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Comparison of College Performance of General Educational Development (GED) and High School Diploma Students in Nova Scotia and PEI

Dr. Audrey J. Penner

January, 2011

Learning Policy Directorate

Strategic Policy and Research

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Abstract

The purpose of this study was to identify differences in performance if any, between learners with a high school diploma, and those with a GED credential, at two postsecondary institutions, Holland College on Prince Edward Island (PEI) and Nova Scotia Community College in Nova Scotia (NS). Of interest is how these adults perform in a postsecondary environment as little is known about GED learner performance in Canadian community colleges, and in particular how these learners compare to the traditional high school to postsecondary learning trajectory. Adults who obtain a GED credential need opportunities to bridge to postsecondary education and/or work, thus enhancing long term employment options. Eighteen percent of the working population do not have a high school diploma in both provinces demonstrating a human capital deficit in the labour force, thus a demonstration of higher need in these two provinces. The hypothesis that there was a statistically significant difference in performance between high school learners and those who obtained a GED was analyzed through three research questions: 1) How does the GED credential compare to a high school diploma as a predictor of grade performance in college? 2) How is performance influenced by age, gender, or program type for GED credentialed learners compared to high school diploma learners? 3) Is there a difference between outcomes in PEI and NS? Results were dependent upon variables such as gender, age, and admission processes of the individual institution. There was no difference in overall performance comparisons however, the hypothesis was supported in specific circumstances, for example younger males with a GED and within certain program clusters. Females and older learners performed well regardless of program of study or diploma credential. Certain programs of study influenced performance however different ratios of age cohorts and male/female participation existed within program clusters. Learners at greatest risk for poor performance were males under age 25 with a GED. Policy implications for postsecondary educational institutions include GED as a valid credential for access to postsecondary, support requirements in specific cases for GED learners, and additional supports for identified at-risk learners. Policies should support opportunities for adults with a GED as a bridge to postsecondary education, thus increasing both human capital gain through postsecondary education leading to improved labour market outcomes.

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Introduction

Not all learners in today's society fit the traditional learning trajectory of high school graduation to college/university programs (Brimelow, 2001). Many learners do not complete high school instead opting to go directly to work, and are attached to the labour force without a high school credential. Career options for these learners can be limited given increased demand for highly skilled labour with a postsecondary education credential (George & Schaefer, 2002; Kurlaender, 2005). For adults without a high school diploma, one option is to obtain a credential through the General Education Development (GED) test, accepted at many colleges and universities as a high school equivalent (Baycich, 2003; Brimelow, 2001; Fratt, 2004). GED standardized tests are administered in state and provincial jurisdictions across North America.

Policy Issues

Policy issues regarding the GED relate to labour force development and human capital gain. According to the 2006 Census, more than two million Canadians between the ages of 26–64, do not have a high school diploma, representing approximately 15% of Canada's workforce. The economic climate of the 21st century requires a supply of highly skilled workers, particularly with higher education. Identification of the distribution of human capital supply to match labour force demand is critical. Projections for the jobs of the future show a high school diploma as a minimal requirement for long term employment stability and labour force attachment, with postsecondary education required where job creation and growth is expected (Office of Secretary of State for Business Innovation and Skills, 2009; President's Council of Economic Advisors, July, 2009). Obtaining the GED, as an entry credential to access postsecondary education, is a realistic alternative for learners who want to improve postsecondary opportunities and employment prospects. Thus, supporting GED education promotes accessibility to postsecondary education and skills training. Supporting second chance pathways to high school diploma certification is a policy concern for governments to assure access and opportunity for anyone who did not follow a traditional high school to postsecondary learning trajectory. Access to a second chance credential is a necessary step for postsecondary education to improve future labour market outcomes. Understanding how GED graduates perform also has policy implications if performance in college programs is different relative to high school graduates.

Perceptions exist that the GED is not a true equivalent to a high school diploma (Golden, 2003; Tokpah & Padak, 2003; U.S. Department of Education, 2005). The roots of such a perception can arise due to differences in academic acceptance

in post secondary education (Bozick & DeLuca, 2005; Song & Hsu, 2008; Zhang, Han, & Patterson, 2009), or how GED students perform compared to high school graduates in post secondary education (PSE).

Study Rationale

In order to determine human capital gains for training development dollars it is necessary to measure learning outcomes. Disadvantaged learners with low skills, who are unemployed or under employed are supported in GED attainment through Human Resource and Skills Development Canada's (HRSDC) Skills Development Program. In addition, policies to support GED programs and adult learning exist in both provinces. In both Prince Edward Island (PEI) and Nova Scotia (NS), adult education programs which include preparation for the GED are sponsored through federal and provincial cost sharing agreements. For example, at Holland College, 60% to 80% of adult learners in GED preparation classes, from 2005 to 2008 were typically funded through HRSDC Skills Development Program (Institutional Research, 2006; Institutional Research, 2007; Institutional Research, 2008).

These two provinces have similar rates of the working population (18%) without a high school diploma, which is higher than the 15% national average (Statistics Canada, 2009-12-11). Therefore, support for GED attainment leading to postsecondary education is a labour force development issue. Furthermore, if the GED is considered an academic equivalent to a high school diploma for entry to post secondary institutions and the academic performance is poorer, issues of work and higher education competency are raised. Empirical evidence about GED performance in postsecondary education is needed to assess ladders of opportunity for disadvantaged adults requiring second chance opportunities.

The performance of GED learners is important given the mandate of community colleges to support low skilled, disadvantaged learners and labour force development.

The purpose of this study was to identify differences in performance, if any, between those with a high school diploma following the traditional learner trajectory to second chance learners with a GED credential in programs at two postsecondary institutions, Holland College on PEI and Nova Scotia Community College (NSCC) in NS. Both institutions are provincial community colleges in their respective provinces.

Based upon these policy concerns, the following hypothesis was posed: "there is a statistically significant difference in performance between learners with a GED credential compared to high school learners with a traditional high school diploma". The research questions to examine this hypothesis were:

1) How does the GED credential compare to a high school diploma as a predictor of grade performance in college?
2) How is performance influenced by age, gender, or program type for GED credentialed learners compared to high school diploma learners?
3) Is there a difference between outcomes in PEI and NS?

Methodology

This study is an important breakthrough as it is a comparative analysis between institutions and provinces using administrative data. To answer the research questions, administrative data was required that contained performance records, age, program of study, and entry credential, on all students within the scope of the study. This census approach assured sufficient observations for tests of statistical significance, while multiple years of data supported trend information. The performance measure used for comparison was the learners' postsecondary marks achieved with either a GED credential or high school diploma, for the academic years 2005–2008. With one small and one large institution and different admissions policies, comparisons were within but not between institutions. More than 25,000 observations from NSCC, and 1,300 observations from Holland College were obtained which allowed comparisons within each institution.

The use of administrative data was beneficial due to the nature of registration information gathered about program applicants. The administrative data included randomly assigned identifiers, age, gender, individual marks by course, type of entry credential, program, and year of study. The ethics review processes were not required from either institution as this study was considered additional analysis for institutional research departments. Both institutions protected learners' identity using anonymous identifiers. To further protect learner identity, programs of study at NSCC were grouped into six clusters: Business, Health, Trades, Technology, Agriculture/Aquaculture, and Other (for programs that did not fit any of the other broad categories). To preserve learner anonymity at Holland College comparisons were kept at an institutional level.

The unit of analysis for comparison was performance as measured by the average of all marks an individual achieved at that institution. Descriptive variables included age, gender, and academic year from both institutions and comparison groups. Pearson tests for correlation were used to determine correlation between performance and ranking in the Holland College data. T tests determined between group differences, if any, based upon marks and gender, entry status, or age.

Limitations of the Study

The study was limited by the number of independent variables available for analysis. Socio-demographic information such as economic and employment status were not available. Differences in admission policies limited comparison to descriptive statistics presented separately for the two institutions in the two provinces. The difference in admissions processes related to the criteria for acceptance. At Holland College, the admission process is competitive. Applicant qualifications are a component of ranking. This ranking has a numerical value which includes but is not limited to education credentials, grades, work experience, and volunteer activities. Only top ranked applicants are accepted by Holland College. This merit based acceptance

is longstanding at Holland College. On the other hand, since its inception, NSCC has used a first come first served (open) admissions policy. Qualified applicants are admitted by application date. This difference in admissions policy had different implications for GED learners in the two institutions thereby limiting analysis of performance to each institution and allowing only broad comparisons between them. Holland College data was drawn from a smaller student population therefore analysis was limited by the number of observations, which eliminated analysis by program.

A further limitation to the study, were the marks themselves which were based upon specific institutional criteria. Not all students took the same number and type of courses, as these are dictated by the program of study. How learners are graded is institutionally and program dependent influenced by student success interventions and strategies, which may limit generalizability of these results. Though not all students were successful, data on their performances is included, as well. However, both community colleges are provincial institutions with a broad sampling of GED and high school learners over 4 years thus providing solid evidence of GED performance in community college environments.

General Education Development (GED)

The GED tests were established immediately after World War II, in response to labour force demand for a more educated workforce. In the original GED tests, 40% of examinees took the test for employment reasons. Since 1942, there have been four iterations, with the latest test designed in 2002. The learner rationale for taking the test has evolved over time to include access to employment, employment mobility and access to post secondary education (American Council on Education, 2009).

In 2008, among the 700,000 plus people worldwide who took the GED test, 12,700 people were in Canada, comprising 1.6% of total test takers (American Council on Education, 2010). In Canada, test centers are designated through provincial departments of education and/or advanced learning. Requirements, procedures, and supporting documentation are available on provincial websites (Nova Scotia & Labour and Workforce Development, 2009, American Council on Education, 2010)

The GED tests are delivered in five subjects: Writing; Reading; Social Studies; Science; and Mathematics. Testing scores range from 200 to 800. A minimum score of 450 in each subject area is required to pass, with an overall minimum score of 2,250 for GED certification. The minimum age for taking the GED Test is 16 (with no exceptions) as set by the American Council on Education. Jurisdictions can set their own age limit, and the majority of Canadian provinces use age 18, including PEI (Prince Edward Island & Department of Innovation and Advanced Learning, 2009) and NS (Nova Scotia & Labour and Workforce Development, 2009). Many educational institutions offer preparatory classes for GED but examinees are not required to take classes to prepare for GED tests. It is the learner's choice to determine the amount and type of preparation required, as well as when and where to write the test. In order

to ensure the validity and academic rigour of the GED, the tests are administered only by a GED registered agency which provides specific test administrative services and locations (American Council on Education, 2010). On PEI, GED tests are administered through the Department of Innovation and Advanced Learning (Prince Edward Island & Department of Innovation and Advanced Learning, 2009) and in Nova Scotia, GED tests can be taken through the Adult Education Division of the Nova Scotia Department of Education (Nova Scotia & Labour and Workforce Development, 2009).

Literature Review

According to 2006 Canadian Census Data, 25%–30% of adults over the age of 15, and 18% of adults aged 26–65 in PEI and NS did not have a high school diploma (Statistics Canada, 2009-12-11). Without a high school diploma, options in post secondary education are limited or eliminated. These people obtain low paying jobs that require only low skills with little chance for employment advancement (Brimelow, 2001; Kurlaender, 2005).

The American Council on Education tracks data on GED testing in North America. According to the GED Statistical Report (2008), 1.1%–1.5% of adults without a high school diploma, wrote the GED tests on PEI, while 0.6%–1.0% of eligible adults wrote the GED tests in NS. On average over 1,100 people per year in PEI and NS obtained a high school equivalent diploma through GED testing. In 2007, 348 people on PEI and 996 in NS (American Council on Education, 2007) completed the GED. In 2008, 323 people on PEI completed their GED while 856 did so in NS (American Council on Education, 2008).

Many studies in the United States (U.S.) have focused on GED credential recipients. Kurlaender and Michal (2005), using data from the National Education Longitudinal Study estimated a PSE participation rate of 60% based on post secondary choices and learner pathways of those who had dropped out and/or obtained GED credentials. Baycich (2003) found that motivational factors such as family support and career aspirations influenced GED learner's decisions to attend and to stay in post secondary education in a study of 1,135 GED learners at Kent State University.

Economic returns are important considerations related to education and for GED credential recipients returns have been explored in the 2003 US National Assessment of Adult Literacy. In 2008, a report published by the American Council on Education (Song & Hsu, 2008) showed GED graduates enjoy greater economic and noneconomic outcomes than workers without a high school diploma. Economic outcomes in terms of weekly wages were on average $80 higher for GED recipients than for those without a high school diploma but $50 per week lower than those with a high school diploma. Non economic outcomes in Song & Hsu's study (2008) included higher rates of volunteer activities, library use and civic participation among GED recipients compared to high school drop outs.

Little has been written about the performance of GED learners in a postsecondary environment. Tokpah & Padak (2003) analyzed the academic performance of 3,822 freshmen at Kent State University of which 135 were GED recipients.

Remediation in math was more likely to be required by GED recipients, but high school learners were more likely to require remediation in basic reading indicating academic performance issues within both populations.

Results

Administrative data acquired from each institution was used to develop profiles of students categorized by age, gender, and diploma type at both institutions. To protect the anonymity of learners in the NSCC data set, programs were clustered into Business, Health, Technology, Trades, Agriculture/ Aquaculture and Other (See Appendix A for programs by cluster). This clustering allowed comparisons at a program level.

? How does the GED credential compare to a high school diploma as a predictor of grade performance in college?

The percentage of GED recipients to the total learner population at both institutions for the years 2005 to 2008 is shown in Table 1. In both institutions, GED learners represent less than 7% of the population while the majority of learners have a high school diploma. Note an increase in GED learners at both institutions from 2005 to 2008, by one percentage point at NSCC over the 4 years, and three percentage points at Holland College over the 4 years.

There were 5% more male high school graduates than male GED holders at NSCC but 5% more female GED learners than female high school graduates. At Holland College, gender distribution was evenly divided between both diploma categories (See Table 2). NSCC included data from other admissions categories which were combined to form an "Other" category.

Age distribution of Holland College students showed few GED learners in the youngest age cohort. At Holland College learners with a high school diploma and several years of work/life experience are classified as mature students. Since other criteria are also included for a student to be classified as "mature", this category was not used in the analysis. Learners are classified as entering directly from "High school" only if application to Holland College occurs within a set number of years following high school graduation (See Figure 1).

TABLE 1

Learner Distribution by Diploma Credential for Academic Years 2005–2008

	NSCC			Holland College	
	GED (%)	High School (%)	Other (%)	GED (%)	High School (%)
2005	5	88	7	2	98
2006	6	88	6	5	95
2007	6	89	5	4	96
2008	6	89	4	5	95

A t test confirmed the statistical significance between the age[1] and diploma type for Holland College learners. GED learners were older.

Despite a different classification system at NSCC, the age comparison showed a similar pattern. There were more GED learners in the older age groups, and fewer learners with high school diplomas as an entry credential in the older age groups (See Figure 2). A t test confirmed statistical significance age differences between the two categories; GED learners were older[2] at NSCC as well.

TABLE 2

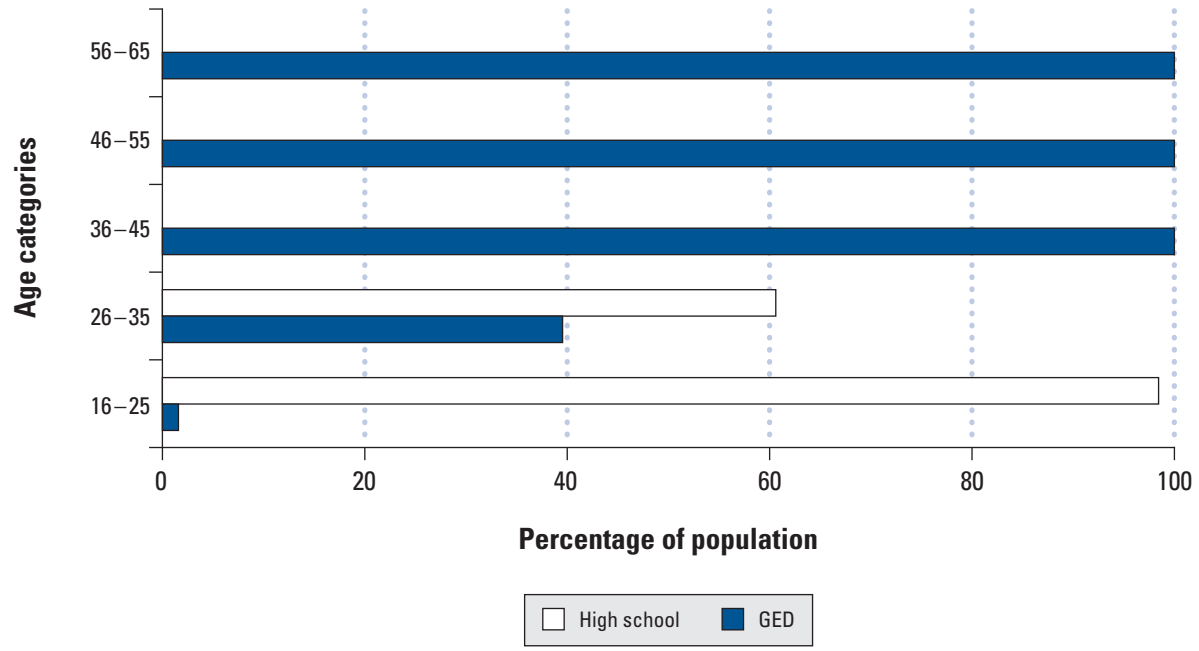
Gender Distribution by Credential (4 Year Average)

	NSCC			Holland College		
	Gender			Gender		
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
GED	44	56	100	60	40	100
High School	49	51	100	57	43	100
Other	36	64	100	–	–	–

Source: Administrative data NSCC and Holland College

FIGURE 1

Holland College Diploma Distribution by Age Cohorts 2005–2008

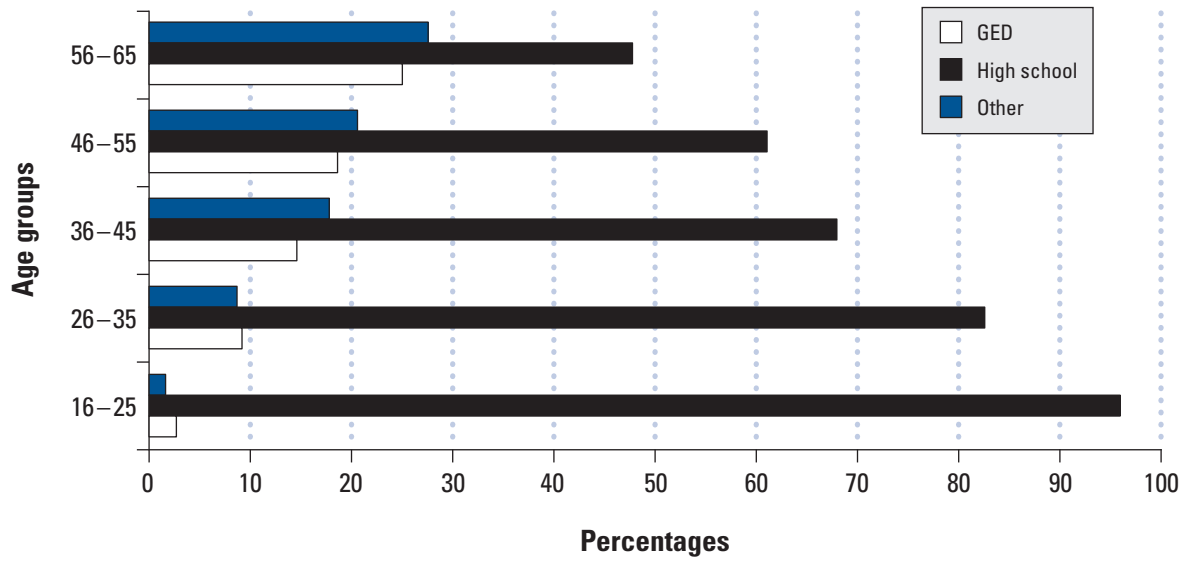


[1] t = 28.33 (1308), $p<0.000$

[2] t= 5.59 (27928), $p<0.000$

FIGURE 2

NSCC Diploma Categories by Age Cohort 2005–2008



However, there were more students with high school diplomas than GED holders in every age group at NSCC.

When NSCC learners were sorted by diploma category and program cluster, GED learners represented approximately 6% of learners in all clusters (See Table 3). The Agriculture/Aquaculture cluster had a higher percentage of GED learners than other clusters (8%) however fewer observations were in this cluster.

Each learner's performance was determined by an average mark for all courses taken. In some cases, a learner was in more than one program; therefore, more courses were averaged. All learners were included in the analysis even if performance averages were below 50%. Performance means for learners with GED and high school diploma are shown for both institutions in Table 4.

Similar means between institutions were noted, with less than 1.2% percentage point difference between institutions for GED learners. High school category averages were within 0.4% percentage points between institutions. Differences in means within each institution showed GED means higher overall at NSCC, while High School means were higher at Holland College. A t test showed no statistical significance at either institution between performance means for GED compared to high school learners.

Holland College

To further explore the performance distribution, a comparison between GED and High school categories was plotted on a kernel density graph (See Figure 3). This graph shows individual percentage averages over the four years, with a line encompassing the shape of the distribution curve.

TABLE 3

Diploma Category by Program Cluster NSCC

	GED (%)	High School (%)	Other (%)
Business	5	90	5
Health	6	88	6
Technology	7	88	6
Trades	6	90	5
Agriculture/Aquaculture	8	85	7
Other	5	86	9

Source: NSCC Administrative data

TABLE 4

Performance Means by Institution and Diploma Category

	NSCC		Holland College	
	Mean	St. Dev	Mean	St. Dev
GED	77.9 (n = 1720)	15.7	76.78 (n = 46)	8.38
High School	77.2 (n = 26317)	15.1	76.8 (n = 995)	11.7

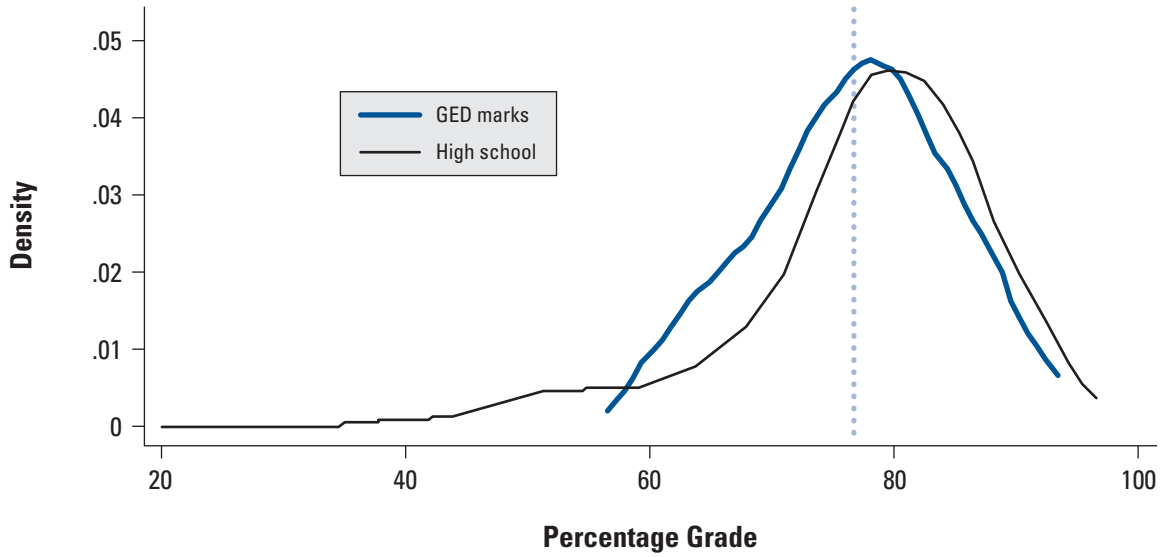
Source: Administrative data NSCC and Holland College

Note the distribution curves for high school and GED marks are almost identical. The long tail for high school averages represents lower scores. A reference line was drawn at 76% to represent approximate averages of both groups, however, the mode is closer to 80%–82%. The right hand side of the reference line are those performance marks above average, and the high school learner distribution moves further to the right than the distribution for the GED indicating slightly better performance after the 82% performance mark. The peak of the GED curve is slightly higher than the high school curve in the 77%–80% range, indicating peak density of averages at that range, while peak density of averages for High School was closer to 80%.

The long tail begins at 60% and represents students with poorer performances. Over the 4 years only 7.3% fell into this poorer performance category of which almost all were high school credentialed learners. A closer examination of the poorer performance scores showed the mode at 45.5%. Note the GED distribution did not extend into this lower performance range.

FIGURE 3

Holland College Performance Distribution 2005–2008



kernel = epanechnikov, bandwidth = 3.37

Nova Scotia Community College

A distribution curve for all individual marks over the four years was plotted for NSCC. Similarities in performance between the GED and high school credential learners are shown. The reference line in Figure 4 at 77% represents the approximate mean for both diploma categories at NSCC. On the left hand side of the reference line, High School marks are lower than GED category, while the distribution on the right hand side shows the GED curve further right than the high school distribution, in the mid 80% to 90% range but re-align at the end of the curve. A t test of overall means of GED learners compared to High School learners in the total population showed no statistically significant difference. The mid 80% to 90% range showed higher performance of GED than High School learners (See Figure 4).

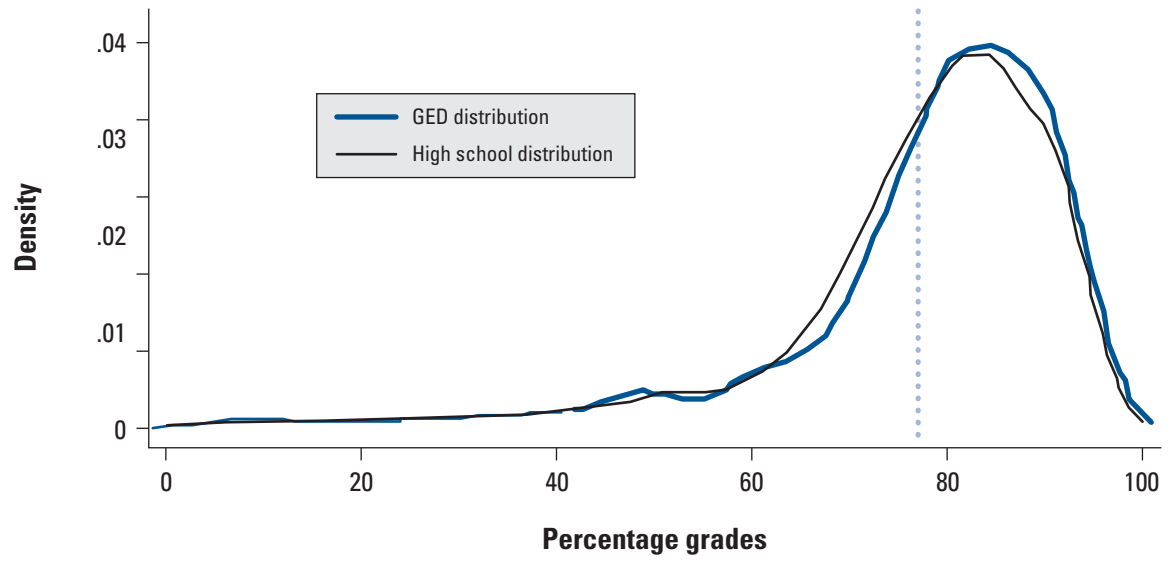
The long tail exists for both GED and High School categories, and represents 6% of the study population performing below 50% for both categories. The mode for this lower performing group was 43% for the GED group and 45% for High School learners. Fifty-eight percent of the low performing group were males, while 68% were in the 16–25 age cohort.

? How is performance influenced by age, gender, or program type for GED credentialed learners compared to high school diploma learners? Is there a difference between outcomes in PEI and NS?

Both data sets held wide age ranges from 18 to over 65 and were collapsed into smaller categories of 16–25, 26–35, 36–45, 46–55 and 55+. At both institutions, the GED cohort had higher

FIGURE 4

NSCC Performance Distribution 2005–2008



kernel = epanechnikov, bandwidth = 2.12

representation in older age cohorts and difference in age means between GED and High School learners were statistically significant.

Holland College

Performance compared between GED and high school categories by age (See Figure 5) at Holland College showed no statistical significant difference or consistent pattern. A random distribution of means was seen within each age cohort. In 2006, 2007, and 2008 years, the means increased with older cohorts, while in 2005 the means were higher in the youngest cohort for the GED category. In 2005, 2006, and 2008, the means of the high school category were higher in the 26–35 cohorts, while in 2007, the youngest cohort had a higher mean than the 26–35 cohorts. In 2008, the highest average was achieved by the oldest cohort; however, this was based upon a small sample.

At Holland College, gender variation in means was examined between 1) male/female 2) females GED/High School; and 3) males GED/High School. In 2005, a 10% difference was shown between females (See Figure 6), but other years showed little variation. GED males outperformed High School males in 2006 and 2007. High school males tended to outperform high school females, while GED males outperformed GED females in 2006 and 2007. This variation in pattern showed no statistical significant results when subjected to a t test.

Holland College used a ranking system in the admissions process with the learner rank included in the analysis. A Pearson correlation was used to determine if a correlation existed

FIGURE 5

Holland College Means by Age Cohort and Year of Study both Diploma Categories

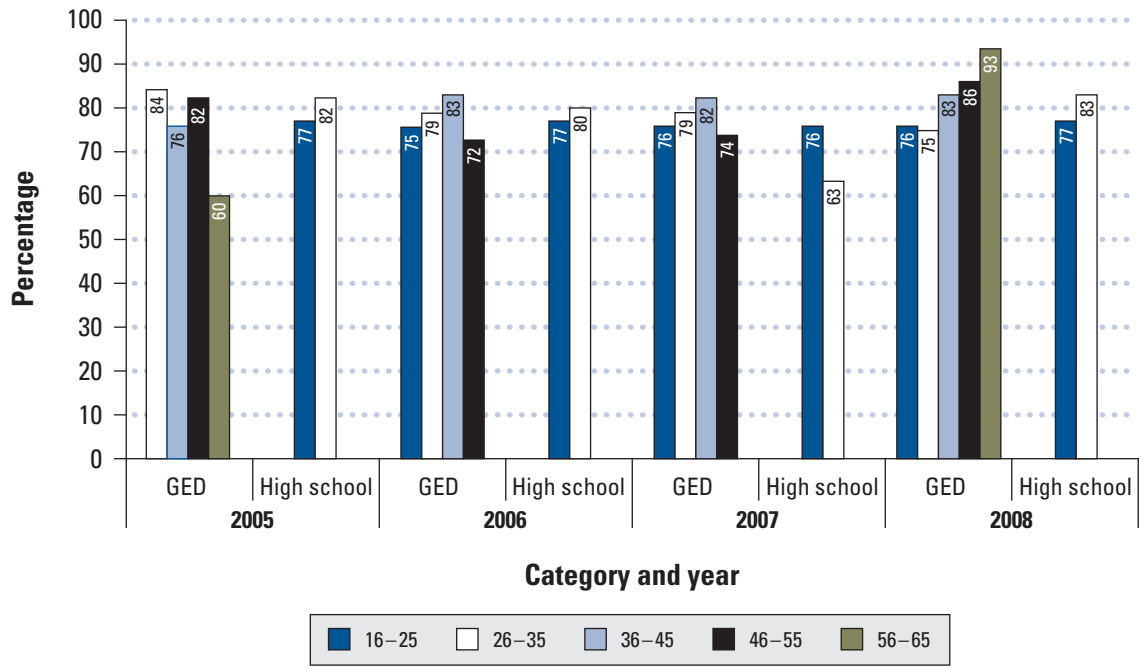
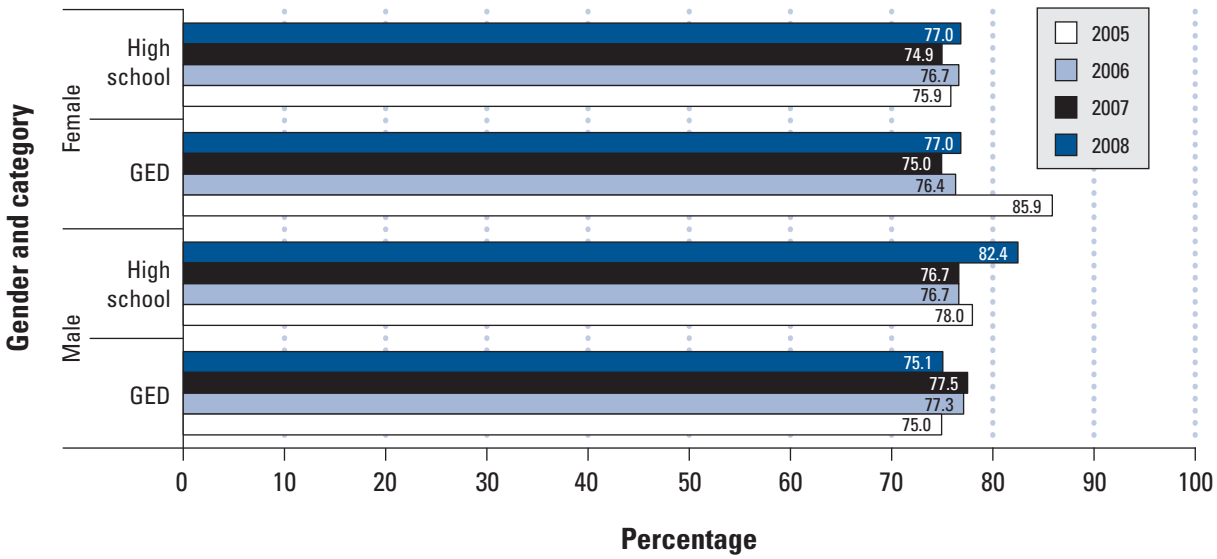


FIGURE 6

Holland College Performance Averages by Gender, Diploma Category and Year



between performance and ranking; or performance and age; or performance and diploma. No statistically significant correlation was found in any of these categories.

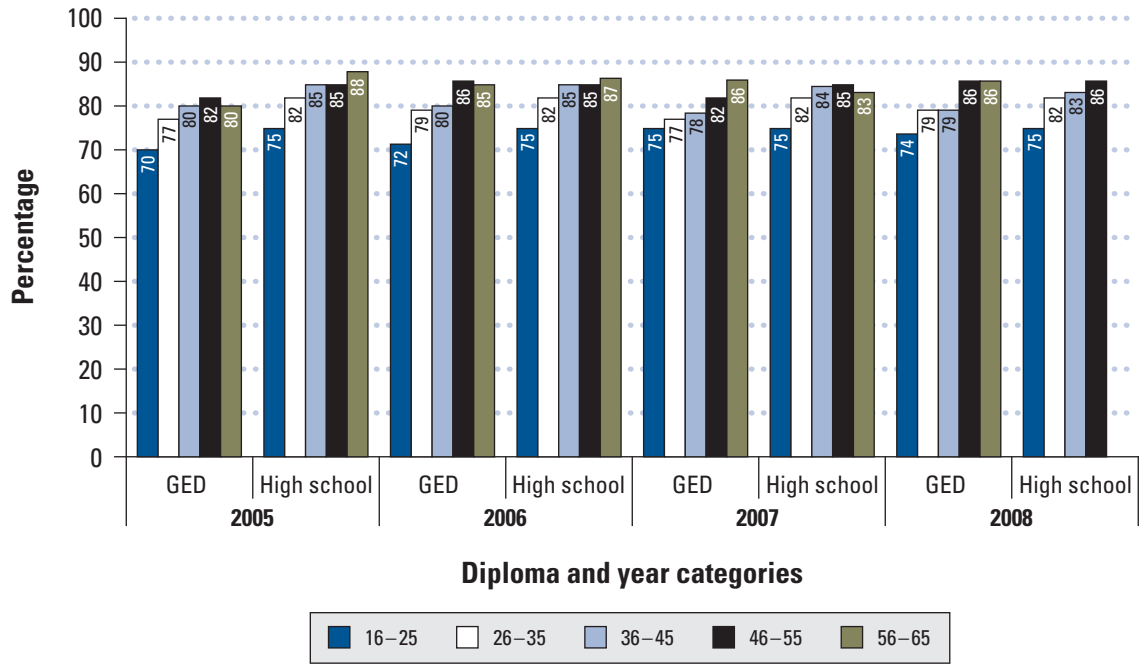
Nova Scotia Community College

For learners at NSCC, there was a consistent pattern of increasing averages with each older cohort, with a drop for the oldest cohort occurring in 2005, 2007, and 2008. Within both categories and in every year, the youngest cohort, aged 16–25, had lower averages than all other age cohorts (See Figure 7). A t test of performance between the youngest cohort[3] and all older learners showed statistical significance with older learners outperforming younger learners regardless of diploma type.

To further explore the influence of age compared with credential type, each age cohort was analyzed on the basis of credential. When compared by age category, the averages of high school learners was consistently higher than averages of GED learners, and this gap grew larger between ages 16–25 and 36–45 cohorts, but was smaller at the 46–55 cohort and equal at the 56–65 cohort (See Figure 8). A t test to determine statistical significance, showed high school learners outperformed GED learners in age cohorts 16–25[4], 26–35[5], 36–45[6], however

FIGURE 7

NSCC Means by Age Cohort and Year of Study both Diploma Categories



[3] t=-40.5374 (29492), $p<0.000$

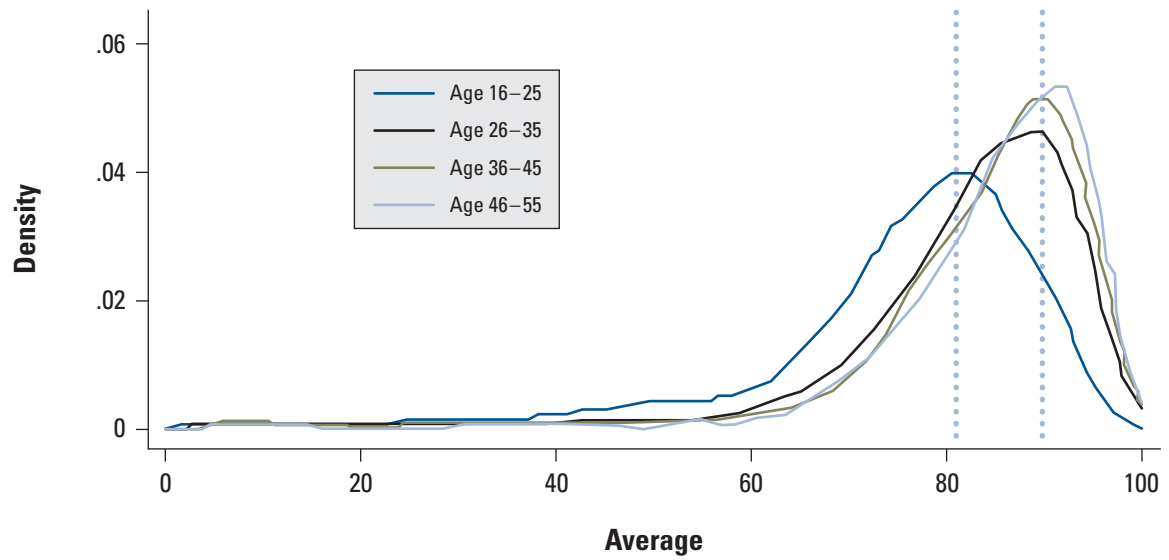
[4] t= -3.08 (19232), $p<0.0021$

[5] t= -6.05 (5116), $p<0.00$

[6] t= -6.51 (2346), $p<0.00$

FIGURE 8

NSCC Distribution of Performance by Four Youngest Age Cohorts, 2005 to 2008



kernel = epanechnikov, bandwidth = 1.3335

this significant difference dissipated in the oldest two cohorts. To demonstrate this, a distribution graph was developed for age cohorts 16–25, 26–35, and 46–55 (See Figure 8).

This distribution includes all individuals over the four year period. The youngest cohort distribution is to the left of the older two cohorts with a peak distribution at approximately 81%, the other cohorts show peaks along the performance axis at approximately the 90% mark, shown with a reference line.

A consistent difference in marks was shown between males and females (See Figure 9). Female performance was four percentage points higher than males in both diploma categories in the 4 years studied. A t test determined this difference was statistically significant with male[7] scores lower than female scores.

With gender and age both influencing performance, the male and female learners were separated by age cohort for further comparison. A t test showed that, females[8] aged 16–25 had lower marks than females aged 26–35. When compared to females aged 36–45, the females[9] under age 25 had lower marks, and this pattern repeated itself when the youngest cohort of females was compared with aged 46–55[10] and 56–65[11] cohorts. The same

[7] t= -22.13 (29602), $p<0.000$

[8] t=-20.0 (12,327), $p<0.00$

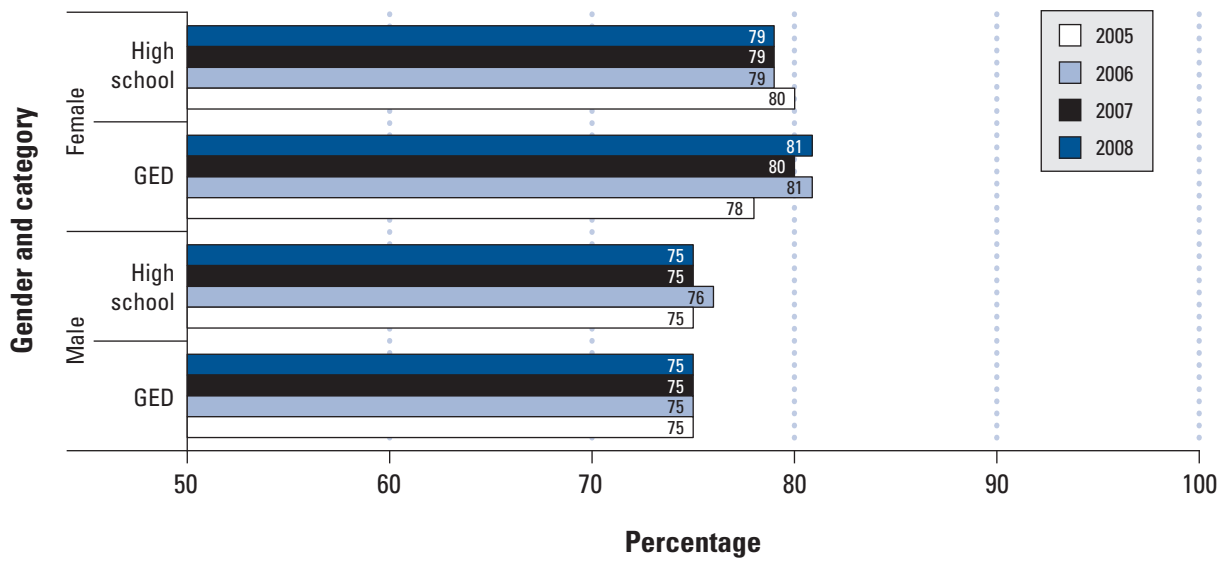
[9] t=-19.5 (11,072), $p<0.00$

[10] t=--17.5 (10,088), $p<0.00$

[11] t=-3.68 (9,238), $p<0.01$

FIGURE 9

NSCC Performance Averages by Gender, Diploma Category and Year



pattern emerged with males when compared by age cohort. Males under age 25 had lower averages than males in the 26–35[12] cohort, 46–55[13] cohort, and 56–65[14] cohort. A comparison of averages by gender and age cohort is shown in Figure 10. With each age cohort, averages increased regardless of gender.

Gender distribution by program cluster is a consideration given that males dominate trades and females dominate health professions (See Table 5).

Patterns of gender preference in NSCC programs reflected national gender distributions in similar sectors. Health programs were predominantly female while Technology and Trades programs were 60–80% male (Statistics Canada, 2007). Trades and Business clusters had the highest representation of the youngest cohort. Health had the smallest representation of the youngest

TABLE 5

NSCC Gender Distribution by Program Cluster

	Male (%)	Female (%)
Business	35	65
Health	11	89
Technology	60	40
Trades	83	17
Agriculture/ Aquaculture	46	54
Other	33	67

[12] t=-18.5 (12,763) $p<0.00$

[13] t=-14.2(11,283), $p<0.00$

[14] t=-12.3(10,788), $p<0.00$

cohort, and the largest representation of the 26–35 cohort (See Figure 11).

Since age influenced performance, an analysis of the youngest cohort by gender and program cluster was used to determine performance differences within this subpopulation. Males and females were separated by diploma type (for example, males with GED under age 25 and

FIGURE 10

Preformance Averages by Gender and Age Cohort

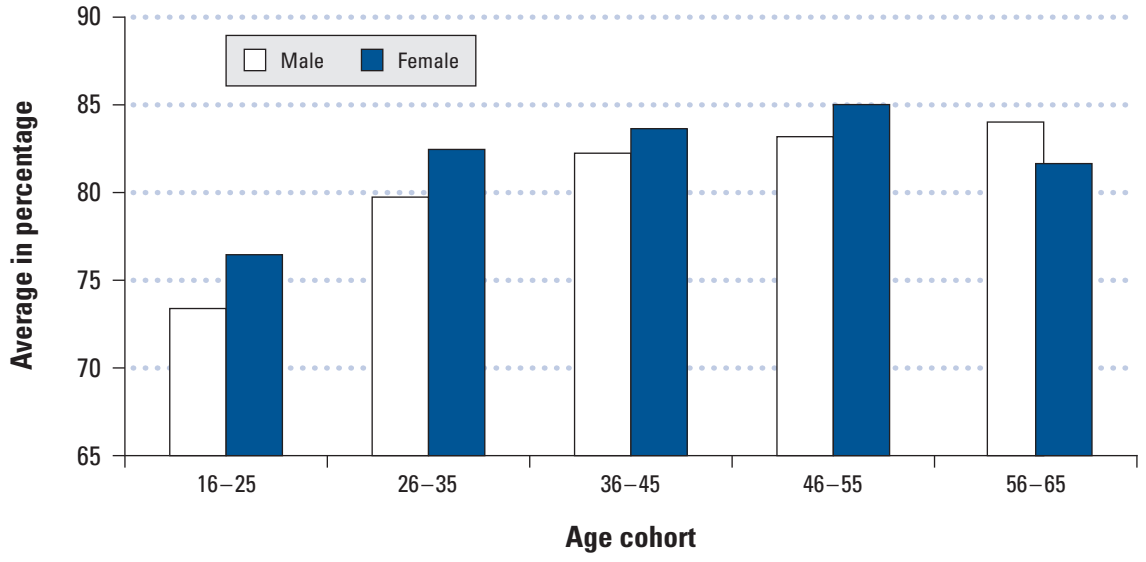
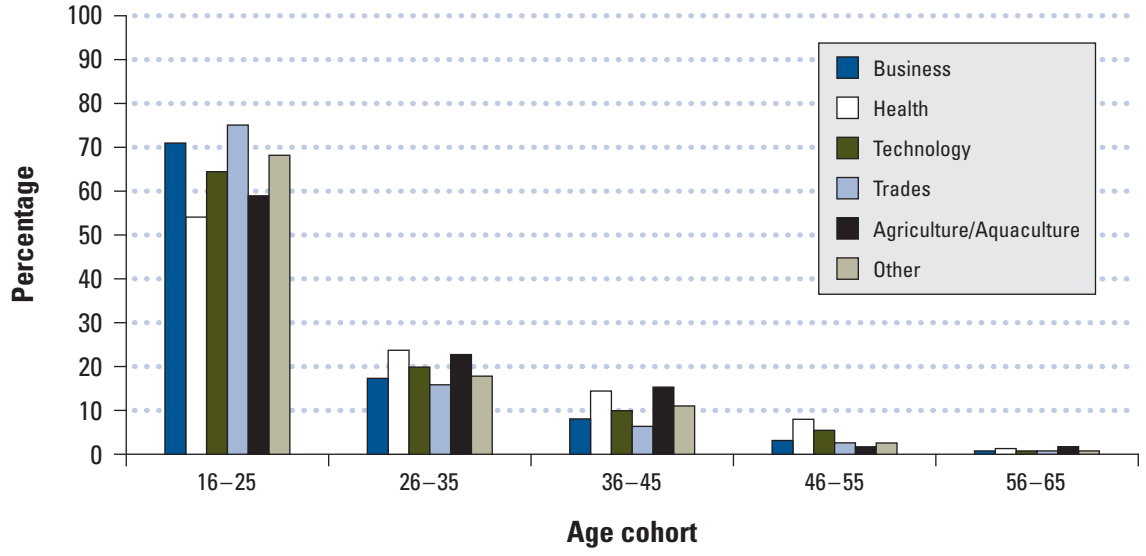


FIGURE 11

NSCC Program Clusters by Age Cohorts 2005–2008

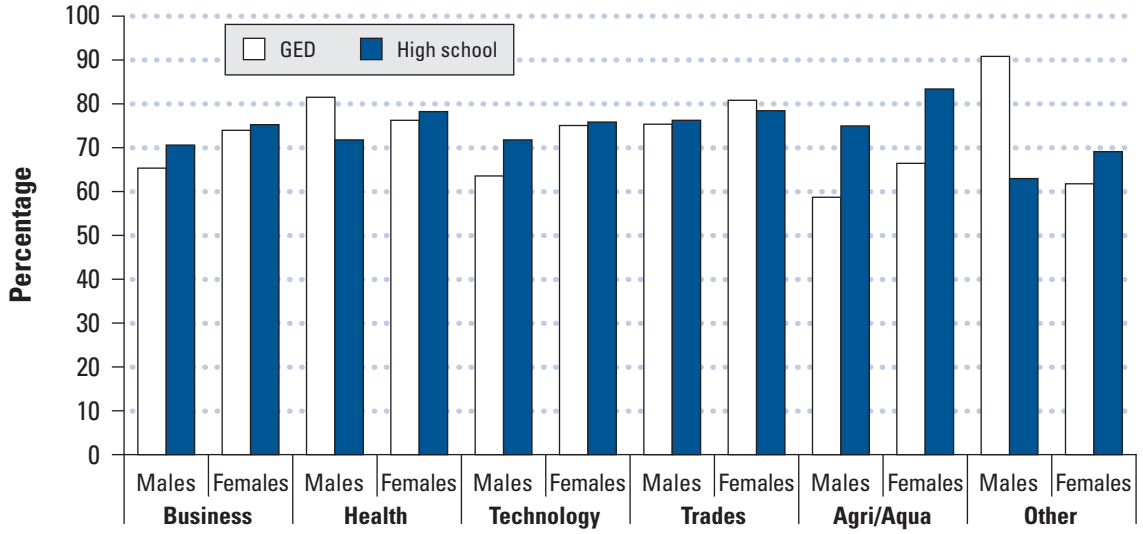


males with a High School diploma under age 25). These variables were subjected to a t test by program cluster. This analysis showed there was no difference in performance between females under age 25 with a GED or High School diploma, or with males in the Trades or "Other" cluster for either diploma type. In Business [15] and Technology [16], differences between male High School and male GED averages were statistically significant at a 95% confidence interval; High School males had higher averages. However, in the Health [17] cluster, the difference in performance was statistically significant at a 90% confidence interval, with GED male averages higher than High School males. Also at a 90% confidence interval, High School males had higher averages than GED males in Agriculture/Aquaculture[18]; however the Agriculture/Aquaculture program cluster of young learners had small numbers.

In this young age cohort, differences between male and female performance[19] occurred regardless of diploma category and were statistically significant at a 95% confidence interval, which reflected the overall gender findings. Females out performed males in each program cluster within this age cohort (See Figure 12).

FIGURE 12

NSCC Age 16–25, Averages by Diploma Category, Gender, and Program



Males and females; GED and high school averages by program type

[15] t+0.03 (1541), $p<0.05$

[16] t+-3.86 (2781), $p<0.00$

[17] t=1.78 (373), $p<0.08$

[18] t==1.82 (32), $p<0.08$

[19] t=-13.15 (18371), $p<0.000$

Discussion

Student enrolment at both institutions reflects a majority taking a traditional learning trajectory of college entry direct from high school.

? How does the GED credential compare to a high school diploma as a predictor of grade performance in college?

As seen in the results, learners with the GED credential performed as well as high school learners at Holland College, probably an effect of the competitive merit based admissions process. Though GED learners were older within the Holland College population, they performed as well.

GED learners were also older at NSCC. At NSCC, the distribution of averages for GED learners was almost identical to that of high school learners with no statistically significant difference between academic performance. These findings did not change over the four years of data examined, so the result is likely to be stable. However, some differences in average scores of subpopulations of age cohorts and gender, were identified. These results indicate that the perceptions of GED as less than equivalent credential compared to high school were not valid. Though the GED student population differed in terms of characteristics and choice of programs, the differences in average performance were negligible. These are positive results supporting the funding of GED education for adults without a high school diploma, in order to improve their future educational and labour market prospects.

? How is performance influenced by age, gender, or program type for GED credentialed learners compared to high school diploma learners? Is there a difference between outcomes in PEI and NS?

Despite the differences in size of institution, admission procedures, and proportion of GED students, there were no difference in the results between the two provinces. Therefore, it is fairly reliable evidence that GED students perform equally well as high school diploma holders.

Analysis showed older learners outperformed younger learners, regardless of gender. Lack of skill acquisition and life experience may negatively influence younger learners' performance, while older learners may benefit from work experience reflected in their performance. The age 16–25 cohort had the lowest performance averages of all age cohorts, while the age 46–55 cohort had the highest. Younger GED male learners did not perform as well as older male GED learners, nor did younger GED male learners perform as well as their male high school counterparts in the same age group. Female learners outperformed male learners, and older female learners outperformed younger female learners.

The average performance of GED students can be further improved by increasing the performance of younger students, both males and females. Tokpah & Padak's (2003) identified remedial needs in young GED learners compared to High School Learners at Kent State. Such remedial training should be based on clear diagnostic information to be cost effective.

The superior average performance of women was a key finding. With females outperforming males in all years and both diploma categories, the gender influence was pervasive. Females in older categories did as well at college while males in all cohort age groups, regardless of the type of entry credential found postsecondary education more challenging. Younger males with the GED were at highest risk for poor performance and pre-emptive action could be taken during GED preparation to ensure that they have solid core knowledge and skills. The reasons why females outperformed males may be related to their background education, problem solving ability, or simply greater motivation once at college but this is speculative and should be studied further before policy or program decision are taken.

At NSCC, within program clusters, high school diploma holders outperformed GED students in Technology and Agriculture/Aquaculture but there were no statistically significant differences in performance in the other four program clusters. Among the men and women in the 16–25 age cohort, males with GED had weaker performance in the Business and Technology clusters. Why these two program clusters would pose more problems for young males with a GED is a question with no easy answer. This is also surprising because female GED learners and female high school learners in this age cohort consistently outperformed males. Both sexes had equivalent entry criteria but it is not known if more women than men took preparation courses. It is also not clear if poor performances were related to lower GED or High School diploma marks. Commonalities between the Business and Technology programming clusters could be examined to determine if additional core skills, for example problem solving, mathematics, or general writing abilities could be embedded in the program or if supplementary programs could be provided for poor performers. Underprepared students in colleges can add costs to both the students and the institutions.

How learners selected their program of study was also not part of this research, but both age and gender distributions were consistent across programs, and similar to Statistics Canada data on gender distribution by employment sector. However, programs that have a high ratio of males with GED credential under the age of 25 could require more attention to curriculum and classroom management. Since more males than females, and more of the younger cohort selected Business and Technology, these two factors could impact performance in future programs. The under performance by the younger cohorts at NSCC may also be due to attitudes and behaviours that are described in the literature on Millennial learners (Baycich, 2003; George & Schaefer, 2002; Golden, 2003) where a sense of entitlement can overshadow learning motivation (Zhang et al., 2009).

One unanticipated finding was the relatively small uptake of GED students in both provinces to a community college. Over 1,100 GED exams are written yearly between the two provinces (American Council on Education, 2007; American Council on Education, 2008), however, the transition to community colleges in the two provinces represents approximately 40% while estimates from the American Council on Education responsible for GED test administration and data tracking,

estimate 60% proceed to college (American Council on Education, 2007). GED graduates could be entering the workforce, or enrolling in university, but it is also possible that they are applying to colleges but not getting accepted. Less than 7% of the learner population at both institutions are using the GED as an entry credential which is a low rate given the mandate of both institutions for labour force development.

When discussing these small numbers with both institutions, it was acknowledged that the competitive process at Holland College could potentially screen out applicants who have only a GED without any additional high school credits, as the ranking process is cumulative, increasing in value with additional education. However, Holland College does reserve 20% of seats in all programs for adult learners to provide opportunity for qualified applicants. At NSCC, learners who apply with a GED are encouraged to take additional adult upgrading programs to build a stronger foundation for postsecondary learning. Both institutions indicated that there could be other GED learners within the institution which could not be isolated within the data; for example if a learner had obtained additional education it would result in a different admission category and the GED status would not be identified. Anecdotally, both admissions offices expressed concern about GED learners' abilities within postsecondary programs, a demonstration of the belief system that the GED is not truly an equivalent academic credential to traditional high school diplomas (George & Schaefer, 2002; Golden, 2003; Kurlaender, 2005). If such perceptions persist that GED learners are not capable of performing as well as high school learners, this could affect the admission rate.

On average, students with both GED and High School diploma perform equally well, there are some variations due to age, gender and program, however, these variations also exist among high school graduates. Broader perceptions of GED performance could be based upon the attitude and behaviours observed by faculty in the classroom, not on empirical evidence. Findings regarding faculty's negative perceptions about adult learners were reported previously at Holland College (Penner & Sutton, 2007) where faculty believed that learners from an upgrading program do not perform as well in postsecondary education. These perceptions were shown to be directly linked to one or two incidences where faculty had a negative experience with an adult learner that influenced that faculty member's perception of all adult learners (Penner & Sutton, 2007).

Policies for adult upgrading through HRSDC Skills Development funding support GED as a "terminal" credential (Service Canada, 2006). This can be renegotiated with the learner once a GED is obtained, however the interpretation of whether or not the GED is a terminal credential is left to the discretion of local administrators who may or may not believe the GED is an equivalent diploma to enter postsecondary education. Since 2006, the Skills Development Program was devolved to both provinces. Whether or not the practice of tying Skills Development funds to a "terminal" GED will continue is unknown. If this practice continues, it could create potential barriers to higher education for GED learners.

Overall, learner success rates at both institutions were a demonstration of positive performance. Both institutions had distributions which showed the majority of learners achieving average grades in the 70%–100% performance range over all the courses taken, with a small but long tail to the left of the distribution. This success of learners is a reflection of intervention strategies employed by both institutions, to ensure that students have the support they need to achieve learning goals.

Summary

Notable proportions of adults in PEI and NS do not have a high school diploma. Second chance options include the GED, which provides adults with the credential required to gain better employment and further education. Community colleges in PEI and NS provide preparatory courses for the GED funded and administered by federal and provincial governments. This research aimed to study if students with a GED performed equally well as high school students in community college programs, confirming the strategy of upgrading adults to at least a high school equivalent education.

The objective of this study was to identify the difference in academic performance if any, between learners with a high school diploma, and those with a GED credential at two postsecondary institutions, Holland College on Prince Edward Island and Nova Scotia Community College in Nova Scotia. Results showed that GED students on average performed equally well as high school students, though there were variations due to gender, and program.

Policy implications from this study indicate that support for GED credential attainment for adult learners in both provinces is worthwhile as second chance education. However, where 18% of the labour force is without a high school credential, the rate at which adults achieve the GED is very slow since only about 1,100 complete it annually in the two provinces.

The traditional learning trajectory of high school to postsecondary is still a more common pathway for learners. GED learners may not be attracted to higher education if institutional admission policies favour high school diploma holders and if faculty and staff at institutions continue to believe that GED holders will not perform as well as high school graduates. This study based on administrative data has shown that the proportion of GED holders that transition to community college is in the 40% range compared to the US projections of 60%. This suggests that institutions must be informed about the potential of such students, who may be older but arrive with maturity, and work experience and furthermore, perform equally well at college. Policies at institutions need to support equal access, opportunities, and encouragement for GED applicants. The provinces and the institutions may need to review their outreach programs to attract potential GED students.

Based on these results, the same risk factors, males and young age, apply to both high school and GED learners. Colleges can include enriched programs as well as supplementary education in core subjects for these underprepared students to ensure their successful graduation.

For those who do not complete high school, the job prospects are poor. However, even for those that complete the GED, the availability of jobs is limited. Therefore, for those who have shown the initiative to complete the GED, career counselling could make further education more attractive. Currently, under the Skills Development Program, GED is seen as terminal diploma. Future policy direction for funding agencies that support adult learning may require a rethinking of the GED as a "terminal" goal of adult learning. Policies should recognize the GED credential as a career laddering opportunity, opening doors for adults to enter post-secondary programs. This would foster ongoing learning using the GED as an entry credential for postsecondary education, thereby gaining a future ticket to long term employment for those who did not achieve a traditional high school diploma on their first try.

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Appendix A

TABLE 1

NSCC Program Clusters

Business	Health	Agriulture/Aquaculture
• Business Admin Management • Business Administration • Business Applications • Certificate in Management • Motor Cycle and Power products • Office Admin-Information Mgt • Office Information Technology • Paralegal Services • Recreation Leadership • Music Business	• Addiction Counselling • Continuing Care • Continuing Care Assist • Dental Assisting • Fundraising Management • Early Childhood Studies • Educational Assistant • Funeral & Allied Health Services • Human Services • Medical Laboratory Assistant • Medical Laboratory technologist • Medical office assistant • Medical Transcription • Pharmacy Technician • Practical Nursing	• Aquaculture • Forestry Resources • Hort/Land Technology • Hort Landscape • Hort Grower • Hort Pract • Landscape technician • Planning Land Info Technology
Trades	**Technology**	**Other**
• Aircraft Maintenance Engineer • Appliance Service • Automotive Service Repair • Aviation Commercial Pilot • Cabinet making • Boulanger and Baking Art • Bricklaying Masonry • Carpentry certificate • Carpentry diploma • Certificate in Welding • Cooking • Cosmetology • Culinary Arts • Diesel Rep-Industrial and Marine	• Airline Dispatcher • Applied Communication Arts • Architectural Eng • Basic Marine Eng • Composites Fabric Tech • Cartography • Civil Engineering Tech • Computer Electronic Tech • Computer Service Tech • Construction Admin Tech • Digital Animation • Drafting Archtect Tech • Drafting Mechanical • Elect Eng Tech	• English for Academic Purposes • Food and Beverage Services • General Arts and Sciences (2) • Law and Security • Esthetics • Protective Security

(Continued)

(Concluded)

TABLE 1

NSCC Program Clusters

Trades	Technology	Other
• Elect Const & Industry • Heating Services Professional • Heating Vent Refrig & Air conditioning • Heavy Duty Equipment Rep • Heavy Construction • Heavy Duty Equipment Truck • Heavy Duty Equipment Truck & Transport	• Electro Mechanical • Electrical Eng Technician • Electronic Eng Technician • Electronic Eng Technologist • Environmental Eng • GIS Technician • Graphic and print production	
• Heavy Duty Equipment Operator & Repair • Heavy Duty Operator • Heritage Carpentry • High Pressure Pipe Welding • Industrial Mechanic/Millwright • Industrial Mechanical • Metal Fabricating & Plating • Motor Vehicle Body Repair • Motor Vehicle Repair Mechanical • Oil Burner Mechanic • Pipe Trades • Plumbing • Power Engineering 4th Class • Refrigeration and Air conditioning • Retail Meat Cutting • Sheet Metal Worker • Steamfitting Pipefitting • Transportation Mech Repair • Utility Line Worker • Welding • Welding Certificate • Welding Inspection and Quality • Welding Diploma • Wood Manufacturing • Wood Products Manufacturing	• Industrial Maintenance Technician • Info Technology foundation • Info Technology • Library and Info Technology • Machining/Comp Numerical Controller • Manufacturing Eng • Marine Industrial Rigging • Mechancial Eng Technician • Survey Technician • Water Resource Technology • Radio and Television Arts • Recording Arts • Web Page Design • Graphic and print production • Industrial Maintenance Technician	