1.38	5.17
Row percentage	20.9	49.7	23.6	5.8	...
Standard error	5.68	5.85	6.24	2.97	...
Column percentage	20.2	60.1	74.5	80
Standard error	5.31	6.73	9.78	20.13
PISA reading score 529 or higher					
Population Counts	46,414	18,473	4,536	810	70,234
Standard error	7544	4252	1832	890	8,393
Percentage	36.8	14.6	3.6	0.6	55.6
Standard error	5.4	3.1	1.43	0.71	5.17
Row percentage	66.1	26.3	6.5	1.2	...
Standard error	6.28	5.44	2.56	1.27
Column percentage	79.8	39.9	25.5	20	...
Standard error	5.31	6.73	9.78	20.13
Total					
Population Counts	58,130	46,329	17,762	4,061	126,282
Standard error	8,183	6,495	4,339	1,947	8,540
Percentage	46	36.7	14.1	3.2	100
Standard error	5.71	4.43	3.35	1.52	0

... not applicable

1. The **standard error** of an estimate is the standard deviation of the sampling distribution associated with the estimation method. Standard errors provide readers with a sense of the magnitude of sampling error that is associated with an estimate, specifically the proportion of samples that would give a result that falls within 2 standard errors above and below the reported value.

Source: Youth in Transition Survey, etc.

Overall 46% percent of the cohort had participated at the university level and 36.7% at the college level for a total post-secondary participation rate of 83.7% by age 21. Were the admission process perfectly efficient this level of participation implies that the least able student admitted would have a PISA score of 538, well below the lower bound of IALSS Level 3. Under the same assumptions the least able university student would have a score of 500 on the IALSS scale.

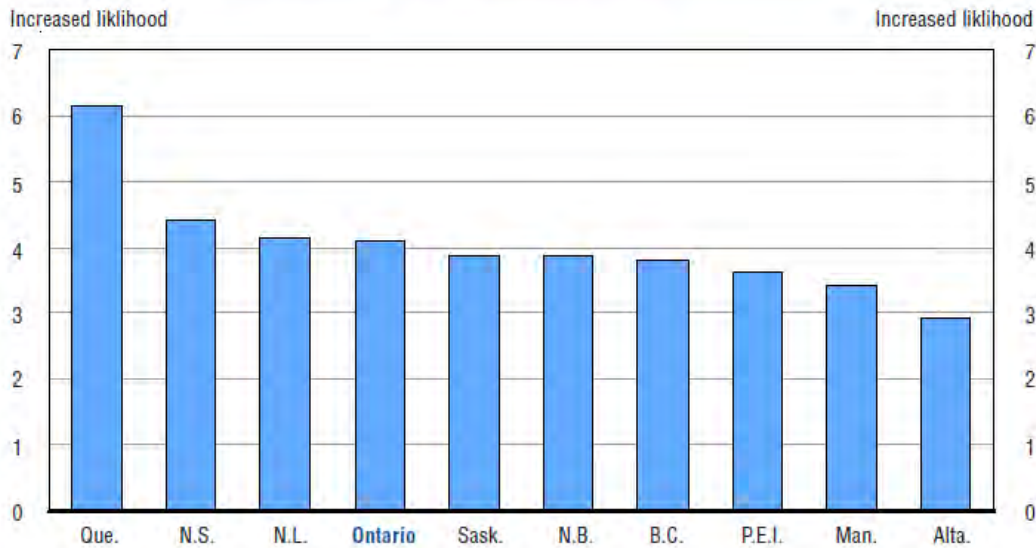
The table shows that 9.3% of the cohort with skills below 529 attended university and 22.1% attended college, proportions that represent 20% and 60% of enrollment at these levels. These data confirm that post-secondary classes include significant numbers of students with low literacy skills even at the university level.

Comparing the literacy selectivity of jurisdictions' post-secondary systems

The following chart plots by province how much more likely youth at age 15 with PISA literacy scores above 529 (IALSS Level 3) are to participate in education at

the post secondary level than their counterparts with scores under 529 (IALSS Levels 1 and 2).

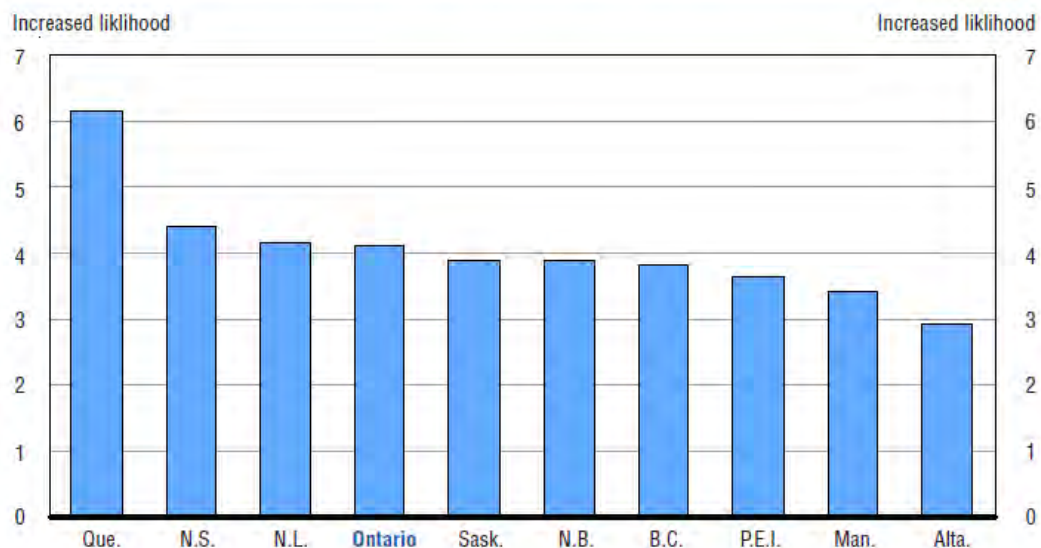
The relative likelihood of post-secondary participation by age 21 for youth with literacy skills above 529 at age 15, by province, 2006



Source: Special analyses of the Youth in Transition Survey, 2000 cohort.

Manitoba does not appear to stand out from the other provinces in this regard. Manitoba youth with IALSS Level 3 or above being 3.5 times more likely than students classified at IALSS Levels 1 and 2. Judged by the magnitude of the increase in the likelihood of admission associated with literacy skill, Quebec's admission standard appears to be significantly more demanding. Level 3 and above youth in Quebec are over 6 times more likely than their lower-skilled peers of having been admitted to post-secondary education by age 21. The following figure compares the relative likelihood of universities admitting students with literacy scores above 529 compared to their college peers by province.

The relative likelihood of post-secondary participation at the university level by age 21 for youth with literacy skills above 529 at age 15, by province, 2006



Source: Special analyses of the Youth in Transition Survey, 2000 cohort.

The figure reveals that Manitoba's universities are 3.4 times more likely to admit students with IALSS Level 3 or above literacy skills than Ontario colleges. Thus, by this standard, Manitoba is the least demanding in terms of literacy-based admission standards compared to their college peers in other provinces. The foregoing four figures provide several important findings. They confirm that:

the probability of receipt of a secondary diploma is highly dependent on literacy skill level, with more skilled youth displaying much higher rates of receipt.

the probability of admission to study at the post-secondary secondary level is even more highly dependent on literacy skill level, with more skilled youth displaying much higher rates of participation.

the probability of youth with literacy skills at IALSS level 3 or above is considerably higher than those with literacy skills at IALSS levels 1 and 2.

admission to the university system is significantly more selective than the college system with respect to literacy skills.

Collectively these figures confirm that the Manitoba secondary and postsecondary systems are relatively efficient in the sense that the receipt of a diploma and access to study at the post secondary level are based to a large extent on students' literacy skill levels.

There is, however, one result that suggests that youth with literacy skill below IALSS Level 3 are nevertheless being admitted by Manitoba's post-secondary institutions. Additional data from the YITS study that suggests that a significant proportion (16%) of those leaving high school without receiving a diploma have participated in some form of post-secondary education by the age of 21

This latter observation opens the possibility that institutions are admitting students irrespective of their skill.

4. A Potential Alternative

Canada is one of the few countries in the world that has a classification system that identifies the levels of key cognitive skills required for each occupation in the national occupational classification. Known as Essential Skills profiles the list of skills includes the system identifies nine skills including oral fluency, prose literacy, document literacy and numeracy. The majority of jobs in Canada require a minimum Level 3 prose literacy, document literacy and numeracy skills and the proportion of jobs that demand Levels 1 and 2 is dropping rapidly.

A large body of research, including work done by Doug Willms at the University of New Brunswick and by the author, identifies that student success is highly conditioned on these same skills with students requiring Level 3 to take full advantage of instruction at the post-secondary level. Students with these skill levels get higher marks, persist to graduation at higher rates, graduate in shorter periods of time, take less time to find a job after graduation and get higher starting salaries.

A second body of research, undertaken by the author, reveals that these same cognitive skills exert a profound influence on a broad range of individual and collective outcomes. Individuals at Levels 3 and above work more, are less likely to experience unemployment, experience fewer and shorter periods of unemployment, earn higher wages, are healthier and are far more likely to participate in all forms of adult learning and are more socially engaged. In sharp contrast individuals at Levels 1 and 2 bear a disproportionate share of the "bad" things that can happen to people – ill health, poverty, unemployment and social exclusion. The research also identifies collective impacts. Differences in average literacy skill levels explain 55% of long term differences in the rates of GDP and productivity growth over the long term and the larger the proportion of adults at Levels 1 and 2 the lower the overall long term growth rates.

So Level 3 skill is profoundly important to our individual and collective economic, educational and social success.

Fortunately the Government of Canada has funded the development and validation of a web-based assessment system that provides a means to establish skill levels for oral fluency, prose literacy, document literacy and numeracy, as

well as reading components. Developed by Bow Valley College in Calgary and known as PRIME, the assessment delivers results that are valid, reliable and interpretable in real time. The use of adaptive algorithms greatly reduces the amount of testing time required and the use of the web eliminates the price barrier to use. The system also provides users with a choice of any mix of domains and four levels of precision to serve different assessment purposes. The assessments are delivered through a network of authorized testing centres so cheating is not an issue. Importantly for the current analysis this assessment system reports proficiency results on the same scales and levels as the Essential Skills profiles.

We believe that the Prime system could replace the GED for three of the four purposes listed above. More specifically, the PRIME system could:

Provide general learners with a unambiguous estimate of their skill level on scales that have established social, economic and educational meaning. One could use Level 3 as a threshold or could use the empirical data to establish a skill threshold that is associated with high school graduation.

Provide learners seeking employment in a particular occupation with a certified assessment of the skill level and its fit to the ES profiles.

Provide learners seeking access to the post-secondary education system with a certified assessment of the skill level and its fit to the ES profiles for the fields of study that feed those occupations.

The only purpose for which the PRIME system is not well suited is for those post-secondary programs that impose specific prerequisites. Appendix A includes an example from the Alberta Apprenticeship and Industry Training Program where entrance requires a minimum of Math 10-3 and English 10-2 or the GED or an successful completion of an entrance exam. Serving this purpose would require one to establish an empirical relationship between the ES levels and the provincial English and Math levels, something that would require the PRIME tests to be administered to samples of 500 – 1200 students to establish equivalence. Once equivalence was established (eg Physics 30 equals Level 5 on the ES scales) the PRIME system could serve as a low cost low burden replacement for the GED and the provincial entrance requirements. This latter advantage is an important one. The fact that a significant proportion of adults lose skill over time suggests a need for a current and reliable indicator of actual skill. Having taken Physics 30 20 years ago may be a very poor indicator of true skill. Work by Bynner with data from the UK birth cohorts study shows a half life of 3 years for math skills for unemployed and underemployed youth. Similarly the high proportion of immigrants with foreign credentials in some provinces also suggests a need for a current and reliable indicator of actual skill.

5. Summary, Conclusion and Next Steps

Our analysis suggests that adopting the PRIME system might represent an attractive alternative to the GED. Among other things it is:

Linked directly to the demands of Canadian occupations and indirectly to the fields of study that feed those levels

Linked to a large body of research that establishes the link to social, economic and educational success in Canada

More reliable, less burdensome, cheaper and more flexible than the GED

The PRIME system is capable, in its current form of serving the needs of general learners, of general learners seeking access to the post secondary system and of adults seeking employment in specific occupations.

The PRIME system, in its current form, is not capable of replacing the course prerequisites set by provinces as entry requirements to specific post-secondary programs. Serving this need would require an empirical linking study to establish the equivalence of levels in the two systems.

