

Bridging the Gap: A Study on the Best Practices in Industry-Academia Partnership



**Intergovernmental Committee for Economic and Labour Force
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1. Introduction of the study

1.1 Background of the Study

The new century is marked with rapid changes in the global economy, primarily supported by technological innovation and demographic changes. Consequently, the production system has been drastically changed with increased application of advanced technologies. Countries have become increasingly interdependent due to barrier free access of goods and services. As a result, these changes have put unprecedented pressure on industries/businesses worldwide and Canada is no exception. In order to survive in such a competitive environment, each country needs to develop efficiency, cost-effectiveness and mastery over cutting-edge technology, which is a prerequisite for a skilled workforce.

In light of the global scene outlined above, a new approach to organizing and planning the labour market is imperative for Canadian society and economy. Canada, despite being the second largest country in the world by landmass, has a population of just over 34 million which is 10 times smaller than the USA and 40 times smaller than China. There is also a regional dimension involved in this issue.¹ There is a question as to whether the Canadian labour force is proportionately distributed in areas where industries (and jobs) are located.

Another grave question to think about is whether Canadian education and training industry has been producing skilled labour to the scale that matches demand (see Annex 4). The question also arises as to whether industries have taken their share of the load in producing the skilled labour force they need both now and in the future. Finally, it is very important for policy makers to accurately know and understand the various dimensions of skill gaps by sectors, levels and regions in order to plan for filling those gaps.



A lot of discussion is happening in academic and policy circles about the scale and nature of skill gaps and the potential policy solutions to resolve it. Among OECD countries, Canada has a relatively high proportion of post-secondary educational attainment (OECD, 2015²). However, that does not necessarily mean

¹ Innovation, Science and Economic Development (ISED) Canada (2008) The Labour Market and Skill Implications of Population Aging in Canada: A Synthesis of Key Findings and Policy Implications. <https://www.ic.gc.ca/eic/site/eas-aes.nsf/eng/ra02035.html> (viewed: 29 January, 2016)

² OECD (2015) <http://www.oecd.org/edu/education-policy-outlook-2015-9789264225442-en.htm>

that the skill transfer has occurred at the desired level (Munro, Stuckey, and MacLaine, 2014³). A report by McKinsey & Company Canada revealed that half of graduates and around two-thirds of employers felt that graduates were unprepared for employment (see Annex 4). This view is not necessarily supported by education providers. In total, 83% of education providers reportedly believed that their graduates were ready for job in their chosen field (www.mckinsey.com).

It is predicted that there will be a further skills gap when the baby boomer generation leaves the workforce in the near future⁴. There is also an issue of whether young Canadians as well as those who are already in the workforce have the opportunity to update their skills to suit the changing labour market demand. It is not accurately known how incoming flows of immigrants have contributed to filling skills gaps. In the context of these uncertainties and challenges, industry-academia partnerships (IAPs) have been proposed as a way forward⁵. This current study was commissioned in part to examine if there are any best practices in IAP. It is very timely to gauge mindsets, actions and behaviors of the key players in this problem area.

1.2 Objectives of the Study

The objectives of this study are:

- To examine a few on-going partnership cases between industry and post-secondary sector and to illustrate if there are any best practices to disseminate; and,
- To provide an overview of innovations that have been made in education and training in the post-secondary sector in other countries (mainly in developed countries) and to examine if there is something that Canada can learn from.

1.3 Research Questions

Based on the objectives listed above, a set of research questions were formulated to keep this study focused. Formulated research questions were as follows:

- What is the general landscape of industry-post-secondary partnerships for addressing skill gaps in the Canadian labour market?
- What aspects are innovative in industry-post-secondary partnerships which were different to traditional approaches to education and training?

³ Munro, D., Stuckey, J. and MacLaine, C. (2014) Skills—Where Are We Today? The State of Skills and PSE in Canada. Ottawa: The Conference Board of Canada, p. ix.

⁴ See footnote 1 above.

⁵ Drummond, D., Finnie, R., and Weingarten, H. (2015) Canada must Develop People with the Skills the Modern Job Market Requires. <http://www.theglobeandmail.com/report-on-business/rob-commentary/canada-must-develop-people-with-the-skills-the-modern-job-market-requires/article26872675/>

- What is the international context and what can Canada learn from international best practices?
- What are the overall lessons learned for developing effective industry-academia partnerships in the future and what are the ways forward to mitigate a skills shortage in the Canadian labour market?

1.4 Scope, Boundary, Scale and Limitations of the Study

Although an extensive scope would exist to cover a number of aspects in the study, efforts were made to narrow the study and focus on the key themes originally identified. It was recognized that a great deal of studies were underway along other avenues relates to skilled trades. For that reason, this study chose to focus on those areas which would not be clearly covered by the studies and discussions on skilled trades. While laying much emphasis on undergraduate, diploma or other job-tailored training, the community colleges and their partnership with industry got more space in this study. In so doing, partnerships in advanced level courses or research between universities and industry partners was not covered. Due to the limitation of resources and the expected level of coverage, the study was designed to focus on cases mainly from around the Greater Toronto Area in Ontario.



The partnership cases presented here provide a window to look at the broader environment in industry-academia partnerships. As the select cases were identified through referral and internet searches, they do not demonstrate the characteristics of a systematic sampling. Similarly, the inference of the study is not to claim that the cases covered in the study are the best examples of partnerships. It is also important to bear in mind that the study depends on the case-specific information provided by at least one partner institution which owns the partnership. It was not in the scope of the study to independently verify information received from such sources.

1.5 Methodology/Approach

The study used a three-prong approach in terms of the study process and methodology: literature search/review, case studies, and analysis and interpretation.

Literature review

The study started with the review of literature and published materials related to the scope of the study. The purpose of the literature search was to scan if any relevant publications are available on industry-academia partnerships in Canada and globally. The online avenue targeted for literature searches were as follows:

- Google /google scholar search (with a set of different key words pertinent to the study)
- A number of key line-ministries' websites were browsed and other government organizations both in the federal and provincial governments in Canada which have roles and accountabilities in policy areas such as education/training, skills, labour force development, higher education, industries and business development
- Websites of a number of key post-secondary educational institutions (mainly community colleges in the GTA)
- Information was also searched in the websites of the key institutions involved in the areas of training, innovation and skill development, including the Conference Board of Canada, and several workforce planning boards in Ontario
- Similar search was conducted into key professional and industry associations; for example, the Canadian Institute of Financial Planners(CIFP), Chartered Professional Accountants of Ontario (CPAO), and Canadian Manufacturers and Exporters (CME)

Case study Interviews



After the initial review of information gathered from the internet research, a few cases were selected for further study. These identified organizations were then contacted for further information and interviews (See Annex 1 and 2). For all

cases, interviews were conducted with at least one partner organization to discuss the details of the partnership, personal and organizational experiences in the partnership and the lessons learned. In most cases, interviews were undertaken with the Faculty Dean, Associate Dean, Academic Director/Chair, or Program Manager if they were from a post-secondary institution and with chief Executive Officers (CEOs) or other high level officers when the interview was conducted with industry partners. In all cases, semi-structured interviews were conducted with the respondent; the interviewer asked questions and the respondents shared their experiences related to the partnership. The interviewer prepared interview notes for each case when the interview session was over. Case-specific interview notes were sent to the relevant interviewees to confirm if their responses were correctly represented.

Analysis and Interpretation

At the final stage, both set of materials were pooled together for analysis and interpretation. Case studies were evaluated in the light of findings from the literature review. Using the lessons learned from international best practices, Canadian partnerships were evaluated and room for improvements identified. Recommendations are presented at both the policy and program levels to help advance these kinds of partnerships.

2. Case Studies

In this section, findings of the case studies are presented in descriptive fashion. There were six cases explored for the study, which are presented here in order of interview date (See Annex 1 and 2).

2.1 Siemens Canada-Sheridan College Partnership for Mechatronics Education

It is widely recognized that traditional engineering education is lopsided towards the theoretical learning of concept and design only. Partly related to the same discrepancy, fresh graduates are not allowed to use engineering designation until they accumulate certain years of work-place experience. In that context, the new wave in engineering education favors a holistic approach known as the CDIO (concept-design-implement-operate) model that combines components of learning with practical experience. There are a few renowned international institutions who have embraced this new movement and Sheridan College (Brampton) proudly claims to be a part of it.

Traditionally, industry provided significant training for new employees but today the private sector as a whole is looking for job-ready graduates who can start working independently immediately. Industries and businesses are under pressure to cut costs in the global competitive environment and are increasingly reluctant to pay for training new employees.

In response to the pressures on businesses and the reconceptualization of engineering education highlighted above, Sheridan College formed a partnership with Siemens Canada to develop curricula that included mechatronics education in their program portfolio. Accordingly, Sheridan's Centre for Advanced Manufacturing and Design Technologies (CAMDT) was expected to be transformed as a learning platform for the industry, the student and the college itself. It is important to note that professional relationships were key to developing this partnership. Both of the main figures behind this partnership got to know one another well through their participation in various networking groups in Peel and Halton region where they would have ongoing discussions regarding innovation, need and opportunities.

Drawing from the knowledge repository of Siemens Germany, Siemens Canada uses a systematic approach to mechatronics and that is what Siemens Canada wanted to see taught through this partnership. Both partners claim that the new notion of engineering under CAMDT (also supported by Siemens's partnership) would transform engineering education in a manner that would bridge the silos of sub-disciplines. Siemens and Sheridan, as partners, believe in the need for integrated knowledge in a technician/technologist who can confidently handle engineering problems in a manufacturing environment and provide solutions to it. The new approach takes problems as a whole and develops and offers solutions

to these problems. The new approach starts from the top (the problem) and progresses to the bottom (the solution) whereas traditional teaching would typically start from the solution. The reason behind this is that the traditional approach to engineering tends to get lost in the narrow niche of each sub-discipline and graduates trained in this model lack skills to collaborate or even communicate with colleagues/professionals in the other sub-disciplines. It is noteworthy that the field of mechatronics, as its name suggests, involves concept, theories, and methods of all major three subfields: mechanical, electrical and computer engineering.

The partnership would involve four pillars within it--education and training, infrastructure/software etc., curriculum development, and qualification and certification. For all stages of partnership, Sheridan College primarily bears the cost whereas Siemens provides support in knowledge and technology and for some other minor causes basically in kind. As part of the partnership, professors from Sheridan College went to Germany to learn the skills and technology related to the program at Siemens Academy where there are 10,000 students studying at any time. To start, Siemens helped Sheridan establish a learning Centre/lab and also in curriculum development. Siemens kept its eye on lab set up and development and significantly contributed in curriculum development and will also be involved in students final skill-test for diploma when the first batch of students complete the course in May 2016. When a student completes the course, Siemens will offer Siemens certification and the college will offer a diploma. Noteworthy is that Siemens certification is widely recognized by big names in the industry worldwide. Both partners expressed satisfaction with the ongoing progress, process and collaboration. It appears that there could be a great role of personal approach and trust for this kind of partnership to be successful. Interviewees from both sides of the partnership were excited about the response and interest shown to the program by both students and the industry community. Mainly manufacturers are excited about the skills the new generation of student possesses on graduation. When asked which sub-sector of manufacturing will benefit more by this particular training, the answer was that the skill set applies horizontally with potential application to almost all sectors from food production, construction, mining, energy, automobile, healthcare and all. A Mechatronician deemed to learn problem-solving skill just as one and an internally connected a complete set.

2.2 George Brown College Partnership with GTAA for Design Study

This best practice story comes from the post-graduate (PG) certificate *Interdisciplinary Design Strategy* program that is part of the Institute without Boundaries (IwB) at George Brown College in Toronto. Each year, the Institute works with different partners, which enables the Institute and the College to develop innovative solutions for various challenging and exciting design problems for industry partners. One such partnership occurred in 2013-14 when the Institute coordinated and led a program of innovation for which the Greater

Toronto Airport Authority (GTAA) provided the platform. The partnership was developed between the IWB and the GTAA with the aim of assisting the GTAA in developing plans for integrating the world-class airport in Toronto with its neighbours. The vision was to develop an advanced airport system, which could compete with other regional airports such as New York and Chicago in innovation and services. One part of the partnership was to study existing differences and similarities in organizational and management structure, human resources practices, operational model, application of technologies, customer service approaches and pollution management strategies.

As part of this collaboration, the Institute provided its students the opportunity to collaborate and exchange with other streams of students from George Brown (students from video game design, architectural technology, design management and graphic design) as well as from the wider institutional and geographic spread. The Institute also sponsored exchanges for professionals from internationally recognized institutions such as Polytecnico di Milano, ECV-Paris, KEA-Copenhagen, and IADT-Ireland to visit Toronto. In this way, the Institute brought together a large number of national and international professionals and students who could significantly contribute to enhance the design study and engage in two-way communication, collaboration and dialogue with the IWB and the student community. The industry partners include the London-based Engineering and design firm ARUP and as many as 70-80 local design firms over the yearlong study. These partners would promote and stimulate ideas and participate in innovation.

During the project, students had the opportunity to work directly with clients and be exposed to and experience real-life challenges in the workplace. Their field experiences would be a great way for learning workplace language and verbal and non-verbal behavior. In return, one of the realized outcomes of the partnership was the design of a report for the GTAA titled 'Pearson at the Centre' which is highly appreciated by the airport authority and is reportedly becoming instrumental for initiating aspects of the airport improvement plan. Interestingly, the partnership was true also in a monetary sense as all stakeholders (i.e. GTAA, Metrolinx and Toronto Region Conservation Authority (TRCA) took responsibility in cost sharing and supporting the students' study activity during the year.

What makes this partnership particularly interesting is that in traditional teaching and training six teachers would deliver six courses/modules whereas in this model, it was possible to bring as many as 150 professionals to teach, train and mentor 12 students. Students learned to work in a fast-paced environment along with the demand for high-speed productivity. Partly because of the success of this project and also other recognition that the Institute has been able to earn, George Brown has experienced increasing interest from other industry partners to collaborate further.

It was repeatedly stressed that traditional teaching and training was focused heavily on theory and classroom exercises but in recent times, at least at the lwB, emphasis is put on skill development and collaborative practice. The new approach and initiative can be seen as an outcome of the experiential learning of the deficiencies in the labour market. In fact, the lwB vision and approach articulates the context of skills shortage in the labour market and a corresponding response of the post-secondary institution in the sector. With special reference to design study, it was reported that the major problem for the new generation of learners is a need to adjust to employment and effectively deal with contingencies and customer behavior. The present need is for more project-based learning; in other words, students need to be ready to plan and conduct their projects and solve all contingent problems to deliver output of a required quality, quantity and time.

2.3 Bitebank Media-Centennial College Partnership for IT and Computer Technology Education

Bitebank Media, a local Canadian web-based product developer, entered into a partnership agreement with Centennial College in Toronto in 2012. The partnership was with the College's Applied Research, Innovation and Entrepreneurship Services. Having known the possibilities for partnership with the College, Bitebank Media approached Centennial College with a clear business objective as well as different functional options for consideration. The main motivation for Bitebank was to work with student learners not just at the final stages of their study (as typically happens in the traditional apprenticeship model) but also from the early stages of their course or the talent development. The partnership, in other words, would allow Bitebank to watch for enthusiasm, talent, and potential in each student learner who works with them for a sustained period of time. The students, in return, would get the opportunity to learn the skills, behavior and the real-life challenges in the workplace that the industry or their prospective employer will be in pursuit of at present or in the future.

Both partners signed a memorandum of understanding where Centennial College would send IT/computer technology students to do internships with Bitebank as part of their course. Further motivation for the students was that they would also get paid for their time, with the level of compensation depending upon the project they sign up for. According to the project agreement, both partners would bear the cost of the student's wage on a 50-50 basis. The college was able to receive grants from public funds to compensate for this cost. During the course, students were co-mentored and trained simultaneously by both the college and the industry.

During the first stage of the partnership, Bitebank hired 10-12 students for a couple of projects and all successfully graduated by the end of their term and have already got full time employment at Bitebank or in other local companies in the sector . The first batch of students worked on a couple of projects developing

websites (<https://dentalpatiented.com/> <http://mypracticetv.com/>) that targeted dentists and their service recipients as the main consumer. The website has useful features including 3D patient education movies, reputation management, a unique online booking engine, and patient notifications via email, SMS and voice reminders.

Dentists from all over the world can have access to it upon their membership and the payment of premium. As the content of the website mainly caters to the English speaking population, there are thousands of subscriptions for it from all over the world which spreads mainly in 4 major English-speaking countries - Canada, USA, UK and Australia. By now, products developed during the partnership have been fully functional and owned by Bitebank Media so all income generated from subscriptions now becomes a source of revenue for the company.

Thus, this partnership offers benefit to all parties involved. The college has demonstrable success in their objective of delivering employable education and training when their graduates easily obtained jobs after graduation. This helps raise the college's credibility and public perception of their standards. The partnership allowed them to cater practical aspects of learning and training in their course due to the support and avenue provided by the industry partner. It was a remarkable shift to a new philosophy of education and training as opposed to the traditional model where theoretical aspects were much emphasized and post-secondary institutions were under public criticism for failing to give students real-life practical work experiences. The students got the opportunity to get the real fruit of their education and training when they got practical training during their study and the dream job after graduation. This model gave the industry, in this case Bitebank, an opportunity to participate in developing the kind of talent they would need in the present and in the future. It also got the opportunity to learn from the viewpoints and exciting ideas and enthusiasm of the young generation of learners. The media content that was developed during the project for which they had to pay only 50% of the human resource costs remained their permanent asset and source of revenue forever. Thus, the model presents an example of partnership in post-secondary education and training with win-win outcomes for all.

2.4 Developing New Skillsets in Human Resources Management Study: The Partnership between George Brown College and Ceridian

As part of the graduate diploma course in human resources management, students are expected to demonstrate a range of cutting-edge skills in human resources management and the industry has been more competitive due to the aid of advanced technologies. Businesses in the field were increasingly using sophisticated tools and techniques raising their effectiveness (in terms of time and cost), competitiveness and professionalism. Employers in the sector were looking for those skills in the prospective employee and the college was under

pressure to deliver those skill-sets to the new graduates who were entering the labour-market in near future. That very pressure is something that paved the way for this partnership between Ceridian and George Brown College to come into being. The college explored/evaluated different options for working with industry and finally arrived at the conclusion that a partnership model with Ceridian was the most cost effective and practical.

Both partners had an established working relationship with each other as Ceridian was one of the local industry partners in George Brown's program advisory committee and that relationship fostered further partnership between the two organizations. Ceridian, widely known for their payroll outsourcing services, had recently developed an online HR Information System (HRIS). Ceridian had been using this tool within their organization but this was the first time they had partnered with an academic institution. The view and experiences of the present and future user would be illuminating and valuable for its improvement and future success. The company believed that their software and the HRIS was comprehensive and provided tailor-made solutions for different tasks relevant to the HR management industry such as payroll production, workforce planning, employee record management and using data to aid managers in decision making. In light of this understanding, an agreement was drawn between the two partners to conduct a pilot test within the platform of HR management classes at George Brown. In order to proceed with this option, the faculty sought a general opinion from the college IT department and received a positive opinion to the overall concept and process inherent in the proposal. According to the agreement, Ceridian provided training to George Brown faculty members in all aspects of HRIS and took the major responsibilities to set up the system for testing. Under the agreement, the business partner (Ceridian) would provide support for maintenance and updates/changes.

The partnership was, in fact, realized to be beneficial for all involved. The faculty members got the opportunity to update and learn new technology along with the spirit of continuing professional development. Students got the opportunity to learn an advanced online system which they would need to demonstrate while applying for jobs and would need that competency to effectively work in real life workplaces. The HRIS component in the program would enhance the standard and popularity of the George Brown's HR management course among the prospective student community and this was something which effectively attracted the college to this partnership. For Ceridian, it provided multiple benefits. Firstly, the partnership provided the opportunity to test their software and get feedback from students and faculty who make up the community of end-users of their product. Secondly, their software and HR system would become popular among the student community who were going to be the real users and promoters of their software when they knew it and liked it. The generation of students who learn their system/software would be prepared to work for them or would promote their HRIS tool in the HR industry at large.

The pilot phase has come to an end with the expected level of success and negotiations are under way to continue this as part of the HR diploma program in the years to come. So far, this component of learning was embedded within the business elective course but in near future, the college is evaluating an option to make it a mandatory for all HR courses and integrating this tool both at the diploma and postgraduate levels. In reference to various factors such as the success in achieving the planned objective, the benefits realized by all parties involved, and its direct use in the real workplace problem solving, this partnership demonstrates itself as an example of best practices in industry-academia partnership.

2.5 Centennial College and Bombardier Partnership for Structural (Aircraft) Assembly Training

Bombardier Aerospace, the Canadian aircraft maker, and Centennial College have partnered to address a looming skills shortage in Ontario aerospace industry. Having identified Centennial College as the company's "Trainer of Choice" for aerospace skills training, Bombardier recognized that Centennial would have the capacity and expertise to support the launch and delivery of this 16-week program for the first time in Ontario.

The company realized that partnering with a post-secondary institution like Centennial College would enhance the scope of the training as they would have effective systems in place to conduct a wide-scale recruitment of prospective students and instructors. Bombardier has contributed curriculum and some materials required to launch the program, and Centennial contributed the development of a newly developed lab at its Ashtonbee Campus.

Since the cost for aerospace training is very high due to the expensive nature of the equipment, the two partners sought support from the Ministry of Economic Development, Employment and Infrastructure (MEDEI). The partners applied for and received funding from the Youth Skills Connection – Industry Stream program (which is part of the Ontario Youth Jobs Strategy). This funding was instrumental as it provided a subsidy to student tuition costs for qualifying youth, increasing the number of eligible applicants.

The partnership started with an active review of curriculum by both partners as well as collaboration on the development of the new lab to ensure alignment with College standards as well as Bombardier business practices. To ensure successful implementation and launch of this program, the project was actively coordinated and a weekly 'traffic meeting' was held between project committee members from both sides. The meeting would often focus on reviewing curriculum, recruiting faculty and students, delivering courses and resolving any emerging issues.

Bombardier was also actively involved in the student recruitment process, as it was understood that students who were accepted into the program also needed to be eligible for employment upon successful completion. In fact, in alignment with the government-funding program, there was a requirement for the industry partner to commit to hiring a percentage of successful applicants. Therefore, the student recruitment process also included a thorough employment screening, including an interview with Bombardier.

The project funding was approved in March 2014 by the government and since then 40 students from the first two cohorts have successfully completed the training. All those who graduated have received offers of employment with either Bombardier or its subcontractor Mitsubishi Heavy Industries.

2.6 Seneca College Partnership with Public and NFP Sector Organizations in Communication, Art and Design Study

Many of the courses within the Faculty of Communication, Art and Design have a focus on enhancing communication skills in their students by the use of arts and design and this is increasingly realized as a useful skill in a broad spectrum of work settings—community organizations, media, public services and business corporations. This particular partnership bannered under ‘design for social change’ was embedded within the graphic design program at large. The model for this kind of partnership is described as ‘client-based collaboration’ and following this model the school has been in partnership with different partner agencies every year. In recent years, organizations such as Toronto Community Housing Association (TCH), March of Dimes, and Toronto Police have been the client/industry partners. To illustrate the feature of the partnership, a couple of cases were chosen for discussion. Among the two cases discussed here, one was a Seneca partnership with TCH and the other was the partnership with March of Dimes- a well known not-for-profit organization in Canada. The partnerships with TCH helped student design a communication strategy to raise awareness in architects and builders about the importance of accessibility in community housing. The second case of the partnership with March of Dimes was about developing a communication campaign to raise public awareness about elder abuse.

The guiding concept of this partnership model is that there are varieties of problems in society/community where public and not-for profit organizations work. Often the root cause and the solution is differently assumed and it becomes challenging for a change agent to communicate their message to the target audiences. This is in fact, one of the key areas where a skill gaps exists in the public and not-for-profit sectors. In that context, the field of ‘art and communication design’ claims that it can help design and implement communication campaigns/strategies in more visually effective ways.

Deeply guided by the concept and aspirations of partnership, this school in Seneca were always motivated and open for proposals from the public sector as well as NFP organizations. When the college receives proposals, it assesses the presented problem for its do-ability and determine if it falls within the scope of art and communication design. If found to be doable and within the scope of the course, a partnership is formed between the proponent and the college. The partner agency is required to send a participant/employee/ representative for a 7 weeks course in the college as a resource person who actively participates in class with the students and provides detailed information about the problem to help the students arrive at an effective communications solution. In seven weeks' time, different groups of students develop their projects and the school evaluates which one was the best and forwards it to the partner agency to consider for implementation. In the case when the partner/client would accept and use it, they would compensate the nominal costs of the project to the group of students who prepared it.

For example, in the case of the partnership with TCH, students advised a number of strategic communication activities to help raise awareness in architects and builders about the accessibility issues in community housing. The case with elder abuse issues while working with March of Dimes was similar. The final recommendation involved a number of strategies and programs that, when implemented, were likely to help communicate key messages of the agency across target audiences in an easy, effective and socially acceptable way.

Partnerships under this model have often been very successful in filling skills gaps in the community organizations and helping solve societal problems in very cost effective ways. Students could claim their patent rights on the design developed and refer to the project in their resumes. They also learn other key skills such as how to design communication campaign/strategies to resolve real-life social challenges through their training in communication design. They also learn to work with community workers who actually work in the community and are knowledgeable about community problems. The partner community organizations got cost-effective solutions to the challenging social problems they were dealing with on an everyday basis. The college, being the liaison between the community clients and student, would definitely have reason to boast when their students become instrumental in reducing or alleviating social problems and when their course becomes instrumental for filling skill gaps in the relevant organizations/sectors. This model of partnership has a lot of scope in raising the skills and competency of Seneca students, aiding their employability in the field.

3. Review, Evaluation and Recommendations

The study was able to cover cases from a wide selection of academic or skill areas that allows one to see outcomes in a cross-sectoral as well as inter-disciplinary perspective. Although the study was limited in terms of coverage and the number of cases involved, it is supported by enough insights for making a generic conclusion.

3.1 Review of Cases and Lessons Learned

A summary of findings that came out from the analysis of the cases is presented below.

Pioneering attempts are encouraging and inspiring

The outcomes of the partnership cases covered in this study are generally positive. It appears that the stakeholders on both sides of partnership were generally aware of the opportunities as well as the concept and process of partnership. There were indications that revealed how most of the partnerships were able to achieve the desired output/impact. An optimum level of success in graduate employment in Centennial-Bitebank, and Centennial-Bombardier partnership are just two examples. An increasingly positive response from prospective industry partners for further partnership has been evident in Seneca-NFP partnership cases in the communication design field. Similar experiences are evident with other cases of partnerships covered by this study too.

Public funding can have a positive impact

It appears that public funding has a positive role in fostering industry-academia partnerships in addressing skill gaps. This is likely to work as a motivating factor for either or both sides of the partners to invest time identifying likeminded partners and doing preparatory work for the partnership⁶. The involvement of public agencies may also help enhance the recognition of programs and partnerships in the wider community which one or both partners value. This inference is supported by the case of Centennial- Bitebank media partnership as well as the Centennial-Bombardier partnership. In the earlier case, the college was able to pay wages for the time student spent with the partner agency and in the latter case, part of the funding was used to support the learner in paying their tuition fees.

⁶ Jones, S. and Clulow, S. (2012) How to Foster a Culture of Collaboration between Universities and Industry, The Guardian <http://www.theguardian.com/higher-education-network/blog/2012/aug/02/the-value-of-research-collaborations>

Businesses in the driving seat enhance potential for success

A partnership is likely to have a sustainable outcome especially if it is initiated by an industry partner. Concepts for partnership in Centennial-Bombardier, Centennial-Bitebank Media, and the Seneca-NFP partnership first came from the industry side and an active involvement of industry partners was reported during the planning stage related to Sheridan-Siemens as well as the George Brown-Ceridian partnership. Among other things, the concept coming from the industry-partner is likely to support their business interest. In fact, partnerships seemingly take clear shape when industry interests are clearly understood, defined and addressed. It is industry or business that know what skills are required and where the gaps are.

Individual, professional and institutional contacts pave ways for partnership

No partnership emerged in a vacuum. Existing contacts at individual, professional and organizational levels were found to help build trust and pave ways for partnership. Key figures behind the Sheridan-Siemens partnership were in professional contact for long time, the industry-lead in Centennial-Bitebank partnership was a college alumni and the George Brown-Ceridian partnership was supported by the organizational contacts between the two partners from the past. Thus, pre-established contacts and institutional memory likely ease information flow, facilitate smooth communication and nurture trust. It is less likely for any partnership to emerge between people who don't know each other. There was a case of a partnership between an Ontario community college and an industry partner that ended prematurely when the persons behind the partnership left their positions.

Motivation for academic partner



It is important to identify factors that motivate academic partners to be pro-active, knock on the industry door and extend hands for partnership. These factors could be either threats or attraction. When a training provider fails to attract new students or there are increasing complaints about the deficiencies in the skill set in a given course then there may be some motivation for a post-secondary institution to review their program and work for innovation. In other words, the potential for enhanced employment outcomes is a key that might effectively motivate post-secondary partners to collaborate. Positive motivation could be the alternative. When there is an opportunity for individual networking and professional development then that could motivate a post-secondary institution to form a partnership. Both factors seemingly worked equally for the partnerships reviewed in this study. Changing demands for the new skill set were behind the partnerships for Sheridan-Siemens George Brown-Ceridian, George Brown-GTAA. Opportunities for continuing professional development, networking with industry colleagues, and attraction of international exposures (in some cases) appears to be motivational factors for the Sheridan-Siemens, Centennial-Bombardier, George Brown-Ceridian, George Brown-GTAA partnership.

Size of the business matters

It is interesting to note that the size of the potential industry partner is one of the determinants for the potential participation with post-secondary institution. Big companies with complex organizational structures and a bureaucracy with a lot of protocol issues may find it more difficult to form partnerships. However, exceptions apply when certain conditions exist. Partnership may still be possible

if prospective partners had a pre-established relationship in the past, or if an academic partner has a competitive advantage in the field (as in the case with Centennial- Bombardier partnership). Instead, small organizations seem to be easier to communicate with and bring to the partnership table when their interests are visibly addressed. An example of this is the Centennial- Bitebank Media, Seneca-NFP, George Brown-Ceridian partnerships.

One-to-one partnership has a higher chance to succeed—simplicity matters

The reviewed cases suggest that one-to-one partnership has a better chance of success. This proposition is also supported by hindsight of program review committees that often pooled together a large number of stakeholders. More than one partner on either side -- industry or post-secondary sector - could bring complications and conflicts of interest in the partnership process. The differences in organizational structure and culture, chain of command, technology in use also provides reasons for differences and conflicts among partners when more than one partner is involved on either side of the partnership. A thorough review is a precondition to formulate a partnership plan having two or more organizations from the same side (training provider or industry) to assess whether they share sufficient similarities in human and technological dimensions. One of the reasons for the cases presented here to be successful was their straightforward and simplistic relation with their single partner on the other end.

Physical proximity as a success factor

Physical proximity allows for better contact and communication including visits and face-to-face meetings. Coming from the same geographic or eco-regional category may increase the chances for the partners to hold a shared understanding of people, places and problems they deal with. Except for Centennial-Bombardier and George Brown-GTAA partnerships, the partners on both sides were local in all cases included in the study. One of the challenges reported in the prior case was the distance between Bombardier headquarters which is in Montreal and the location of Centennial College in Toronto.

Cost-sharing is a precondition

There is a general consensus that the shared responsibilities for costs could be a strong prerequisite for any partnership to succeed⁷. Cost sharing may enhance the feeling of ownership and concern for success for either side of the partners. This factor was present with all the cases included in this study as both partners would share some kinds of resources to make the partnership happen.

⁷ Soares, L. (2010) The Power of the Education-Industry Partnership: Fostering Innovation in Collaboration Between Community Colleges and Businesses <https://www.americanprogress.org/issues/labor/report/2010/10/04/8518/the-power-of-the-education-industry-partnership/>

Changing needs trigger partnership

Partnerships are warranted when at least one of a few situations are present. One of those situations exist when a prospective academic partner realizes a critical need to add practical learning in an otherwise theoretically driven course (i.e. cases of Centennial- Bitebank media, Sheridan-Siemens, Seneca-NFP, George Brown-Ceridian, George Brown-GTAA). The need of IT skills in the course (Ceridian), or a market pressure for interdisciplinary/multidisciplinary knowledge and skills (i.e. cases of Sheridan-Siemens, George Brown-GTAA) could present other compelling reasons for the academic partner to go for partnership. The industries for which post-secondary institutions are supposed to produce a skilled work force may have an accurate understanding of the changing needs in the sector and a mastery over those skills. Therefore, partnership would allow post-secondary institution to benefit from a technology transfer from their industry partners during the partnership.

Roles in program advisory committee is not enough

Representation of industry partners on a program advisory committee is the most common mode of involvement of industry with a post-secondary institution. Program advisory committees often draw membership from a wide range of stakeholders and that way it becomes an all-in-one type. Due to the diversity of the committee, it often becomes challenging for a post-secondary institution to get a focused, substantive, and uncontested views from industry partners. Even though there may be a big number of similar industries related to one program/skill area, their technological domain and genre of skill-sets may be varied and for that reason someone's views and experiences may contradict the others'. The concept and method of industry-academia partnership as covered in this study seems to be a progressive initiative building on the hindsight of the industry partnership in program advisory committees.

3.2 Evaluation of the Partnership Cases

Evaluation of the presented cases is deemed appropriate in two respects as to how they stand out from and are innovative to the traditional teaching and training landscape in Canada and where do they stand in international comparison. Traditional teaching and training in general was considered to be more theoretical and comprehensive in nature. The notion behind this was that the graduates would learn task specific practical skills at the workplace itself. When realizing a changing needs of the market, different transitional arrangements were introduced that included the idea of internship as well as apprenticeship. The industry-academia partnership can be taken as a new and advanced approach down the line^{8,9}.

⁸ See footnote 5 above.

Internship is an opportunity that provides a learner an avenue to understand the profession, to become familiar with the work pattern, and to learn 'some skills' related to the job. Apprenticeship offers the learner more in-depth opportunities to engage and work in the trade. By nature, apprenticeship is more job-tailored, in-depth, and thorough than the opportunities available for an intern. Primarily, interns are understood to be those who are interested to know the profession and learn some skill sets when they have not yet determined to pursue that career path. Apprentices are those who have decided to go in the career path in question and want to gain competence of the skill set to work in the profession. Another difference is that interns may not end up working for the employer they are doing internship with; whereas, it is highly likely for an apprentice to work for the employer in future where they are doing their apprenticeship. In Canada, internships may be available in almost any profession but apprenticeship is much more popular in the skill trades sector.

It may be a valid question to ask why Canada bothers with the new approach of industry-academia partnerships instead of strengthening or expanding on the success achieved in the apprenticeship model. However, it is to be recognized that the concept of industry-academia partnership is not something designed to replace any existing schemes or arrangement. Despite that it is appropriate to look at and examine key differences between the two. The following are those key features identified by the review of apprenticeship model in reflection to the cases examined in this study.

- apprenticeship is typically available and popular in the skilled trade sector whereas industry-academia partnerships could be developed in any field of learning and training
- in the apprenticeship model, apprentices join their prospective employer (apprenticeship provider) in the later stage of their theoretical learning in post-secondary institutions whereas an industry/employer can collaborate with a post-secondary institution at all stages of courses starting right from the curriculum design stage to the stages of course delivery and assessment down the line
- apprentices are expected to connect and utilize their theoretical learning to the practical setting and there may be a lack of support, mentorship and guidance for the apprentice upon a two-way back and forth communication, interaction and dialogue between the provider (post-secondary institution and industries/employer) whereas a well-designed industry-academia partnership can tailor to the need of a learner placing them in the center of planning

⁹ OECD (2012) Leveraging Training and Skills Development in SMEs: An Analysis of Two Canadian Urban Regions: Montreal and Winnipeg
<http://www.oecd.org/canada/Canada%20report%20FINAL%20formatted.pdf>

- apprenticeship approach is linear in structure - i.e. theoretical learning in the initial stage and then practical exposure but a well-designed industry – whereas academia partnership provides learning opportunities in theory and practice in parallel in a more organic process, both gradually growing as the process evolves. The apprenticeship approach is more prescriptive as there will be a predefined learning outcome in one's apprenticeship period whereas industry--academia partnership fosters innovation and creativity and promotes new horizons of knowledge and scholarship
- apprentices learn skills/trade in a specific learning environment (people and place) and the training provider is most likely to be his/her employer in the future but the model of learning supported by industry-academia partnership is open and the learned skills would be applicable to work with any employer in the given field

Thus, having considered these differences between the two, an innovation towards the industry-academia partnership model should be understood as a prudent response to the challenges surfacing in the present-day labour market. Whereas the apprenticeship model may still have relevance in a particular trade, location and for the group of employers, the industry-academia partnership can open a wide horizon of possibilities for macro-scale problem-solving.

It is not just in Canada where industry-academia partnerships have been introduced or invented; instead this has been a global phenomenon in recent time, especially in the developed West. Therefore, it is a valid question to ask whether there were any interesting international achievements from which Canada could learn.

Partnerships are popular in both the UK and USA,, especially in research and innovation. In terms of career-focused skill transfer, the German model of 'education and training', known as dual model, is something that has drawn significant attention in academic and policy circles worldwide. The German model is known for its flexibility and transferability between work and education^{10,11}. A German model, combining practical and theoretical learning, is something education planners around the world envy. A learner in the German career model has the opportunity to take benefit from theoretical learning in the academic institution and practice it in the applied environment simultaneously. Both academic institutions and the industries have shared responsibilities when it

¹⁰ MacLaine, C. (2016) Three Take-Aways from Germany's Apprenticeship System. http://www.conferenceboard.ca/topics/education/commentaries/16-01-29/three_take-aways_from_germany_s_apprenticeship_system.aspx

¹¹ Wessner, W. (2013) How Does Germany Do It?, The American Society of Mechanical Engineers <https://www.asme.org/engineering-topics/articles/manufacturing-processing/how-does-germany-do-it>

comes to skills transfer and they are all well informed of the processes in each other's side. Despite this, it could be a risky move if some other country tries to copy it in different socio-cultural and ecological contexts.

With regards to the element of work-based learning, the UK model of education and training offers some interesting examples of flexibility and transferability which other countries can learn from (See Annex 5). A framework of education and qualification that applies to England, Northern Ireland and Wales is presented in Annex 5. This model offers significant flexibility, involves diversity and allows transferability within. Of the major three routes, the pure academic route is characterized as comprehensive education. The second route is a combination of academic and vocational learning. The third route develops along apprenticeship and work-based learning and all routes often recognize qualifications from the other routes and allows transfers. The Scottish system shares a lot of these characteristics but has some distinct features too. There is a greater role for the employer and workplace in shaping educational structure and content related to the second and third routes described above. Given the fact that Canada and UK share very close views in social and economic values for society, the UK experiences could be relevant for Canada.

Universities, mainly in England, Wales and Ireland, offer alternative models for undergraduate degrees. In most courses, students can choose from a three year course or a four year course with a sandwich year for professional learning in the workplace. In the latter case, a student goes to a relevant industry to learn the profession related to his/her course. Universities work closely with industries to ensure placement and coordinate practical learning for their students. Industries provide a great deal of opportunities for the learners to learn key skills required in the profession. Aspects of work-based learning are more heavily present in the courses organized within the vocationally driven route (described as second route above). The third route, known as National Vocational Qualification route (NVQ) is entirely about work-based learning. The qualification framework within this route is based on national occupational standards. These standards are statements of performance that describe what a competent person in a particular occupation is expected to be able to do. They cover all the main aspects of an occupation, including current best practice, the ability to adapt to future requirements and the knowledge and understanding that underpin competent performance. NVQs do not have to be completed in any specified period of time. They can be taken by full-time employees or by school or college students with a work placement or a part-time job. There is a greater role for the employer to facilitate their workers in learning key skills in their profession and preparing for NVQ assessments.

City and Guilds is one of the other leading skills development organizations in the UK, providing services to training providers, employers, and trainees across a variety of sectors to meet the needs of labour market (City & Guilds, 2016). This organization also works closely with employers to improve their performance through learning and technology.

There is also some literature that discusses industry-academia partnerships and the model of education and training in different countries. Some of them have based their discussion in special reference to an actual assessment of the partnership cases. A compendium of publications is listed in the table presented on Annex 3. With special reference to the German system, Wessner (2013) outlined a strong collaborative culture of research and innovation between small and medium enterprises (SME) and research organizations and highlighted it as crucial for sustained growth in German businesses and industries. Jones and Clulow (2012) discussed possible determinants for the failure of partnership in special reference to UK¹² whereas a report published by the Canadian Chamber of Commerce highlighted potential barriers for successful industry-academia partnership¹³. With reference to the actual on-going partnership cases, studies from USA such as Soares, 2010¹⁴; Caro, 2007¹⁵; The Economist Intelligence Unit, 2014¹⁶; BHEF, 2013 have presented interesting observation about the precondition for success¹⁷.

The case studies conducted for this study have some similar findings to those of case studies from USA. Soares (2010) highlighted the importance of professional development to the faculty and the sharing of resources. Caro's study (2007) highlighted factors such as flexibility on the part of the academic partner and their resilience to change, leadership commitment and careful deliberation of faculty roles in nurturing partnership as preconditions for success. The report of the Economist Intelligence Unit (2014) underlines the roles of value for all partners, strong leadership, shared governance whereas BHEF (2013) highlights the need for identifying and tapping core competencies for education-to-workforce transition and co-development of new courses. Observations made in this study include some points that were not specifically reported by the other previous studies reviewed. The positive role of public funding, motivating factors for both academia and industry partners for a successful partnership, size of the businesses and the physical location were additional factors noted in this study.

¹² See foot note 6 above.

¹³ The Canadian Chamber of Commerce (2015) Fragmented Systems: Connecting Players in Canada's Skills Challenge.

¹⁴ See footnote 7.

¹⁵ Caro, M.E. (2007) Higher Education Collaboration with Industry: Three Case Studies of Instruction based Partnerships. Dissertations available from ProQuest. Paper AAI3255874. <http://repository.upenn.edu/dissertations/AAI3255874>

¹⁶ The Economist Intelligence Unit (2014) Closing the Skills Gap: Companies and Colleges Collaborating for Change https://www.luminafoundation.org/files/publications/Closing_the_skills_gap.pdf

¹⁷ Business-Higher Education Forum (BHEF) (2013) The National Higher Education and Workforce Initiative: Forging Strategic Partnerships for Undergraduate Innovation and Workforce Development. http://www.bhef.com/sites/g/files/g829556/f/201308/2013_report_playbook.PDF

3.3 Recommendations for Future Policy and Intervention

Based on the lessons learnt from the analyzed cases, a set of recommendations are listed below for future policy reform and intervention.

Gather evidence

The activities in industry-academia partnership and stories of success are either limited or have not got enough publicity in Canada yet. While there are indications of encouraging outcomes as this study suggests, Canada needs more robust evidence to consider for a remarkable policy departure in this direction. At this stage, government should encourage industries and post-secondary institution to explore potential in partnership and showcase best practices. A further policy action may be appropriate when enough supporting data has been built.

Motivation for post-secondary institutions

It is important to motivate academic partners to be pro-active, knock on the industry door and extend hands for partnership. Provisions can be introduced in relevant policy that motivates post-secondary institutions to bring relevant industries to the table for designing and delivering skill sets within the range of courses they design and deliver. Successful partnerships with an industry partner could be introduced as one of the screening criteria for the post-secondary sector institution to qualify for public funding.

Another part of the same policy tool is the introduction of a sanction mechanism. When certain courses fail to attract a new generation of learner or there are increasing complaints about deficiencies in the skill sets provided, that should motivate the post-secondary institution to review their program and work for innovation. At the international level, a new movement is under way for making post-secondary institutions accountable for the quality of their course by using a graduate employability matrix. But this is something that may not turn out to be a magic button and it may take some time to make a positive impact on society. At least at the present time, Canada seems to lack effective policy measures that relate public education funding to their performance measured in graduate employment. Policy makers should think of ways to make post-secondary institutions more accountable for what they promise to deliver. It is safe to argue that the more the post-secondary institution works with industries, there is more opportunity to enhance the employability of their degrees/courses.

Motivate businesses

In a time of global financial uncertainty, businesses are under pressure to be competitive and cost-effective. Reducing labour costs could be one of the more effective ways to survive in this climate which is likely to be achieved through a

smart labour force strategy. Businesses are most likely to get an incredible benefit in effective workforce development if they collaborate with post-secondary institutions. However, this is something that has remained an untapped opportunity, at least in Canada so far. Businesses seem to have tried a lot of big initiatives and strategies but neglected something which is under their nose. In pursuit of enhancing productivity and competitiveness, businesses often end up hiring talent from a rival company offering high compensation which may not always be a smart and cost-effective strategy. Partnerships with post-secondary institutions allow them to reduce in-house training costs, obtain services from a floating pool of workers, participate in developing talent they will need in the near future and learn from the innovative ideas of the young generation of learners who have not yet joined the labour force. Federal and provincial governments should seriously scale up efforts to persuade businesses about the benefits of such partnerships.

Caution should be taken while adopting from international experiences

There is a lot of discussion going on in the academic and policy circles around the world regarding suitable models of education and training for the new century. A substantial discussion is taking place around the success of the German model known as 'dual-model' which offers flexibility to the learner and is highly career-focused. However, a caveat has also surfaced against a view which suggests other countries copy that model with little consideration to the differences between those two countries (Germany and the country in question) in their legal, political, cultural and administrative structure. Especially in the present time of uncertainty and sliding innovation in information technology, the future of labour market has become shaky. Technological innovation is taking away thousands of jobs every day¹⁸ but also creating a whole new arena of jobs. So, excessive emphasis on career education with a focus on a specific skill set may put the learner at high risk if new technology is developed to replace their job. Countries can certainly learn from each other's best practices and successes, but it is not recommended that they blindly adopt any specific model that was successful in a particular social, cultural and ecological context of a country.

Facilitating and promoting roles

While there are numerous agencies working in the area of education and training within the different levels of government, there is still room for further development especially in the area of promoting and facilitating industry-academia partnership. A possibility can be explored for reorganizing existing organizations/entities or establishing a new one with mandates in facilitating

¹⁸ Frey, B., and Osborne, M.A. (2013) The Future of Employment: How Susceptible are Jobs to Computerization?
http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

industry-academia partnerships. The entity could work to sensitize, educate, facilitate and promote the concepts and methods of and opportunities in industry-academia partnership amongst likeminded stakeholders. It could facilitate data generation, encourage methodological debates and dialogues, support match-making and publicize best practices. Lessons could also be learned from the organizational structure and process of relevant international agencies; for example, the skill program within Enterprise Ireland <https://www.enterprise-ireland.com/en/About-Us/Services/SkillsPlus/> the Skills Development Scotland <https://www.skillsdevelopmentscotland.co.uk/> the Skill Funding Agency in the UK and the Business-Industry-Higher Education Collaboration Council in Australia (BIHECC, 2016).

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Annex:

Annex 1: Details of the cases selected for in-depth study

Best practice case	Skill sector	Focus	Modes of industry involvement	Roles for post-secondary partner
Siemens Canada and Sheridan College	Engineering (Mechatronics)	Introducing newer approach in engineering training	Deliver faculty training, lab set up, curriculum design, student assessment and certification	Adopt Siemens supported mechatronics approach and integrate in faculty course portfolio
George Brown College and GTAA	Design Study	Innovative problem solving	Provide platform to study and innovate	Coordinate knowledge exchanges, liaise with stakeholders to provide favorable learning platform
Bitebank media and Centennial College	IT and Computer technology	Research-focused innovation	Provide space, workstation and engage in innovation	Tailor theoretical learning to feed into student's practical learning; co-mentoring
George Brown College (GBC) and Ceridian	Human Resources Magt.	Enhancing skill portfolio	System set-up, deliver faculty training	Host for HRIS system and provide HR courses as platform for testing and promotion
Centennial College-Bombardier	Aircraft Assembly	Imparting job-specific training	Provide curriculum, involve in student recruitment, course delivery and assessment	Provide organizational space and collaborate to deliver industry-led training
Seneca College and public and NFP sector	Communication and Design	Innovative problem solving	Bridging student with community knowledge and problems	Liaise between community partner and students; facilitate student's innovation

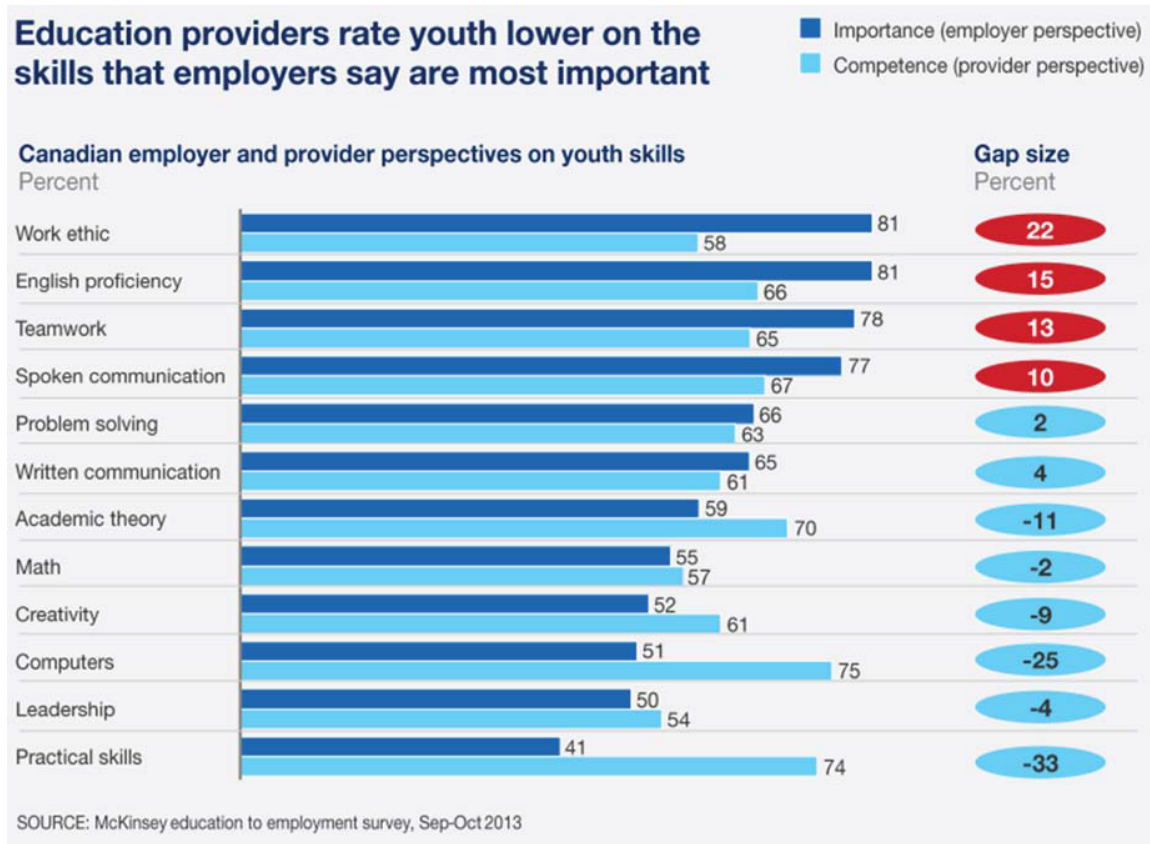
Annex 2: Interview details for the cases selected for in-depth study

Partnership case	Skill sector	Interviewee/respondent	Date of interview	Location
Siemens Canada and Sheridan College	Engineering (Mechatronics)	Dr. Farzad Rayegani (Associate Dean, School of Engineering) & Dr. Tom Murad (Director, Siemens Engineering and Technology Academy)	21 Dec., 2015	Davis Campus
George Brown College and GTAA	Design Study	Dr. Luigi Frerera, the Dean, Centre for Arts, Design & Information Technology	22 Jan. 2016	GBC, Richmond Street E., Toronto
Bitebank media and Centennial College	IT and Computer Technology	Chaitan Pettukola, CEO and cofounder of Bitebank media in Toronto	26 January	Phone interview
George Brown College (GBC) and Ceridian	Human Resources Magt.	Elizabeth Speers, Director, Centre for Business	27 Jan., 2016	GBC, 200 King Street E., Toronto
Centennial College-Bombardier	Aircraft Assembly	Carolyn Hyde, Manager, Projects and Operations, Centennial-Bombardier project	25th January 2016	Phone interview
Seneca College and public and NFP sector	Communication and Design	Mark Jones, Chair of School of Creative Arts and Animation (in presence of Michael Maynard, Dean of the Faculty of Communication, Art and Design)	27th Jan. 2016	Seneca College, 70 Pond road, Toronto

Annex 3: Compendium of previous research relates to the theme of this study

Reference	Country/ location	Precondition for success
MacLaine and Watt, 2016	Canada	mutual benefit, clarity in goals and objectives, communication, performance evaluation, adaptability and celebrating success
The Canadian Chamber of Commerce, 2015	Canada	barriers for participation: lack of understanding of each other's strengths, uncertainty of the roles employers can play, lack of shared vision for work-integrated learning, and gap in expectations about preparedness
Soares, 2010	USA	curriculum and instructional transformation, academic and social support to the learner, professional development to the faculty, sharing of resources, systemic institutional alignment and improvement
Jones and Clulow, 2012	UK	cause of failure are: uncertainty about the potential benefits (business's motivation for profit and academia for research output), time commitment for preparatory stage
MacLaine, 2016	German success (apprenticeship)	recognition of the skill across regulatory/administrative boundaries, coverage in broader set of skill area, extensive engagement of employer in planning, delivering and regulating
Wessner, 2013	Germany's Robust manufacturing success	Fraunhofer Society's research support to SMEs; flexible educational route; industry participation
Caro, 2007	USA	academic partner remain flexible and resilient to the changes, careful deliberation of faculty role for partnership handling, senior level commitment
The Economist Intelligence Unit, 2014	USA	local or regional challenge that calls for collective action, shared mission and goals, value for all partners, strong leadership, shared governance and accountability mechanisms
BHEF, 2013	USA	corporate philanthropy, identifying and tap core competencies for education-to-workforce transition, co-development of new courses, student research opportunities, employee and staff engagement for ensuring mass-support and advocacy for educational reform

Annex 4: Skill-gaps in Canada: perception of employer vs. education provider



Annex 5: UK (England, Wales and Northern Ireland) education and qualification model

