

The Reservist Re-Entry Program: An alternative approach prior learning assessment and advanced placement in academic and vocational programs for Canadian Soldiers

By
Kevin Wainwright
Simon Fraser University/BC Institute of Technology

Sonia Dhaliwal
BC Institute of Technology

*Prepared for the Atlantic Canada Economic Association Conference
October 19-20, 2012, Halifax Nova Scotia*

JEL Classification I: Health, Education and Welfare

Abstract

Both the Canada and United States invest a great deal of resources in the training of their military personal. Many of the skills and experiences accumulated by soldiers are those that are highly valued by civilian employers. Further, these skills are often embodied in academic programs, suggesting soldiers would have a comparative advantage in such programs; however, despite the efforts of government agencies, many soldiers are unable to convert their skills and training into meaningful careers. This paper presents the findings from a pilot program at the BC institute of Technology 2009-2012. The program uses an alternative approach to assessing military training for advanced placement into post-secondary programs. By mapping learning outcomes rather than course equivalences, those from non-traditional education backgrounds are given advanced placement into post-secondary programs. During the pilot period, a cohort of reservists and veterans who have been given advanced placement are tracked and benchmarked against regular students in the same programs over time, measuring academic scores and testing for the development of skills, abilities, and qualities considered important for workplace success.

Introduction

This paper presents the findings of a pilot project in prior learning assessment and advanced placement involving reservists and veterans from Canadian Forces regiments in British Columbia. Further we outline a proposed research agenda that expands on the pilot program. In addition, we consider some of the issues and trends in education and how the extension of the model presented in this paper could be applied and its benefit to helping address Canada's rising skills shortage.

The purpose of this research is to integrate and expand the scope of two pilot projects that have been operating in the pilot phase since 2009 at the British Columbia Institute of Technology. The first project is a time series study that attempts to measure the development of essential workplace skills, or human capital, of students as they progress through post-secondary education.

The second project has been the development of outcome based evaluation tools for the purpose of advanced placement in post-secondary programs. The outcome based education research is focused at groups with skills, training, and experience from models that differ from traditional post-secondary programs. In particular, the research is targeted at three broad groups: military personnel, first responders, and those from remote communities with extensive on-the-job experience but little or no post-secondary education.

The goal of the research is to carry out empirical studies of essential skills (or human capital) of two different groups and integrate the findings to identify potential opportunities for prior learning assessment and advanced placement. The first study is to measure essential skills development within post-secondary education by tracking 350 students from a selection of technology programs. The second study involves measuring the essential skills and experiences of groups from non-traditional training. The second study will involve the application of learning outcomes assessment tools developed in the pilot project. The objective is to develop a comprehensive mapping of equivalencies into post-secondary courses and programs using an outcomes approach that will allow for prior learning assessment, which can be quantified in a manner that would allow for advanced placement and course credits in cases that would not occur under traditional models. Further, the prior learning models developed would generate metrics that allow for validation of results, making transferability of skills to programs traceable.

Skills Shortage in Canada

In 2007 Human Resources and Skills Development Canada (HRSDC) reported that post-secondary education was required for 65% of all new jobs. This number increased to 76.2% in 2009. Dr. Rick Miner, of Miner Management Consulting, concludes that 550,000 people will not qualify for jobs that will be available in 2016 because they do not have a post-secondary education credential. Employers are often not able to find people with the required qualifications, despite the high unemployment rate.

Of the Organization for Economic Cooperation Development (OECD) nations, Canada's productivity has decreased from third in 1940, to 11th in 1990, and to 17th in 2010. This is mainly due to a skills shortage. There is a shortage of subject-matter experts with technical knowledge and abilities, business acumen, and interpersonal abilities. Employers are concerned about the shortage of workers with advanced skills, as this is what is needed for productivity and growth.

Enhanced support is needed to provide individuals from non-traditional groups, such as military, first responder, and Aboriginals, access to post-secondary education. Opening doors to "nearly qualified" candidates would ultimately lead to a larger workforce in the long run. Post-secondary institutions need to forecast the future skills needs at a national and regional level, in order to address employers' needs.

The cost of education is increasing and the government budget for education is decreasing. Canada needs to be more efficient on how people are moved through the post-secondary education system. An advanced skills action plan is required for Canada. Canada's economic and social development lies in the knowledge and skill base of our human capital. The risks associated with this issue include slower economic growth, lost opportunity and compromised productivity.

Trends in Post-Secondary Education

Approximately three out of every four Canadians have participated in some form of post-secondary education¹. In 2011, 53% of Canadians aged 15 and over had earned either a trade certificate, college diploma or university degree². Therefore, while 75% of the population will

enter post-secondary education, only 50% will earn a credential. Further, Canada has a relatively lower level of Ph.D graduates in comparison to countries like Finland and other EU members.³

Age of students and graduates has decreased over the past years, meaning that the average post-secondary student is younger than before. In 1992, 57% of university students were between the ages of 17 and 24; by 2007, 17 to 24 year-olds accounted for 65% of university students. Similarly, in colleges, 69% of students were aged 17 to 24 in 2006.⁴ However, the gap in median age between bachelor's and master's students is approximately 7 years. This suggests that students are taking longer before entering graduate studies. Possible explanations are (a) the financial burden associated with an uninterrupted progression from undergraduate to graduate studies, or (b), the desire or need to gain work experience and on-the-job skills before continuing with school acquired skills. In the case of executive MBA programs, it is clearly the latter explanation. However, the requirement – or even recognition – of experience as part of admission to a post-secondary program tends to vary across programs and, in most cases, limited to a few fields.

Education Trends

The Canadian Council on Learning released a report on the future of Canadian learning in 2010 that examines positive and negative trend in the education system⁵. The report concludes that the Canadian government has been successful in educational expenditures as compared to other countries. In terms of post-secondary participation, the 2009 academic year was the highest level in 20 years. Quality of education and educated immigrant population were also listed among successes.

The report also cites negative trends are which are consistent with the synopsis. The first trend dictates that there is a lag at the doctoral level, hindering research, development and innovation. The report found that males are less likely to hold university and college credentials and immigrants are under-represented in the Trades professions. The report also concludes that a lack of national post-secondary education strategy prohibits the formation of strategies, benchmarks, or public reporting. Also Canada is the only country in the study that has no formal post-secondary education accreditation system of programs, which has a negative impact on global competitiveness. The education system can benefit from a national strategy which would track

the allocation of R&D resources and evaluated the impact those resources had on the intended sector.

Another recent trend in post-secondary education is the *reverse gender gap*.⁶ Historically, there has been gender gap with female participation lagging behind males for most of the twentieth century. However, in the past twenty years, the gender gap has reversed, with females accounting for 60% of the students in post-secondary programs. Statistics Canada conducted research in 2008⁷, which tried to identify the cause for the reverse gender gap. There were two factors identified as a possible cause of the new gender gap. The first was the perceived lower return on investment in human capital for males. The second explanation was that, in high school, females performed better with respect to standardized reading tests, overall marks, and time spent doing homework. These are all positively correlated with university participation.

Use of Non-traditional Admission Rules

Universities and colleges now more than ever are seeking out new ways of admitting students. In particular, MBA programs have been in the forefront of in the development of alternative admission rules. Columbia University, now asks students to write a 200 character answer on what are their post-MBA goals. The University of Iowa's Henry B. Tippie School of Management offered a full scholarship valued at \$37,240 (USD) to the applicant who best answered the question, "What makes you an exceptional Tippie full-time M.B.A. candidate and future M.B.A. hire?" in a single tweet.⁸ The University of Alabama at Birmingham that has a "non-traditional application" process for undergraduate students that allows students to write an alternate exam instead of the SAT.⁹ Heriot Watt University in United Kingdom allows students to enter into the Masters program given they passed 3 courses,¹⁰ one of which must be a core course for the MBA. Further, there are about eight hundred schools in the United States that do not require the SAT or any other standardized test for admission purposes.¹¹ Ivy League schools are focusing on the holistic assessment of the entrant, such as service learning, community involvement, social involvement in addition to academic achievement.

Athabasca University in Alberta offers an Executive MBA to students who meet the admission criteria of work experience, a designation and managerial experience but are missing an undergraduate degree. Applicants who do not have a degree can apply to a "Post Baccalaureate

Diploma in Management” and upon successful completion applicants transfer into phase two of the MBA program because the PBDM is equivalent to phase one of the EMBA.¹²

Manchester Business School also allows entry to students without a degree to its part-time global MBA program. They allocate the equivalent bachelor credits based on evidence of achieving appropriate and assessed learning outcomes. They will consider an applicant’s application if they “can demonstrate high levels of achievement, exceptional career progression and significant management experience in a leadership position or, have an excellent track record as a successful entrepreneur.” The EMBA at MIT Sloan School of Management also noted that they will consider candidates without an undergraduate degree given that the candidate “demonstrated exceptional capabilities through other endeavors”.¹³

In most cases, when entering post-secondary education, there are standard entrance requirements a prospective student must meet in order to be considered for admittance. If the student does not meet these requirements their application is often back filed. At York University, the admission policy has been changed to allow for more flexibility in admissions. Potential students can be admitted based on other qualifications and a letter outlining other credentials. York University allows students who do not meet the academic requirements may still be considered for admission as a Non-Standard Applicant.¹⁴ University of Southampton also accepts alternative qualification subject to attaining equivalency to other candidates for certain programs.¹⁵ University of Victoria allows students to pursue research in an area that has not been formally approved as a graduate degree program via special arrangement.¹⁶

Labour market Trends

Millennial Branding and Experience, Inc. released a 2012 study of 225 US employers that reveals information about employer skill requirements. Jennifer Floren, CEO of Experience Inc. in an interview about the study said,

“It’s clear based on the data that employers truly value the so-called “soft skills”, such as analytical thinking and communication ability. I think this speaks to the fact that specific on-the-job skills change, and they change more quickly these days than ever before. As a result, employers are looking for raw material — talent that they can work with and develop, people who can adapt to changes over time.”¹⁷

The report states that employers view communication skills (98%), having a positive attitude (97%) and teamwork skills (92%) as being important or very important when hiring for entry-level positions.¹⁸ Also the report finds that 69% of managers believe that relevant courses are

important when reviewing candidates, 65% say a referral from a previous boss or professor, 50% say leadership positions in on-campus organizations and only 49% say GPA. The National Association of Colleges and Employers (NACE) conducted the a 2012 job outlook survey which found that employers rate team work, communication, problem solving, analytical thinking and planning among the highest weighted skills.¹⁹

Training

An annual career forecast from careerbuilder.com says 38% of employers plan to train people who don't have experience in their particular industry and hire them for positions within their organizations in 2012.²⁰ Moreover, Statistics Canada's Access and Support to Education and Training Survey (ASETS) stated that 36% of working-age adults (aged 25 to 64 years) participated in job-related education or training in 2008, an increase from 30% in 2002. Over 4 out of 10 adult workers (41%) participated in formal job-related training activities or education in 2008. Another study by the European Commission in 2009 compared adult participation in education and training across 18 countries and showed that on average, 36% of adults aged 25 to 64 years had participated in some type of education or training. In comparison, 43% of Canadians aged 25 participated in some type of education or training, which is a positive signal. According to Statistics Canada's Workplace and Employee Survey (WES), 59% of Canadian workplaces offered some form of workplace training for their employees in 2005.²¹ However, the report cited some negative trends:

1. Low Literacy levels limit Canada's potential;
2. Many Canadians are not participating in continuous learning or training;
3. Declining training efforts hampering productivity;
4. Limited learning in the community;
5. No national system of prior learning assessment and recognition (PLAR);
6. Poor labour-market information;

Of these negative trends it should be noted that Canadian employers ranked significantly lower than their European counterparts when it came to the availability of training in the workplace.²²

In the United Kingdom 90% of firms offer training and development. On average Canadian firms spent \$787 per employee on training in 2008, which is a 40% decline over the past decade-and-a-half.

In 2005 Canada was under-performing in workplace learning in comparison to other countries according to the Canadian Policy Research Networks (CPRN).²³ Canada slipped from 12th to 20th place in terms of priority employers place on training their workers. “Fewer than 30 per cent of adult workers in Canada aged 25-64 participated in job related education and training in comparison to 45 per cent in the States. As a percentage of their overall payroll, US firms spend about 50 per cent more on training than Canadian firms. Canada now sits behind the US, UK, Norway, Germany and other European countries in overall job training.”²⁴ CPRN also concluded that employer-sponsored training is more concentrated among young workers, those with higher education and workers in large firms. Barriers for training include: costs, lack of information, skepticism about ROI, no linkage to business objectives.²⁵

Canadian Federation of Independent Business (CFIB) released a report that measures small and medium-sized businesses’ contribution to workplace training. The research is based on feedback from 8,077 independent business owners. “CFIB’s results indicate that small (under 50 employees) and medium-sized firms (50-500 employees) spend on average \$1,958 per employee on informal training (on-the-job) and \$746 on formal training for a total of \$2,703 per employee per year. For an employer hiring a new employee with no experience, the cost is double.”²⁶

Skills

The government of Ontario published a website listing what Canadian employers are looking for. The website lists soft skills as employability skills, and includes things such as communication, problem solving, positive attitudes and behaviors, adaptability and ability to work with others. Much of these skills have been repeated throughout this report confirming the trend. Some of the “hard skills” or technical skills include ability to use a computer, to measure, analyze data, speak the language and operate a machine. These basic skills are taught at the most elementary level in school and high school. Experience is the third factor, and as directed by the website, it varies industry to industry.²⁷ The Conference Board of Canada also listed a set of skills required for employment.²⁸ These skill categories include:

1. Fundamental skills (communication, managing information, using numbers and problem solving)
2. Personal management skills (positive attitude, responsibility, flexibility, continuous learning and safety)

3. Teamwork skills

Tests for Workplace Skills²⁹

To address the problem of quantifying skills and thereby putting metrics to the skills shortage, several measurement tools have been developed. Two of the more prominent ones are TOWES – Test of Workplace Essential Skills, a Canadian testing tool; and WOWI – World of Work Inventory, an American based testing tool. Both of these tools are used in this project and the description and background is given below.

TOWES Background

Building on international research in the early 1990s, the Government of Canada launched the Essential Skills Research Project (ESRP). The Project identified nine Essential Skills: reading text, document use, numeracy, writing, oral communication, working with others, thinking skills, computer use, and continuous learning.

These skills were found to be common in all occupations and workplaces despite the various forms they take. The ESRP answered a range of questions from “How can we describe these differences?” to “can we use a common language to describe skills across occupations?” To answer these questions the ESRP developed a way to profile the skill requirements of occupations in the labour market.

ESRP conducted open interviews with workers to find out how they used these Essential Skills on their jobs. They took a sample that represented different industries, occupations, specialties, business sizes and geographic locations and then analyzed the data to identify common tasks and rate the complexity of those tasks. They used independent quality control reviews to ensure that the tasks sampled were reflective of the workplace skill requirements. The end result was a profile of the Essential Skills with regards to how they were used in each occupation.

As of May 24, 2007, approximately 4,500 interviews were conducted and almost 200 Essential Skills profiles have been developed for occupations found in the National Occupational Classification (NOC). The primary focuses were occupations requiring a secondary school diploma or less, but have since expanded that to include highly technical and professional occupations.

According to Statistics Canada, 47% of Canadian workers lack the adequate skills in three specific areas that are required for workplace safety and productivity. These three areas are Reading text, Document use, and Numeracy. TOWES allows employers to test their workers to determine their levels of those Essential Skills and put into place plans for improving them to achieve better productivity and workplace safety. (College, about TOWES, 2011)

TOWES Validity

TOWES conducted a varied and diverse round of testing to determine the validity of the test. They utilized participants ranging in age, gender, being born in Canada or not, how many years in Canada, first language, aboriginal/Metis/Inuit, years of formal education completed, highest level of schooling completed, and mother's highest level of schooling completed. The test consisted of 95 TOWES tests, 75 in paper and 20 online to validate the test. They then paired the results with their demographics to look for common themes and trends with the participation group and selected population groups.

The results suggested that TOWES was free from bias as it showed little to no differences in the scores by age, gender, number of years living in Canada, first language, whether someone was aboriginal/Metis/Inuit, years of formal education completed, and highest level of schooling completed up to a non-university certificate. There was a slightly higher score for those born in Canada and a significantly higher score in those with trade or vocational certificates and university level degrees. (College, 2009)

WOWI Background

The World of Work Inventory (WOWI) has been in development for the last 62 years. This powerful assessment tool utilizes an individual's subjective educational and occupational choices, objective job duty preferences, aptitudes and achievements, and preferences for qualities of a work environment.

Dr. Robert E. Ripley began developing WOWI in 1959 while teaching graduate courses in Occupational and Educational Information and Psychological Testing. (Ripley, 2011) During this time, he noticed that the tests and inventories used in those courses were more often used to tell individuals what to do rather than provide them with a process of self-exploration.

He spent time attempting to analyze both the test takers and test users. He discovered that test publishers did not take some fundamental factors into account such as reading levels, size of print, and spacing of the material.

While working as a consultant for the Department of Labour, he toured the United States noting the differences and similarities within the greater “world of work.” (Ripley, 2011) Dr. Ripley concluded that there was a need for an assessment that would take into account existing materials in occupational exploration and recent developments in the areas of occupations and careers.

Dr. Ripley developed WOWI over a 12-year period of research, observation, teaching, and consultation in the areas of psychological testing and occupational exploration. It utilizes a comprehensive assessment, which looks at the individual’s preferences, personality, and aptitudes in conjunction with their work environment.

WOWI Validity

Validity is of the utmost importance when talking about testing of this type. In psychological and educational testing, validity is the measure of the meaningfulness of the results.

The scales, items, and profile analysis of WOWI went through systematic steps to determine its validity. The first step was developing the items within the scales utilizing job description and job analysis from the Dictionary of Occupational Titles and those developed by the U.S. Department of Labor.

After this step, Dr. Ripley and his staff of summer interns and graduate students gathered personal job analysis and descriptions. To maintain job relevancy, the items were created around the job tasks and activities identified from the previous steps.

The items were then organized into homogeneous scales with each item only being used once in a single scale. Inside the Career Interest Activities section of WOWI, the items were clustered using job analysis and career family grouping then reviewed by four to five judges in 117 Career Families. The judges that were used are subject matter experts, supervisors, and trainers/teachers who work in the occupations listed. The judges had to have a unanimous agreement on the placement of each item before it would be finalized.

After revising and finalizing the instrument, Dr. Ripley utilized a stratified sample by age, sex, educational level, minority group, and occupational group to determine inter-item, intra-scale, and inter-scale correlations. There were 7,280 correlations discovered for the Career Interest Activities, Job Satisfaction Indicator, and Vocational Training Potential Scales.

91.36% of these correlations resulted in being significant at or beyond the 0.001 level. They then determined the inter-scale correlations of the 35 different scales. There were higher correlations between the Career Interest Activities themselves, lower correlations with the Job Satisfaction Indicator Areas, and even lower with the Vocational Training Potentials, indicating that the three sections are measuring different criteria. The exceptions to this were specific, related fields within the Career Interest Activities and Job Satisfaction Indicator Areas such as Sales and Influencing.

Dr. Ripley then tested WOWI in each of the 17 specific occupations in the different Basic Career Directions with people that were satisfactorily employed in those occupations. The assumption was if WOWI were valid, then these people would score highest in the Career Interest Activities area that they were currently working in and different from people in closely related areas. Several occupational samples were tested and compared to closely related occupations. (Ripley, 2011)

The Pilot Project at BCIT

The Reservist Re-Entry Program³⁰

In 2009 the BC Institute of Technology started a pilot project that gave advanced placement to reservists and veterans from the Canadian Forces into an advanced diploma program that ultimately ladders into a bachelor's degree in business. The normal requirement for admission is a minimum of a diploma or associates degree. However, the soldiers in the pilot program had little or no post-secondary education, with a high school diploma as the highest credential earned.

One of the significant differences about this pilot project was the approach in determining admission to the program. Normally admission is determined by previous academic work: grades in courses and credentials previously earned by the applicants. With the soldiers we developed an outcomes based approach. We identified the skills and abilities that were

considered necessary for successful completion of the program. Evaluation tools were developed to measure and assess these skills in the soldiers. The evaluation tools consisted of a combination of aptitude and problem solving tests, personality profiles, and interviews that thoroughly reviewed each soldier's military and work histories.

The evaluation tools were developed from extensive research and a mapping process that involved a complete analysis of the standard military training modules. The mapping process and skills inventory was carried out in collaboration with the local regiments, in particular the training officers and commanding officers of relevant cohorts in the pilot. In addition to the evaluation and mapping of the military training modules, extensive research was done on the deployment process and the experience of soldiers during this period. Profiles were developed on the duties, expectations, and experiences of a standard deployment to Afghanistan.

From the research on the military training and experience, a set of criteria was established for admission to the program. This criterion was combined with a limited number of academic requirements to determine admission into the program. The primary academic requirement was English grade 12 and Math grade 11. Some of the soldiers in the pilot program were required to make up academic deficiencies in the semester prior to the start of the full time program.

The initial research reveals two interesting findings. First, the assessed skills and abilities of the soldiers far exceeded the recorded training on military and civilian transcripts. Second, there was no necessary link in interest and aptitude to pathways followed in the military history.

The first finding suggests that a significant amount of the overall human capital was acquired through experience and on-the-job training. This supports proposition that an outcomes based assessment approach is a more appropriate method of evaluation.

In the initial assessment of applicants from the military, the WOWI evaluation test was administered to all applicants. The WOWI measures both aptitude and interests of applicants. In the case of the soldiers many showed a strong interest and fit for areas of business, public services, and health sciences. The WOWI results, combined with the other aspects of the evaluation process, lead to the conclusion that a majority of the soldiers had both the ability and suitability to successfully complete the advanced diploma program in business. In contrast, a credential based evaluation considering only formal transcripts suggested that most of the

soldiers would best fit a trades or vocational program such as mechanics, truck-driving, or construction. The soldiers themselves, in self-evaluation reports, considered they had been best prepared mostly for policing or private security careers because they have the perception that their training is position specific. Given the educational requirements of most Canadian police forces, most soldiers believed private security or labourer were the most likely career paths available.

In the 2009 pilot project with the Canadian Reservists, initial research led to the conclusion that the military training and experience had the potential for advanced placement in post-secondary education. However, it raised a couple of challenges. The first was that the nature of the military training model did not lend itself well to traditional prior learning assessment processes. The second challenge, or question, was whether any systematic patterns existed that would allow us to identify common skills, traits and abilities within a cohort, thereby allowing economies of scale and other efficiency in the assessment and review process.

To address the problem of determining equivalencies, an alternative assessment model was developed. The new model, which was a block learning outcome approach, was created. First, a cross-section of diploma programs were reviewed, breaking down all the individual courses into their learning outcomes. This work produced a set of learning outcomes for each program. Finally a scorecard system was developed that allowed an individual to be scored as to the relative proficiency of each learning outcome. In a similar fashion, all of the basic training models for the Canadian Forces (army branch) were also assessed.

The learning outcomes for the military programs were then compared, both individually and as a block, to the diploma programs. While there was a great deal of differences in many of the technical, field specific outcomes, there was a high degree of overlap in many of the general learning outcomes (ie. teamwork, problem solving, time management, etc.)

Benchmarking the Model

In order to validate the findings in the pilot and determine potential growth of the program into other fields, extensive benchmarking was carried out by testing and evaluating the civilian counterparts in the business management diploma program. Benchmarking involved several elements; including a) application of World of Work Inventory, b) statistical analysis of course

grades and GPA's, c) attrition ratios, and d) peer and faculty feedback. The data came from test scores, questionnaires, and focus groups.

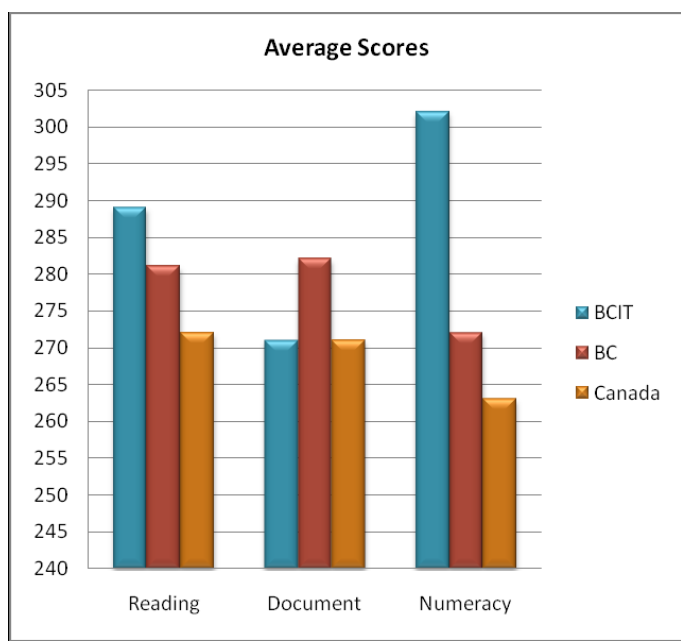
In addition to the evaluations above, the students in the business program, both civilian and military, are part of a time series study using the "Test of Work Place Essential Skills" (TOWES) testing tool. First, we applied the TOWES to students at regular intervals through their academic progression to measure the development of their workplace skills. The purpose was to measure the extent students acquired or developed relevant human capital in the context of TOWES. Second, the TOWES was used as a cross-sectional study of soldiers and civilians in the business program. The TOWES was used both to benchmark soldiers and civilians at the initial admissions stage and as a metric to evaluate relative progression over the life of the program.

Findings from the Pilot Project

[A] TOWES and BCIT Business students

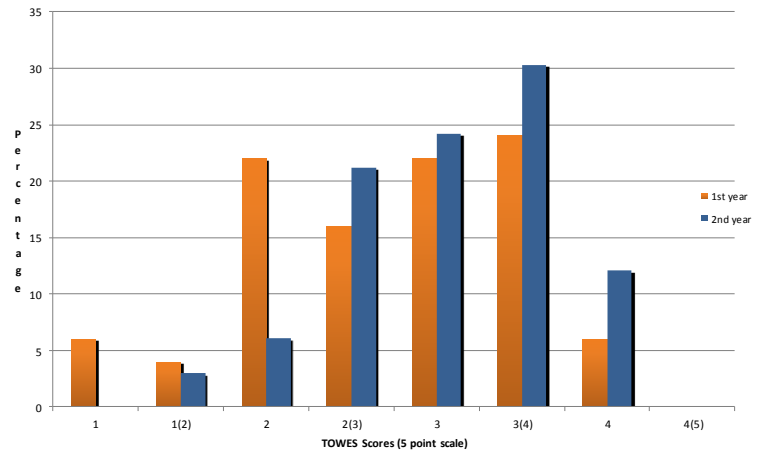
The application of the TOWES test on business students at BCIT produced the following: First, BCIT students, on average, scored higher than the HRDC findings for the BC population and the Canadian population in all three categories (see figure 1). Second, students who completed two years of the business program scored higher than the students tested at the end of one year.

While the sample was limited to students in business programs, the results do suggest that students at BCIT do see an improvement in their essential workplace skills



For reading, the majority of first year students were between 2 and 3(4) on their TOWES Reading score, with the majority, at 24%, scoring 3(4). Second year students increased their score, compared to first years, ranging from 2(3) to 4.

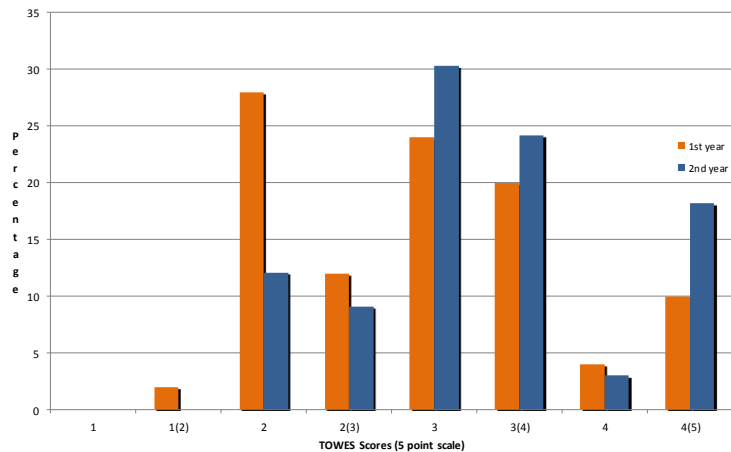
Approximately 30% of second year students scored 3(4) and approximately 12% of second year students scored 4, which is twice as much as first year students. 34% of first year students scored in the range of 1 to 2, compared to 12% of first year students.



In Numeracy, the majority of first year students' scores ranged from 2 to 3(4), with the majority of students scoring 2, at 28%. Second

year students' scores clustered from 3 to 3(4), which is higher than first year students. The students who scored 4(5) in second year were approximately 8% higher than first year students. The lowest score in second year was 2, at 12.1%, which is 15.9% higher than first

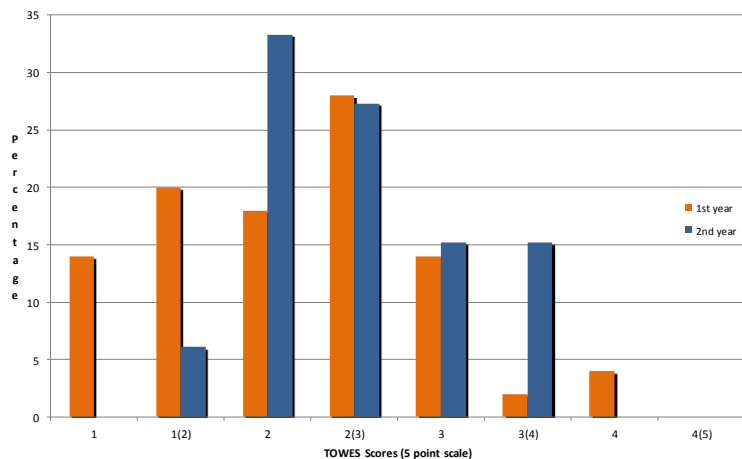
Numeracy



year students.

Document Use

Document use is similar to reading scores, in that more second year students received higher scores in



document use. First year students' scores ranged from 2 to 3(4). The majority scored 2(3), with 23%, with the minority scoring 3(4) and 4. 14% of the first year students scored 1. The majority of second year students scored in the same range as first years but with a higher majority scoring 2, at 33%.

[B] BCIT and Reservists

After analyzing the results from the Canadian reservists and comparing them to the Business students at BCIT, we found that, on average, reservists scores were between those of first year and second year students. Based on an essential skills evaluation, reservists entered the program with higher skills scores than their civilian counterparts. These results are consistent with the overall performance of reservists in the pilot program. When using the WOWI, we found that Canadian reservists were not significantly different from the students in vocational training potential, job satisfaction indicators and career interest activities.

The next issue to be addressed was to determine if there were common characteristics, skills, and abilities within the soldiers as a group. Further, it was necessary to evaluate these attributes in a manner that allowed direct comparisons to civilian activities, in particular students in post-secondary programs. This was done using focus groups, extensive on-on-one interviews and standardized testing with exams such as Test of Workplace Essential Skills (TOWES) and World of Work Inventory (WOWI). The findings of the empirical research demonstrated a high degree of homogeneity across the reservists in the sample. Further, when compared to post-secondary students who had also participated in the same testing procedure, the reservists scored higher than students who had completed one year of post-secondary education and were slightly below the average scores of students who had just completed technical diplomas.

As a result of the findings, reservists were given advanced placement into a program that normally required a minimum of a diploma as a prerequisite. The initial results of the pilot program were very successful. As of June 2012, 90% of the reservists completed the program. Further, the average GPA of the reservists was higher than the overall program GPA. Seventy-five percent of the soldiers who graduated from the diploma program went on to complete their bachelor's degree within 12 to 18 months.

The success of the pilot project with the reservists suggested that the model could be expanded and applied to other groups such as first responders and some types of mature students, as well as those from population groups identified as having common characteristics and experiences (ie. remote communities and Aboriginals).

Active Research (Moving Forward)

The current planned research builds on the pilot projects that have run to date. The research can be categorized into three broad initiatives. The first is a comprehensive mapping of essential skills, desired attributes and knowledge that various sectors in the labour market identify as important. This is not an inventory of academic courses such as English composition, calculus or organic chemistry, but rather an outcomes based inventory.

The second part of the research is the measurement and the tracking of the development of these skills. Students across programs such as engineering, health sciences, business, and trades will be assessed for essential skills at the start of their program and re-evaluated and monitored throughout their entire academic career. The approach will be primarily quantitative in nature. Metrics will be developed to produce an index that allows for the measure of the growth in essential skills, knowledge, and attributes.

Third, prior learning assessments will be developed that are consistent with the measurements developed. The assessments will determine where individuals who receive prior learning assessments rank relative to students at various stages of their academic progression towards a desired credential.

Data Collection at BCIT

As part of this project, we intend to track approximately 350 students at BCIT from the time they enter a program to their final semester. The students will come from a cross section of programs in the fields of engineering health science, business and trades. At regular intervals each cohort of students will be administered TOWES examinations to measure their levels of essential workplace skills.

The choice of BCIT is crucial to the success of this study. BCIT, by the nature of its educational model and size, allows for the construction of a large data set that is often prohibitively costly at the other post-secondary institutes.

The BC Institute of Technology has an enrollment of 46,000 full and part-time students. It has 340 programs that range from certificates to masters degrees. The scope of its programming includes trades, engineering diplomas and degrees, nursing degrees and a variety of health science diplomas, as well as one of the largest business schools in the province that offers over 20 different diplomas and two bachelor degrees.

A feature of the BCIT model that is significant to this project is the cohort based model applied to all its full-time programs. In every program students are admitted to a cohort where every student takes the same curriculum, workload and schedule. With a few exceptions, there are no electives and all students' progress at the same pace. Except for some attrition, all students entering a cohort graduate at the same time. This feature of the BCIT education model allows us to track and test groups of students over time that will have the same incremental education at every instance of testing.

A second benefit of carrying out the project at BCIT is the quality of internal data collection by the institute. With the support of the institute, we will compile a comprehensive data set that will include all post-secondary transcripts, high school records, work histories and demographic profiles of each student in the study. The data collected in this project will allow us to produce a variety of statistics relating education and demographics to essential skill development.

Prior Learning Assessment

In this part of the project we will develop, expand and validate the outcomes based assessment tools used in the pilot project with the reservists from Canadian Forces regiments in Vancouver. In the outcomes approach, we will amalgamate all the learning outcomes identified with each level with a cross-section of programs from engineering, trades, health and business. The purpose is to develop a block learning outcomes assessment which will measure the percentage of outcomes a person has relative to someone who has completed first year, second year, or third year of a program. For shorter duration programs, such as certificates and diplomas, the individual will be assessed relative to the entire program.

The block learning outcomes approach was piloted in the reservist program using business diplomas and a Geomatics diploma. This project will expand the number of programs with

learning outcomes mapped and testing tools developed. The goal is to have mapping in electrical, mechanical and civil engineering as well as one in health sciences.

Upon completion of the mapping and testing of the block outcome assessment tools, we will evaluate participants from the three target groups: Canadian Forces veterans, first responders and the aboriginal community. The prior learning assessments will be combined with TOWES testing focus groups and one-on-one interviews.

The use of focus groups and interviews are to address two issues. The first is to validate the findings of the prior learning assessments and TOWES scores by reviewing each participant's history and records. The second purpose of the focus group and interview process is to address the problem of "engagement." Experience from the pilot program with the reservists reinforced the findings of researchers³¹ regarding the problem of certain groups not engaging in educational opportunities, even when fully funded.

Often such individuals are uncomfortable transitioning from their own environment to the culture of a typical post-secondary institute. In other cases, individuals are unaware of the skills and abilities they possess and believe they are not equipped for programs they may qualify for. For example, the nature of military and fire training self-entrenching and these men and women have the perception that their training is only specific to their position in the military or fire service. This is due to a lack of recognition of the knowledge, skills and abilities they already hold. As part of the prior learning assessment and evaluation of the target groups, research into non-quantifiable barriers is part of the scope of the project.

Upon the completion of the prior learning assessments across the target groups, the results will be compared to the findings of the TOWES and education assessment carried out on post-secondary programs. The findings of both parts of the project will be used to compare those from prior learning relative to the various levels of post-secondary education. From there, the research will identify differences or academic deficiencies when comparing similar scores of essential skills and learning outcomes.

The final phase of the research will be to develop recommendations for an advanced placement strategy in each of the educational fields evaluated. In addition, depending on the participants,

we will expand the scope of the current pilot project involving reservists in programs to include first responders and the aboriginal community.

Bibliography

Journals

Campbell, B., Coff, R., & Kryscynski, D. (2012, July). Rethinking Sustained Competitive Advantage from Human Capital. *Academy of Management Review*, 37(3), 376-395.

Foster, K., Neidert, G. B.-R., Artaleio, D., & Caruso, D. (2010, November). A psychological profile of surgeons and surgical residents. *Journal of Surgical Education*, 67, 359-70.

Jepson, C., & Montgomer, M. (2012, February). Back to School: An application of human capital theory for mature workers. *Economics of Education Review*, 31(1), 168-178.

Ndingury, E., Prieto, L., & Machtmes, K. (2012, June). Human Capital Development Dynamics: The Knowledge Based Approach. *Academy of Strategic Management Journal*, 11(2), 121-136.

Tatoglu, F. Y. (2012). The Relationships between Human Capital Investment and Economic Growth: A Panel Error Correction Model. *Journal of Economic and Social Research*, 13(2), 75-88.

Whiting, H., & Kline, T. J. (2006, December). Assessment of the equivalence of conventional versus computer administration of the Test of Workplace Essential Skills. *International Journal of Training and Development*, 10(4), 285-290.

Government

Government of Ontario. (2012, 01 30). What do Canadian employers want? Retrieved from settlement.org: http://settlement.org/sys/faqs_detail.asp?k=WORK_CUL&faq_id=4001128

Human Resources and Skills Development Canada. (2012, 06 16). Learning - Educational Attainment. Retrieved from hrsdc.gc.ca: <http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?iid=29>

Statistics Canada. (2008). Trends in the Age Composition of College and University Students and Graduates. Retrieved from statscan.gc.ca: <http://www.statcan.gc.ca/pub/81-004-x/2010005/article/11386-eng.htm>

Statistics Canada. (2008, 12 01). Why are the majority of university students women? Retrieved from statscan.gc.ca: <http://www.statcan.gc.ca/pub/81-004-x/2008001/article/10561-eng.htm>

Statistics Canada. (2011). Postsecondary Education Participation among Underrepresented and Minority Groups. Retrieved 06 16, 2012, from <http://www.statcan.gc.ca/pub/81-004-x/2011004/article/11595-eng.htm#a>

Government of Canada:

ARMY DP 1 – INFANTRYMAN Training Plan A-P9-031-DP1/PH-B01 November 2007 Source: Canadian Forces, Seaforth Highlanders, Regimental Headquarters: Seaforth Armoury 1650 Burrard Street Vancouver, BC V6j 3G4

ARMY NCM DP 1 BASIC MILITARY QUALIFICATION A-PD-050-BMQ/PH-H16 November 2007 Source: Canadian Forces, Seaforth Highlanders, Regimental Headquarters: Seaforth Armoury 1650 Burrard Street Vancouver, BC V6j 3G4

ARMY NCM DP 1 – SOLDIER QUALIFICATION A-P2-002-D10/PH-B01 September 2004 Source: Canadian Forces, Seaforth Highlanders, Regimental Headquarters: Seaforth Armoury 1650 Burrard Street Vancouver, BC V6j 3G4

DP 2 ARMOUR RECONNAISSANCE OBSERVER A-P2-011-S01/PH-B01 May 2005 Source: Canadian Forces, Seaforth Highlanders, Regimental Headquarters: Seaforth Armoury 1650 Burrard Street Vancouver, BC V6j 3G4

MOC NCM DP2 INFANTRY PLATOON SUPPORT WEAPONS A-P9-031-DP2/PH-B01 November 2005 Source: Canadian Forces, Seaforth Highlanders, Regimental Headquarters: Seaforth Armoury 1650 Burrard Street Vancouver, BC V6j 3G4

TACTICAL COMBAT CASUALTY CARE April 2006 Source: Canadian Forces, Seaforth Highlanders, Regimental Headquarters: Seaforth Armoury 1650 Burrard Street Vancouver, BC V6j 3G4

ORGANIZATIONAL, SOCIAL AND DEMOGRAPHIC CHANGE IN THE CANADIAN FORCES Source: <http://www.internationalmta.org/1998/9837.html>

Statistics Canada July 2008 Perspectives – A Profile on Canadian Forces by Jungwee Park Source: <http://www.statcan.gc.ca/pub/75-001-x/2008107/pdf/10657-eng.pdf>

Canadian forces deployed outside of Canada 1992-2003 Government of Canada Source: <http://www.army.forces.gc.ca/land-terre/life-vie/army-armee/statistics-statistiques-eng.asp> Date Modified: 2009-07-27

Fit to Serve: Universality of Service and Related Support Programs June 29, 2010 Source: <http://www.forces.gc.ca/site/news-nouvelles/news-nouvelles-eng.asp?cat=03&id=3449>

Other (magazines, blogs, program websites)

Allevne, S. (2012, February). Getting a Head Start. *Black Enterprise*, 42(7), p. 48.

Association of Canadian Community Colleges. 11 October 2012 <<http://www.accc.ca/xp/index.php/en/advocacy/advskills-actplan>>.

Association of Canadian Community Colleges. Association of Canadian Community Colleges. August 2010. 11 October 2012 <http://www.accc.ca/ftp/briefs-memoires/201008_FinanceBrief.pdf>.

Athabas University. (2012). Admission Requirements . Retrieved from mba.athabascau.ca: <https://www.mba.athabascau.ca/titanweb/au/webcms.nsf/AllDoc/AE2B75971096593B8725756F00033B7D?OpenDocument>

Bailey, P. D. (2011, 11 27). The Role of Class Difficulty in College Grade Point Averages. Retrieved from econweb.umd.edu: http://econweb.umd.edu/~bailey/Paul_Bailey_JMPaper.pdf

Canadian Council on Learning. (2010). What is the future of learning in Canada? Retrieved from www.ccl-cca.ca: <http://www.ccl-cca.ca/pdfs/CEOCorner/2010-10-11WhatistheFutureofLearninginCanada.pdf>

Canadian Federation of Independent Business. (2009, 05). Canada's Training Ground. Retrieved from www.cfib-fcei.ca: <http://www.cfib-fcei.ca/english/article/368-canada-s-training-ground.html>

Canadian Policy Research Networks. (2006). Employer Investment in Workplace Learning in Canada. Retrieved from www.ccl-cca.ca: <http://www.ccl-cca.ca/pdfs/WLKC/EmployerInvestmentWorkplaceLearningCCLCPRN.pdf>

Canadian Policy Research Networks. (2009, 02 27). Enhancing Access to Post-Secondary Education in Canada: An Exploration of Early Intervention Initiatives in Selected Countries. Retrieved from www.cprn.org: http://www.cprn.org/documents/51117_EN.pdf

Carey, K. (2012, July). The Assets Between Your Ears. *Washington Monthly*, 44(7), pp. 33-34.

Colleges, Association of Canadian Community. *Post Secondary Transfers*. May 2010. 11 October 2012 <http://www.accc.ca/ftp/briefs-memoires/201005_SocialAffairs.pdf>.

Edinsburg School of Business. (2012). Applications and Admissions. Retrieved from ebsglobal.net: <http://www.ebsglobal.net/programmes/mba-distance-learning-admissions>

Engineer Leader. (2011). Patience. Persistence. Perseverance. Retrieved from www.engineerleader.com: <http://www.engineerleader.com/?p=1110>

Faisal, Sharif. *Financial Post*. 12 September 2012. 11 October 2012 <http://business.financialpost.com/2012/09/11/collaboration-essential-to-overcome-skills-shortage/?_lsa=9d4c82f0>.

Forbes. (2012, 05 14). The Student Employment Gap for the Class of 2012. Retrieved from forbes.com: <http://www.forbes.com/sites/danschawbel/2012/05/14/the-student-employment-gap-for-the-class-of-2012/>

Freakonomics. (2008, 09 29). Do Good Grades Predict Success? Retrieved from freakonomics.com: <http://www.freakonomics.com/2008/09/29/do-good-grades-predict-success/>

Giziene, V., Simanaviciene, Z., & Palekiene, O. (2012). Evaluation of Investment in Human Capital Economic Effectiveness. *Engineering Economics*, 23(2), pp. 106-116.

Graduate Management Admission Council. (2008, 01). Proof Positive: Study Underscores GMAT® Validity. Retrieved from gmac.com: <http://www.gmac.com/why-gmac/gmac-news/gmnews/2008/january/proof-positive-study-underscores-gmat-validity>

Halvorson, H. G. (2011, 02 25). Nine Things Successful People Do Differently. Retrieved from blogs.hbr.org: http://blogs.hbr.org/cs/2011/02/nine_things_successful_people.html

HR Voice. (2012, 02 17). Training the Workforce: How Canada Measures Up in Skills and Job Training. Retrieved from www.hrvoice.org: <http://www.hrvoice.org/training-the-workforce-how-canada-measures-up-in-skills-and-job-training/>

Lehrer, J. (2011, 03 14). Which Traits Predict Success? (The Importance of Grit). Retrieved from wired.com: <http://www.wired.com/wiredscience/2011/03/what-is-success-true-grit/>

Lopper, J. (2010, 06 06). Success Factors from Psychology Studies on How to be Successful. Retrieved from suite101.com: <http://suite101.com/article/success-factors-from-psychology-studies-on-how-to-be-successful-a245313>

M Live. (2011, 12 28). Employment outlook improving in 2012; more employers willing to train, more workers quitting for better jobs. Retrieved from mlive.com: http://www.mlive.com/jobs/index.ssf/2011/12/employment_outlook_improving_in_2012_mor.html

Manchester Business School. (2012). Part-time Global MBA entry requirements. Retrieved from www.mbs.ac.uk: http://www.mbs.ac.uk/programmes/mba/global/admissions/entry_requirements.aspx

- Mashable. (2012, 06 17). 4 Business School Trends to Watch. Retrieved from mashable.com:
http://mashable.com/2012/06/17/business-school-trends/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+Mashable+%28Mashable%29&utm_content=Google+Reader
- McMaster Association of Part-Time Students (2012, 03) Policy Paper: Mature Students. Retrieved from
<http://www.ousa.ca>: <http://www.ousa.ca/wordpress/wp-content/uploads/2012/03/Mature-Students-FINAL.pdf>
- Millennial Branding. (2012, 05 14). Millennial Branding and Experience Inc. Study Reveals an Employment Gap Between Employers and Students. Retrieved from millennialbranding.com:
<http://millennialbranding.com/2012/05/millennial-branding-student-employment-gap-study/>
- Miner, Rick. Miner and Miner. March 2011. 11 October 2012
<http://minerandminer.ca/data/TD_Access_Report.pdf>.
- MIT Sloan School of Management. (2012). Frequently asked questions about the MIT EMBA Program. Retrieved from emba.mit.edu: <http://emba.mit.edu/admissions/faq/>
- NACE. (2011, 10 28). Job Outlook: The Candidate Skills/Qualities Employers Want. Retrieved from naceweb.org:
http://www.naceweb.org/s10262011/candidate_skills_employer_qualities/
- Next Web. (2011, 09 01). The Twitter Influence: Columbia Business School limits application essays to 200 characters. Retrieved from thenextweb.com: <http://thenextweb.com/socialmedia/2011/09/01/the-twitter-influence-columbia-business-school-limits-application-essays-to-200-characters/>
- Palatnick, F. (2011). Non Traditional Colleges Are Allowing Non Traditional Entrances. Retrieved from
<http://www.evollution.com/opinions/non-traditional-colleges-are-allowing-non-traditional-entrances/>
- PR Web. (2012, 04 17). Make Money-The Richest Immigrant to the USA Releases Secret #8 to Make Billions. Retrieved from chron.com: <http://www.chron.com/business/press-releases/article/Make-Money-The-Richest-Immigrant-to-the-USA-3487203.php>
- Schwartz, S. (2012, 04 30). LSAT Requirement May Be Eliminated. Retrieved from lsatblog.blogspot.ca:
<http://lsatblog.blogspot.ca/2012/04/lsat-requirement-may-be-eliminated.html>
- Scott, S. (2007, 08 30). Do grades really matter? Retrieved from macleans.ca:
http://www.macleans.ca/education/postsecondary/article.jsp?content=20070910_109139_109139
- Steinke, J. P. (2009, April). Getting Credit for Life. *Certification Magazine*, 11(4), pp. 22-25.
- The Conference Board of Canada. (2010, 01). Education and Skills. Retrieved 06 16, 2012, from
http://www.conferenceboard.ca/hcp/Details/education.aspx#canada_right
- The Conference Board of Canada. (2012). Employability Skills 2000+. Retrieved from conferenceboard.ca:
<http://www.conferenceboard.ca/topics/education/learning-tools/employability-skills.aspx>
- University of Alabama at Birkingham. (n.d.). Retrieved from uab.edu:
<https://www.uab.edu/students/undergraduate-admissions/non-traditional/admissions-us-residents>
- University of Southampton. (2012). LM39 BSc Applied Social Sciences (Criminology) (3 yrs). Retrieved from
www.southampton.ac.uk:

http://www.southampton.ac.uk/socsci/undergraduate/courses/Sociology_list/lm39_bsc_applied_social_sciences_criminology.page#entry

University of Victoria. (2012). Specialized degree programs. Retrieved from [uvic.ca](http://www.uvic.ca/graduatestudies/programs/home/programdescriptions/special/index.php):
<http://www.uvic.ca/graduatestudies/programs/home/programdescriptions/special/index.php>

York Univeristy. (2012). MES Admission requirements & How to apply. Retrieved from [yorku.ca](http://www.yorku.ca/fes/students/future/mes/requirements-apply.htm):
<http://www.yorku.ca/fes/students/future/mes/requirements-apply.htm>

Boeing. (n.d.). Professional Career Assessments. Retrieved May 1, 2011, from Boeing: http://www.iam-boeing.com/everett_QTTP_assessments.cfm

College, B. V. (2011). about TOWES. Retrieved May 1, 2011, from TOWES: <http://www.towes.com/en/about-towes/what-is-towes/what-is-towes>

College, B. V. (2009). TOWES Data Analysis . Calgary: Bow Valley College.

Myers Briggs Personality Type. (n.d.). Retrieved May 1, 2011, from Myers Briggs:
<http://www.teamtechnology.co.uk/tt/t-articl/mb-simpl.htm>

Ripley, D. R. (2011). about WOWI. Retrieved May 1, 2011, from WOWI:
<http://www.wowi.com/geninfo/development/history.php>

Scale, E. R. (n.d.). About the ERS. Retrieved May 1, 2011, from Employment Readiness Scale:
<http://www.employmentreadiness.com/client/default.cfm?wp=ue>

WOWI. (2011). Administration. Retrieved May 1, 2011, from WOWI: <http://www.wowi.com/>

ENDNOTES

¹ (Statistics Canada, 2011)

² (Human Resources and Skills Development Canada, 2012)

³ (The Conference Board of Canada, 2010)

⁴ (Statistics Canada, 2008)

⁵ (Canadian Council on Learning, 2010)

⁶ Christofides, L., M. Hoy, and L. Yang. (2010). Participation in Canadian Universities: The Gender Imbalance (1977-2005). *Economics of Education Review* 29(3),400-410.

⁷ (Statistics Canada, 2008)

⁸ (Next Web, 2011)

⁹ (University of Alabama at Birkingham)

¹⁰ (Edinsburg School of Business, 2012)

¹¹ They include Arizona State University; Berkley College, NYC; Briarcliffe College, NYC; Byrn Mawr College, PA; Cambridge College, Mass; DePaul University, Chicago; Fashion Institute of Technology, NYC; Gallaudet College (Top School For The Visually Challenged), Washington D.C.; John Jay College of Criminal Justice, NYC; Texas A & M, Texas; and Metropolitan College , NYC (Palatnick, 2011)

¹² (Athabasca University, 2012)

¹³ (MIT Sloan School of Management, 2012)

¹⁴ (York University, 2012)

¹⁵ (University of Southampton, 2012)

¹⁶ (University of Victoria, 2012)

¹⁷ (Forbes, 2012)

¹⁸ (Millennial Branding, 2012)

¹⁹ (NACE, 2011) For a full listing please see Appendix 1

²⁰ (M Live, 2011)

²¹ (Canadian Council on Learning, 2010)

²² See appendix 2 for more information

²³ (Canadian Policy Research Networks, 2006)

²⁴ (HR Voice, 2012)

²⁵ (Canadian Policy Research Networks, 2009)

²⁶ (Canadian Federation of Independent Business, 2009)

²⁷ (Government of Ontario, 2012)

²⁸ (The Conference Board of Canada, 2012) See Appendix 3 for the whole list

²⁹ This section is based on a directed studies project in 2011 by a team of BCIT students: Justine Arsenault, Nicole Zschash and Devon Evans (supervised by Kevin Wainwright)

³⁰ The program has since been re-named the *Legion Military Skills Conversion Program*. Further information can be found at <http://www.bcit.ca/legion>

³¹ Elliott, Marta; Gonzalez, Carlene; and Larsen, Barbara. "U.S. Military Veterans Transition to College: Combat, PTSD, and Alienation on Campus", (2011) *Journal of Student Affairs Research and Practice*, Vol 48, Issue 3