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**COMPETENCIES CAN BRIDGE THE
INTERESTS OF BUSINESS AND UNIVERSITIES**

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ABSTRACT

Universities have come under some criticism for not serving students and the business sector well in the school-to-work transition. Aggregate data show the transition is working reasonably well. Yet information that has recently become available points to ways in which the transition can be improved. Greater focus on general competencies may be the bridge that better links university, student and business interests. Business has identified such competencies as communication and problem solving as prime areas of interests in recruits. Some universities are broadening the scope of education from discipline-specific knowledge to encompass these competencies. While the approach has considerable intuitive appeal, mechanisms need to be put in place to track whether competency-based education enhances graduates' success in the workplace over time.

Competencies Can Bridge the Interests of Business and Universities

Executive Summary

Despite Canada's strong post-secondary education sector, universities have come under criticism for not serving students and the business sector well in the school-to-work transition. Although aggregate data suggest that the transition is working reasonably well, there is considerable room for improvement, particularly in the current context of slow economic growth and productivity. New information is surfacing that can be the basis of a skills strategy that would leverage an interest shown recently by both business and universities in general competencies. Such a focus on general competencies may be the bridge that better links university, student and business interests and is potentially useful for stimulating innovation and economic growth. This paper examines how students' transition from universities to the labour market could be improved through greater attention to general competencies and puts forth suggestions for action for the various stakeholders.

Business and Labour Market Perspectives

Business looks to universities to supply well-educated, skilled recruits, provide a portion of training for existing employees, and conduct research. That said, it may not seem appropriate to judge universities simply on how well they prepare their graduates for the labour market. Employability of graduates is not the central mission of the university, unlike colleges where employability of their graduates is often the central element. Yet, while students go to university for a variety of reasons, preparation for a satisfying career is why many if not most students attend university. And it seems fairly obvious that universities would cease to exist if their graduates did not secure good jobs. So it does seem legitimate to examine how well universities prepare students for the labour market, soon after graduation and down the road as well. The question at hand is whether a university education provides a resilience that sees the graduate through the inevitable shifts they will experience in the labour market and in other aspects of their lives.

The discussion of school-to-work transitions has been plagued, however, by imperfect information on developments in the labour market and Canada has had scant information on the labour market outcomes of university graduates. Fortunately, progress is being made on the information front through such tools as the Job Vacancy and Wage Survey, the income tax linkage project of the Education Policy Research Initiative, initiatives of research organizations and employer surveys, all of which are informing the discussion about the role of universities and their students as they relate to future career issues. While a lack of adequate data has shaped the debate about the university / business relationship, recent studies have debunked perceptions of a major disconnect between the two:

- Business leaders (individuals and associations), researchers and media analysts have claimed that Canada will face a large shortage of skilled labour, including in the STEM fields, implying that universities have not concentrated resources in fields that would be in high labour demand. Recent research has found that these claims are not backed up by the data. While there is some mismatch, it appears to be concentrated in specific regions, sectors, occupations and with regard to gender. Moreover, universities and students themselves have responded to persistent shifts in the labour market, as evidenced, for example, by the distribution of students moving from the humanities and behavioural sciences toward business and administration.

- Graduates working in jobs with lower education requirements or working in areas not related to their studies are interpreted by some as signs that universities are producing graduates in the “wrong” fields. The notion that graduates should work in their field of study and in positions deemed appropriate for their level of education, however, is a rigid view of the workplace. Having better educated workers with diverse educational backgrounds may be the catalyst the Canadian economy needs to break out of its productivity malaise. By bringing better skills and different perspectives such workers may be able to improve the way things are done in Canadian business and the economy in general.
- There has been considerable reporting about university graduates struggling to find satisfying and / or well-paying jobs. Recent studies and surveys, however, have generally shown continued high employment rates for university graduates, substantial earnings premiums over college graduates and that the vast majority of students feel they are working in fields closely or somewhat related to their studies. Research results also show that there are, unsurprisingly, discrepancies among graduates based on their varying fields of study. Current research linking income tax data with student data, which is finding a convergence of earnings among disciplines over time, points to the importance of collecting data upon graduation and at points beyond.

Information is emerging on the types of workers Canadian businesses are looking for and the skill sets they seek. Recent employer surveys indicate that the emphasis is less on experience and subject-specific knowledge and more on broader competencies such as people skills / relationship building, communication skills, problem solving skills, analytical abilities, leadership skills, project management skills and creative thinking. The priorities revealed by business are essentially what, in university-speak, is referred to as outcomes-based or competency-based education. The question is, how well does the supply of graduates match what business demands and, to the degree the supply does not match demand, what can universities and business can do to create better alignment?

University Perspectives

The concept of competency-based education (CBE) is receiving growing attention. Colleges, the K-12 sector and professionally accredited university programs have had experience with competency-based learning. By contrast, general undergraduate Arts and Sciences programs tend not to require students to meet general competencies and standardized outcomes or explore competency-based models. Current discussions of competencies, however, owe some currency to converging fiscal and educational realities. Increasingly, universities, governments and employers recognize that students are facing a future characterized by uncertainty and rapid change, that education needs to be more accountable to the public interest and that it needs to be more adaptive to current realities.

CBE approaches are generally based on precisely-stated student outcomes or competencies that specify what the student will be able to do upon completion of the program; they are organized around carefully designed student learning activities that are completion-based rather than time-based and that allow for considerable instructor feedback, rather than instructor-delivered teaching; and they tend to provide extensive work-place opportunities. The competencies include literacy and numeracy, problem solving, critical thinking, communication and other ‘soft’ skills. Although CBE approaches can be difficult to implement and measure, they enable institutions and students to assess and identify student abilities and competencies. They also allow employers to better match those skills with the competencies and skills they need. Few, if any, Canadian universities have implemented CBE on a broad, comprehensive basis. Nevertheless, the principles underlying CBE have been more explicitly set out in a number of jurisdictions and provinces and quite a few pilot projects are underway.

There is little information on how Canadian university graduates fare on general competencies. They are not taught at a broad systemic level nor, as a result, are they generally tested. The available assessments of graduates' competencies do not provide sufficient information to make firm conclusions on the abilities of Canada's university graduates. Although there is enough indication to sense there may be a problem that warrants addressing, the exact nature and extent of the problem is not well known. Similarly, there is little evidence that CBE can improve the skills and competencies of students and graduates. Both issues demand further study.

The Way Forward to Bolster Long-Term Economic Returns to University Education

Improving data, understanding what skills are needed, and improving assessment of graduates' skills are fundamental to any attempt to better align the interests of businesses and postsecondary institutions and all stakeholders have a role to play. While there have been recent improvements in the information available on the competencies employers want and on where and what kinds of jobs are available, there are gaping holes. We need better information on the relationship between labour demand and supply and graduates' outcomes; we need longitudinal data that assess how graduates fare well into the future and we need to ensure that the results make their way to parents, students and educators. We also need a better understanding of the specific skills that lead to successful outcomes in the workforce, with measures for success based on employment and income as well as job / career satisfaction, and we need these results to be used to inform some of the outcomes of postsecondary programs. Finally, we need postsecondary institutions to do a better job of measuring, credentialing and articulating the general cognitive and transferable skills that have been identified as important to the labour force, and identifying which teaching practices and schooling experiences most help in the development of these skills.

Despite the lack of information, there seems tremendous potential for a greater focus on general competencies to bridge the interests of business, universities and students in a manner that would yield strong benefits. While progress has been made on many fronts, the potential remains largely untapped and untested. The paper provides specific suggestions for the various stakeholders, including business, governments, the K-12 system, and universities, to capture more fully the benefits of competency-based education.

The paper also describes an initiative to promote better alignment between the skills and competencies necessary for the modern workplace and the education provided in Canada's postsecondary institutions. A group of educators and organizations is spearheading a research project based on the potential for aligning the competencies needed in the modern workplace with the education provided in Canada's postsecondary institutions. The project consists of developing a strategy to test general student competencies at various times prior to, during and after their postsecondary experience to determine the influence of those competencies on their post-graduation outcomes (including employment, income, life satisfaction, resilience, et cetera). The test results would ultimately be intended to inform the education process in universities and colleges.

Some progress is being made in better matching skill development and skill requirements across Canada. But much more would be accomplished through a coordinated strategy involving all of the stakeholders, including provincial and territorial governments, business, education institutions and the Federal government. A new skills agenda is simply too important to the future of Canada to be left to piecemeal, uncoordinated strategies and actions.

Competencies Can Bridge the Interests of Business and Universities

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Introduction

This paper examines how students' transition from universities to the labour market could be improved. The focus is on competencies as a bridge between the interests of students, universities and business.

Universities have come under criticism in recent years for not effectively serving Canada's labour market. The costs are alleged to be foregone total output, an underperforming business sector and disappointing employment and earnings for university graduates. A core element of the criticism is that universities are not educating enough students in fields demanded in the labour market while churning out too many graduates in fields of weak demand. One result is alleged to be a large and growing shortage of skilled workers in fields of high labour market demand. Another is the prevalence of university graduates either not finding work or working at low wage, low-skill positions unrelated to their education. It has also been suggested that universities do not put sufficient emphasis on skills not directly related to discipline knowledge, such as communication and problem solving.

The discussion of how well universities may be serving the labour market has been plagued by poor information. Until recently little has been known about the disciplines and skill sets business seeks in recruits. Employment and earnings data for graduates have covered only the short term after completion of studies. That may not present a fair picture of the value of a university education, which is intended to serve the student over a lifetime rather than job requirements of the moment. This paper examines the recent criticism of how universities are serving the labour market by reviewing available information with particular attention to sources that have only recently become available.

The evidence, flawed as it may be, suggests there does not seem to be a burning platform in the existing school-to-work transitions for university students. On average, university graduates continue to experience high employment rates and attractive incomes. A survey by the Canadian Council of Chief Executives (CCCE), an association representing Canada's largest employers, revealed a reasonably high degree of satisfaction of employers with recent university graduate recruits. Yet the relationship can be improved and the Canadian economy, the business sector and university graduates would benefit.

The new information surfacing can be brought together to inform a strategy to improve school-to-work transitions. In particular, opportunities are presented by the close mapping between the revealed preferences of employers in general competencies of their recruits and the greater emphasis many Canadian universities are placing in developing such competencies in their students. The paper therefore also examines the emergence of competency-based models as a potential bridge between the various needs of business and those of the university.

Part 1: Business and Labour Market Perspectives

A. The Business-University Link is Critical to the Canadian Economy and Well-Being

Business mainly looks to universities to supply well-educated, skilled recruits; provide a portion of training for existing employees and; conduct research. It may not seem appropriate to judge universities on how well they prepare their graduates for the labour market as employability of graduates is not typically featured in universities' mission statements. This is in contrast to colleges

where employability of their graduates is often the central element of the statement. To cite just one fairly representative example for a college, the first line of the Mission Statement of Centennial College is, “Educating students for career success”. To similarly cite just one example on the university side, the first line of the Mission Statement of the University of Toronto is, “The University of Toronto is committed to being an internationally significant research university, with undergraduate, graduate and professional programs of excellent quality”. There is no direct reference in the Statement to preparing students for jobs and careers. Yet the University of Toronto has seriously contemplated its role in training future employees. In its project, Towards 2030, the Task Force on University Relations & Context (Final Report, April 6, 2008) consulted on the appropriate role of the university in supplying workers. The conclusion was stated as follows:

Industry leaders told us repeatedly that they do not need the University to teach our graduates specific skills or prepare them for specific future jobs. Rather than preparing students for specific work, the University of Toronto’s most important role is preparing our students to be active, intelligent and well-rounded members of the workforce and of society.

Preparation for a satisfying career is the reason many if not most students attend university. And it seems fairly obvious universities would cease to exist if their graduates did not secure good jobs. So it does seem legitimate and important to examine how well universities prepare students for the labour market. But the appropriate test might not be on how they do almost immediately after graduation but how they fare over their working lives. In other words, the test would be whether a university education provides a resilience that sees the graduate through the inevitable shifts they will experience in the labour market.

The research function is extremely important as Canada’s higher education sector accounts for double the share of Gross Expenditure on R&D as the OECD average (The Conference Board of Canada, “Public R&D”). But this will not be addressed in this paper.

Training is also important, particularly given evidence that Canadian businesses offer little training to their employees. And this in turn may be putting a strain on the recruitment of university graduates as employers seem to be seeking work experience even for “starting” positions. This may reflect an unwillingness or disinterest to do training once the graduates are hired. An analysis by HEQCO (“Stakeholder Summary: Employers expect applicants for entry-level jobs to have previous work experience”) found that of 300 Canadian job ads for entry-level positions geared to postsecondary graduates, less than one quarter of employers would be willing to consider candidates with no work experience and on average employers wanted more than one year of experience and as much as two years. This is important information for universities and especially students. It is just a hypothesis, but business might not put such an emphasis on experience for entry-level positions if they were used to doing more training themselves. At any rate, the demand for experience adds pressure to the employability of university graduates. But this too will not be addressed at this time either.

The focus of this paper, therefore, will be the supply from universities of well-educated, skilled graduates that business can recruit. The question will be how well this supply matches what business demands. To the degree the supply does not match demand, attention will then turn to what universities and business can do to better align supply and demand.

B. The Value of Different Perspectives Among Students, Universities and Business

Students go to university and choose their discipline for a variety of reasons. Securing an interesting, well-paid job on graduation is certainly a central, but not the only reason. As such, students' decisions should be guided, but not wholly determined by, job prospects. And value-added from a university education should not be judged solely by the graduate's employment and earning status. Furthermore, it should be recognized that the link from university to jobs may not be "linear". Students may end up working in fields seemingly not directly related to their university studies. That may be voluntary in which case it is presumably welfare enhancing. It may be in response to economic opportunities, and therefore of net benefit to the economy. The work may not even be as unrelated to studies as often portrayed if, in addition to discipline-specific knowledge, the university experience were to develop more general competencies that serve the graduate well throughout life.

The economy's and society's interests may not be best served by having the directions of business and universities perfectly aligned. Universities should certainly consider supplying recruits to business as a major purpose. But universities should not focus exclusively on what appears to be current business needs. First, those needs can and do shift suddenly. Abrupt changes in resources at a university can result in a lot of stranded human and physical capital. Second, in "teaching how to think" universities can provide graduates that will not just fit into current business operations, but would change them for the better. Third, as graduates will likely perform many jobs and perhaps even multiple careers over their working lives, universities should have a vision of individual and labour market needs that is somewhat broader and with a longer-term focus than current business needs. So as with students, current labour demand should guide university decisions but not be the only determinant.

C. School-to-Work Transitions – A Work in Progress

i) Evaluations of School-to-Work Transitions Have Been Plagued by Poor Information

The discussion of school-to-work transitions has been plagued by imperfect information on developments in the labour market. For example, Canada went four decades, from 1979 through 2010, without a job vacancy survey. A new survey started in January 2011 but until the release of the Job Vacancy and Wage Survey (JVWS) August 13, 2015, results were only available at the provincial level and for highly aggregated industry classifications. Canada has had scant information on the labour market outcomes of university graduates. British Columbia and Ontario have surveys, but they are voluntary and therefore subject to sample bias and only measure outcomes at a particular time post-graduation (six months and two years post-graduation in Ontario and two and five years for British Columbia). The National Graduates Survey is Canada-wide, but it is only conducted every five years and looks only at outcomes two years after graduation (three years after for the 2010 survey with adjustments by Statistics Canada to proxy the results had the survey looked two years out). None of the reports receive widespread attention and little of the information filters to high school students contemplating what fields to study in post-secondary education. Additionally, little information has been available on the type of workers business seeks. The job vacancy survey for example provided no information on the skills sought or even how long vacancies had been open.

Fortunately, progress is being made on the information front and this can inform the discussion about the role of universities and their students. The new JVWS has information at the sub-provincial level (economic region) and much richer occupational detail. It also asks questions such as how long a

vacancy has persisted. The income tax linkage project of the Education Policy Research Initiative is capable of tracking university (and college) graduates through the labour market over a longer period, restrained only in most cases by how long a consistent set of student identification numbers has been available. The Forum of Labour Market Ministers is considering establishing a dedicated agency to the task of coordinating labour market information but as yet has not funded the initiative.

Employer surveys conducted by a number of Canadian and American business councils and organizations have contributed to an improved understanding of which skills and abilities are considered important for employers. (HEQCO-EPRI Skills for Success Project: Development Framework, Draft paper made available at HEQCO-EPRI Symposium, Ottawa, September 29, 2015). The CCCE, as an example, is gathering useful information on the labour demand of members and the kinds of graduate recruits they seek through a series of member surveys, the third of which went into the field August 2015. The Conference Board is also surveying employers on their satisfaction with employees on critical skills.

The Learning Partnership (The Learning Partnership, "It's My Future: Student Voices from Across Canada: Final Report", September 2014) has compiled useful information through focus groups and other means on how high school students form their decisions on university programs and careers. It seems the decisions are based upon very little information but there is a great thirst for more and better information on universities and the labour market.

ii) Universities Educate Students in the "Wrong Fields": The Charge and the Evidence

- **A general shortage of skilled workers**

In recent years business leaders (individuals and associations) and some researchers have claimed Canada will face a large shortage of skilled labour. One of the earliest reports was by the Conference Board of Canada which projected in Performance and Potential 2000-01 a one million worker labour shortage by 2020. The report contained a clear caveat that this would not likely be realized because something would "give" such as wages rising and encouraging higher labour force participation or capital would be substituted for labour. But the original Conference Board report did not put much emphasis on the caveat and it was largely ignored. More than a decade later the Conference Board's Director of Forecasting and Analysis (Pedro Antunes, "A Labour Market Shortage of 1 Million by 2020? Where We Stand Today", November 11, 2013) claimed the initial call was widely misunderstood because of the ignorance of the caveat and concluded that as of 2013 there was "no crisis".

Caveat and misunderstanding or not, others piled on with predictions of pending skilled labour shortages. In 2013 the Chamber of Commerce claimed there would be 1.5 million vacancies for skilled jobs by 2016. Around the same time, the Canadian Council of Chief Executives (CCCE) reported that two-thirds of the respondents to a member survey said a shortage of skilled workers would have a medium to high impact on their major projects and/or investments (Gwyn Morgan, "Rising to the challenge of Canada's skills shortage", the Globe and Mail, April 6, 2014). In "People Without Jobs, Jobs Without People", Rick Miner estimated in 2010 that by 2031 there would be a skills shortage of 4.2 million workers. In 2014 he revised this down to 2.3 million, still a staggering figure but the revision, over a four-year period for a target two decades into the future, gives an idea how fluid such projections are. One researcher, in a report released by the CCCE (Ken Coates, "Career Ready: Toward a national strategy for the mobilization of Canadian potential", CCCE, April 2015) went so far as to suggest that the intake of universities be cut by 30 per cent. The notion is that with an unchanged budget, there would be a greater concentration of resources on the top academic students and others would migrate to

other forms of study, training and work experience where social if not personal returns would be higher. In most of the analyses of skills shortages STEM (Science, Technology, Engineering and Mathematics) graduates were in particular claimed to be in short supply.

In no way were universities being singled out as being solely to blame for such shortages of labour. But the inference was that, on one hand, universities were not producing graduates in the fields of labour demand and, on the other hand, were training students in fields that were not in demand.

One difficulty with the projections of worker shortages is that they have not typically been specific on the kind of worker in short supply. Sometimes the reference seems to be to the overall number of workers. Others refer more specifically to skilled workers, but often do not specify what kind of skill. There are at least three general sorts of skills relevant to this issue of worker shortages – skilled in trades (typically coming from colleges or other institutions), university “professional programs” and more general university programs, particularly in Arts. The “professional programs” tend to be considered more aligned with business interests and many universities have formal and informal links to business in these programs. To some degree the professional programs have already incorporated attention to competencies, often as part of the accreditation process. So in the universe of universities, the charge of producing the “wrong” kind of graduates tends to be aimed at the more general Arts and Sciences programs and perhaps at some specialties, such as Education where there appears to be a persistent over-supply of graduates.

A particular claim is that universities move too slowly to reflect changes in the economy and labour market: Too slow to expand enrolment in disciplines in labour demand; and too slow to expand work-integrated learning, a revealed recruitment preference of many employers. Indicators interpreted by some that universities are producing graduates in the “wrong” fields include the OECD measure of “over-qualified employees” and the portion of university graduates not working in jobs directly related to their university studies.

Several researchers have recently analyzed the charges of generalized skilled labour shortages and found they are not backed up by careful examination of the available data. An example is Derek Burleton et al., “Jobs in Canada: Where, What and For Whom?” TD Economics, 2013. They conclude that “with data in hand, we debunk the notion that Canada is facing an imminent skills crisis. At the same time, there is some evidence of mismatch across certain occupations and provinces...” The second CCCE survey of members on labour issues concluded “the survey results do not support the argument that Canada is suffering from a comprehensive, national skills shortage. Rather, they suggest that shortages are limited to certain regions, sectors and occupations in Canada – a conclusion consistent with the findings of recent reports by TD Economics and the Conference Board of Canada”.

In addition to examining the data, several of the more recent studies also approached the issue of a generalized labour (skilled or otherwise) shortage from a theoretical perspective. In a sense, this approach picks up from the caveats from the first Conference Board report that predicted a labour shortage of one million by 2020 and then provided reasons why this probably would not occur. It was argued by the Conference Board and more recently by others that various factors would adjust to bring labour demand and supply closer to balance over time. Wages would rise in sectors with labour shortages and this would draw more workers into that field. Over time the supply would rise even further as students studied in preparation for that sort of work. Capital would be substituted for labour. There would be import substitution. If all else failed, the economy simply wouldn’t grow as fast, making it hard to observe an actual labour shortage.

- **Specific shortages of skilled workers**

With a more sophisticated theoretical approach and careful analyses of the data, the focus for labour shortages shifted to particular occupations in particular regions at particular times. If a perceived shortage has not persisted for a while or is not expected to last, then it would be difficult and likely inappropriate for universities to shift resources into that area. But claims of STEM worker shortages, as one example, have been heard for some time.

The Dodge Task Force (David A. Dodge, Chair, “Some Assembly Required: STEM Skills and Canada’s Economic Productivity”, Canadian Council of Academies, April 2015) analyzed the claim of a shortage of STEM workers and argued there is not a generalized shortage of STEM graduates and workers and indeed there is nothing even particularly magical about these workers in the innovation/productivity challenge. STEM skills are to a degree needed by all workers. The Dodge Task Force emphasized the importance of addressing STEM skills throughout K-12, not just in university.

The Dodge Task Force and others highlighted the relatively low participation of females in STEM subjects. This is even more the case in the trades where females account for only five per cent of enrolment, but that will not be discussed here. Making matters worse in the STEM areas, female graduates have not fared very well in the labour market, unlike their male peers.

In the STEM disciplines, only 39 per cent of the graduates aged 25 to 34 are female (Hango, 2013). At least that is more favorable than the female share of 23 per cent of 55 to 64 year-olds, indicating that female participation in these disciplines has increased substantially over the past 30 years. In particular areas of STEM female participation is especially low among 25 to 34 year-olds, such as 23 per cent in engineering and 30 per cent in mathematics and computer science.

The OECD has studied the gender gaps in mathematics and other STEM disciplines in order to see how female scores and participation might be enhanced. The objective is worthy and one in which Canadian jurisdictions should devote considerable effort. In order to maximize female participation and success in the Canadian labour market, they should be well represented across the diversity of occupations and especially in areas where labour demand is likely to be strong. The reasons for lower female scores and participation are many and some are deeply ingrained such as cultural stereotypes, parents’ expectations, differing ways of spending leisure time, lack of self-confidence, et cetera.

Women may be avoiding mathematics and engineering for good reason, as those women with credentials in these fields tend to have high unemployment rates compared to men in these fields and women who studied almost any other field. For example, the female unemployment rate in 2011 for those aged 25-34 with a postsecondary credential who studied mathematics, computers, or information services was 8.9 per cent compared to a male rate of 4.8 per cent in this field and an average rate of 6.3 per cent for all women aged 25-34 with a postsecondary credential (information in this section on female labour force participation in STEM and the trades is from Don Drummond et al., ‘The Key Challenge for Canadian Public Policy: Generating Inclusive and Sustainable Economic Growth,’ Centre for the Study of Living Standards, September 2015).

The factors which push women out of STEM can likely be modified over time and offset by other approaches. For example, it has been found that females respond well when left to solve mathematics and science problems on their own as opposed to being restricted to using standard algorithms. Some of the same deep-rooted issues as cultural stereotypes and parents’ expectations restrict female

participation in the skilled trades. The lack of female role models and weak labour market information are also important and intertwined.

The under-representation of females in STEM fields is an area where business and universities can work together. Business will need to examine why female STEM graduates have not fared well economically. Universities will need to look at how to create the conditions to attract and retain females in these areas. Both parties will need to reach out to secondary and perhaps even primary schools.

With a job vacancy survey available in Canada since 2011 we can examine patterns of job market tightness and slack at least over the past five years. Some patterns have persisted. For example, health (which is combined with social services in the job vacancy survey) has persistently registered as a tight labour market with a very low ratio of unemployed workers to available positions. At the other extreme, education has featured few job vacancies and a high ratio of unemployed teachers to available education positions.

Health care is an example of where the buzz around shortages of labour does not always match the data. Relative to the trades and various STEM jobs for example, one hears little about shortages of health care workers yet it has persistently been one of the tightest labour markets according to the job vacancy survey. The largest number of vacancies recorded in the new Job Vacancy and Wage Survey is in fairly low-skilled positions. But registered nurses and registered psychiatric nurses are among the four-digit National Occupational Classifications with the 10 highest numbers of vacancies. Health is the area where the largest portion of job vacancies has existed for more than three months, indicating it appears to be especially difficult to recruit in this area.

Health care also provides a useful example of why the information on labour demand needs to be quite precise. As would be expected, the employment rates and earnings in the Council of Ontario Universities survey of 2012 graduates are well above average in medicine, nursing, optometry and pharmacy. But the employment rates are below average in “Health Professions” and income for this education category is just slightly above average. “Health Professions” includes students enrolled Basic Medical Science Programs, Medical Specialties, Para-clinical Sciences, Epidemiology and Public Health, and Medical Technology. Medical interns have been excluded.

The third CCCE survey, put into the field in August 2015, will be interesting in the context of skills shortages and mismatches because it may well show quite different results than the second survey (in the field during October and November 2013) as some of the areas of “hot” labour demand (Alberta/Saskatchewan related to the oil patch for example) have cooled. This may demonstrate how fluid labour demand is and hence the difficulty of trying to always match supply to demand. This may serve as a cautionary note that post-secondary institutions and their students may need to take a longer-term view before dramatically shifting resources and areas of study to accord with current measures of labour demand.

- **“Over qualified” university graduates working in fields unrelated to their studies**

Graduates working in jobs with lower education requirements or working in areas not related to their studies are interpreted by some as signs that universities are producing graduates in the “wrong” fields. A Statistics Canada study (Sharanit Uppal and Sebastien LaRochelle-Cote, “Overqualification

among recent university graduates in Canada”, Statistics Canada, April 2014) found that over the period 1991 to 2011, one-third of working men and women aged 25 to 34 with a university degree in humanities were employed in occupations requiring a high school education or less. In contrast, less than 15 per cent of university graduates in education, health and related fields, architecture, engineering and related fields were working in jobs typically requiring only a high school education. The over-qualification rate is particularly acute for foreign-born Canadians.

Using data for 2006, Jennifer Yuen of Statistics Canada (Jennifer Yuen, “Job-education match and mismatch: Wage differentials,” Statistics Canada, 2010) reports that 18 per cent of university graduates did not have a job related to their studies. The figure tends to be lower for specialized programs like education, health, mathematics and computer sciences and business and higher for general programs such as social and behavioural sciences.

A more general and subjective view on the relationship of studies to work is provided by the annual Council of Ontario Universities survey of graduates. In the 2012 survey, reported in September 2015, 89.1 per cent of the graduates working full-time within two years of graduation considered their work closely related or somewhat related to the skills developed at university.

On the surface the over-qualification rate and mismatch between studies and work seem to suggest universities are not producing the kinds of graduates the workplace demands. Yet the validity of the measures can be questioned. What is an appropriate benchmark for the degree of skill mismatching in an economy? In a new document “The Future of Productivity”, the OECD places great emphasis on improving skill matching as a means of bolstering productivity. This includes measures such as the portion of employees under and over-qualified for their positions. Interestingly, the OECD report finds that Canada has the second least severe skill mismatch among the 21 OECD countries analyzed (the OECD does, however, qualify this result by pointing out that Canada is one of three countries that was not subject to all the testing due to insufficient productivity data). The better performers can always strive to further distance themselves from the others, but the OECD analysis suggests that skills mismatch is far from a leading cause of Canada’s weak labour productivity performance relative to many other developed countries. (Don Drummond, Review of the OECD’s “The Future of Productivity”, to be published in The International Productivity Monitor, December 2015).

More generally, one can question whether measures such as “over-qualification” and working in an “unrelated discipline” capture valid information. On the one hand, Canada has a desperate need to become more innovative and productive. Yet these measures seem to contemplate a very rigid workplace. Perhaps the “over-qualified” university graduate is the person who changes the nature of the work and raises value-added. An experience of one of the authors at the TD Bank speaks to this. TD Economics typically had two research assistants with BAs in Economics. But when an opening was posted, the group was flooded with applications from MAs and even PhDs. From that point on, the research assistant positions were filled with MA graduates. Initially that might have been considered hiring an over-qualified candidate. But the MA graduates changed the nature of the job. They did much more than the previous BAs and essentially became interns as economists.

Another possible issue with interpreting “over-qualification” or working in an unrelated field as problems is that the measures tend to be near term. The graduates may do better economically in time and they may even find work in the field they studied. Below we discuss the income tax linkage project of the Education Policy Research Initiative which for some universities and colleges can track labour market outcomes of graduates over longer periods than other surveys. The EPRI results do not track

whether the graduate is working in a job with a skill requirement below or unrelated to their education, but the early results suggest substantial income growth for graduates in most disciplines over time.

Perhaps working in a discipline seemingly not directly related to study is by choice and therefore welfare-enhancing. Perhaps that person brings a different perspective that enriches that workplace. The same author's experience at Finance Canada speaks to this. Although the Department hired economists almost exclusively for its entry analysis and policy jobs, the General Directors and Assistant Deputy Ministers had diverse education backgrounds and were considered highly successful from both organizational and personal perspectives. So indeed, these measures may be capturing "good" things rather than "bad" things.

- **Universities and students have made some adjustments to labour market conditions**

Universities and students have been responding to labour market and perhaps other signals by making significant changes in the composition of enrolment by discipline. In general there has been a diminution in enrolment in fields generally not thought to yield favourable employment and income prospects and a shift into disciplines where prospect are considered better.

According to the OECD Education Database, the share of total graduates in Canada fell 3.1 percentage points between 2000 and 2012 in education, 2.4 percentage points in humanities and 5.4 percentage points in social and behavioural sciences. Perhaps not surprisingly, however, the absolute number of graduates in each of these fields rose in the context of a 50 per cent increase in the total number of graduates over the 13 years. The most significant increase in the share was from business and administration which went up 4.9 percentage points. By 2012 humanities was down to 7.6 per cent of graduates while business and administration was 18.9 per cent. While it has been argued enrolment in business is relatively much higher in the U.S., the 2012 share in Canada of 18.9 per cent isn't far off the U.S. figure of 21.4 per cent. However, the share of enrollment in some fields claimed to be in strong labour demand did not increase appreciably. In particular, there was not a substantial rise in the share of STEM students. This may seem paradoxical and perhaps a reflection of a slow and inadequate response of universities and students to the labour market as pay tends to be higher in areas that hire these graduates. However, as noted in Burleton et al. (TD 2013), wages did not rise substantially faster in these areas since 2000 than on average. So the economic incentive remained, but it did not perhaps strengthen. And as Dodge et al. found, there did not appear to be a general shortage of STEM workers.

Some anomalies exist such as what appears to be a persistent over-supply of graduates from a number of fields, such as education and journalism. For example, education has had one of the highest ratios of unemployed-to-vacant positions over the history since 2011 of Statistics Canada's Job Vacancy Survey. It is true that the share of education students in total enrollment has declined, but the absolute numbers have not shrunk as one might expect given the dire job prospects. Is the problem poor information availability to institutions and students?

"Liberal Arts" or "humanities" tend to be the popular target of charges that universities offer programs that do not lead to good jobs but: these are a small portion of university students (humanities at 7.6 per cent of graduates in 2012); that portion has been shrinking and; they too seem to do pretty well in the job market over time (see below on early results from the income tax linkage project).

Work-integrated learning may not have expanded to the scale desired by business, but there has been tremendous growth in programs such as co-ops. Universities Canada (Universities Canada, Co-op and internship students a valuable source of new talent – survey, November 18, 2014) commissioned a survey that found that eighty per cent of employers say co-op and internship students add value to their company as a source of new talent and as future employees with workplace skills. Universities Canada also reports (Universities Canada: Back to School: Quick Facts 2014 and 2015) a twenty-five per cent increase in the number of students taking a co-op program from 2006 to 2012. As well, Universities Canada reports that 65,000 students participated in co-ops in 2012-13 and “currently, more than 50 per cent of undergraduate students take part in at least one co-op experience, internship, practicum or field placement during their studies” (Universities Canada submission to the House of Commons Standing Committee on Finance, July 22, 2015). Indeed, Universities Canada argues that the limit on co-ops comes from not enough placements being offered by employers. In turn, the CCCE argues this is an issue with small and medium size businesses as large businesses participate at a high level.

A Conference Board Survey (the Conference Board of Canada, The Cost of Ontario’s Skills Gap, June 2013) shows the high level of business involvement in experiential learning strategies with 76 per cent participating in at least one form and 41 per cent with a co-op program followed by 38 per cent involved with mentoring and 36 per cent with apprenticeship. It should be noted these survey results encompass universities and colleges. A HEQCO report on work-integrated learning and post-secondary education (Peggy Sattler and Julie Peters, Academica Group Inc. “Work-Integrated Learning and Postsecondary Graduates: The Perspective of Ontario Employer” Higher Education Quality Council of Ontario, 2012) has similar evidence.

iii) University Education Does Not Lead to a Good Job

In recent years there have been numerous media stories about university graduates struggling to find satisfying employment. In the Presidential address delivered at the 2014 Annual Meetings of the Canadian Economics Association, Thomas Lemieux (Thomas Lemieux, “Occupations, Fields of Study, and Returns to Education”, Presidential address delivered at the 2014 Annual Meetings of the Canadian Economic Association, Revised September 2014) cites “a common theme in the popular press is that young university graduates have a hard time finding jobs, and when they do so, these jobs often pay poorly and are unrelated to the university training (e.g. Arts graduates working as baristas).”

- **Average returns to a university education remain strong**

Thomas Lemieux (Lemieux 2014) reviews studies on the rates of return to education in Canada and concludes they are “large and relatively stable over time”. He notes studies depicting rising rates of return from the 1980s but observes that two recent studies (Nicole M. Fortin and Thomas Lemieux, “Changes in Wage Inequality in Canada: An Interprovincial Perspective,” Canadian Journal of Economics, forthcoming in Fortin and Lemieux (2014) and Marc Frenette and René Morissette, “Wages and Full-time Employment Rates of Young High School Graduates and Bachelor’s Degree Holders, 1997 to 2012,” Statistics Canada Analytical Studies Branch Research Paper No. 360 (2014)) conclude returns to education have declined slightly over the last 5-10 years. Lest that be interpreted as a sign of an oversupply of university graduates, it should be pointed out that the fact that returns remained high in the face of a 50 per cent increase in enrolment from 2000 to 2012 is impressive. Further, a good part of the decline in the premium to a university education was the economic boom in Western Canada that sharply lifted wages in the resource sectors for high-school graduates. In 2014, the employment rate for all 25-29-year-olds was 61.4 per cent (Statistics Canada, Table 282-0209 labour force survey estimates

(LFS), by educational degree, sex and age group, annual). For those with high school it was 60.0, for post-secondary education certificate or diploma 70.2 per cent and for a university degree 74.0 per cent.

The economic benefit of a university degree is also apparent in income statistics. According to the 2011 National Household Survey, the average salary of university graduates working full-time in 2010 was \$80,500 whereas it was \$54,000 for colleges and trades graduates and \$46,000 for high school graduates.

The economic benefits to a university education endure over time. A Statistics Canada study (Mark Frenette, "An Investment of a Lifetime? The Long-term Labour Market Premiums Associated with a Postsecondary Education", Statistics Canada, 2014) tracked earnings over a 20-year period for people whose age spanned the mid-30s to mid-50s. The earnings premium with a bachelor's degree over high school education is \$728,000 over the 20-year period for men and \$442,000 for women. For a college certificate, the premium on average is \$248,000 for men and \$180,000 for women. The study also finds that, for both men and women, a bachelor's degree and a college certificate are associated with fewer layoffs and more years of coverage in an employer-sponsored pension plan.

Favourable employment and income outcomes also continue to be apparent in the B.C. and Ontario graduates surveys as well as the National Graduates Survey of graduates from 2010. The National Graduates Survey of graduates in 2010 showed that in 2013, the employment rate for bachelor's graduates was 93 per cent for men and 90 per cent for women. The employment rates were very similar for college graduates. The median earnings for BA graduates was \$57,000 for men and \$51,000 for women, premiums of 19 and 31 per cent respectively for men and women over college graduates. Eighty per cent of BA graduates said they were working in an area close or somewhat close to their education. While colleges are sometimes thought to have a tighter link between education and work, the figure is very similar at 81 per cent for college graduates.

The Council of Ontario Universities (COU) survey of 2012 Ontario university graduates shows mostly positive results. The average employment rate was 87.6 per cent after six months and 93.6 per cent after two years. After two years, 89.1 per cent of graduates employed full-time considered their work either closely or somewhat related to the skills developed at university. Results vary considerably by program studied. The lowest employment rates after two years were recorded in therapy & rehabilitation (although the plunge in employment between the six month and two year surveys raises questions about the survey accuracy), physical sciences, mathematics, forestry, agricultural & biological sciences and food sciences & nutrition. The appearance of so many science-related programs in the lower employment results is another sign that not all in the school-to-work transition is as commonly reported. Graduates in fine & applied arts and humanities did not have the worse employment results but they are below average. They did, however, have earnings results well below average.

A potentially troubling aspect of the COU survey is on the earnings side. Average earnings two years after graduation was \$49,001. Alex Usher of Higher Education Strategy (Alex Usher, "Some basically awful graduate outcomes data", posted to www.higheredstrategy.com, September 2, 2015) put together a time series of the COU earnings data and calculated that the class of 2012 earned 14 per cent less in real terms than the class of 2005 two years after graduation. As he concludes, this appears to be "awful". However, a time series analysis may be asking more than this survey supports. It is a voluntary survey and the response rates have changed substantially. In 2005 the response rate was 19.8 per cent while it was 35.3 in 2012. Furthermore, the only very large change from one year to another occurred between the graduating classes of 2004 and 2005. Average earnings jumped 9.5 per cent two

years after graduation and 8.7 per cent six months after graduation. Those jumps seem suspicious and may relate to the nature of the survey and response rates rather than what was actually happening in the mid-2000s. However, there still seems something there in the flatness of graduates' earnings in nominal terms and declines on an after-inflation basis. The response rate has been quite steady since the graduating class of 2009. That graduating class had average earnings of \$49,151 two years out compared to \$49,001 for the class of 2012. In real terms that is a decline of almost 7 per cent. Indeed, nominal earnings two years out for the class of 2012 were still below those the survey recorded in 2005. The nature of the survey question on earnings may make this aspect of the report invalid for comparing across years. Graduates are asked to pick the income range their actual earnings fell into. The ranges are \$10,000 wide (i.e. \$0-\$10,000, \$10,000-20,000, \$30,000-40,000, \$40,000-\$50,000 et cetera). So changes in average earnings over time only reflect shifts in the weights across income ranges. Changes within the ranges are not picked up. In the context of likely modest changes in earnings in recent years, the form of the question does not perhaps capture valid information on changes in earnings over time,

The National Graduates Survey also shows a real earnings decline. Nominal earnings showed a seven per cent increase in average earnings between the university graduating classes of 2005 and 2010. With a rise of 8.9 per cent in the CPI over the five years, that is a real earnings loss of around two per cent. It is not at all clear whether it is legitimate to compare that to the larger loss in the Ontario survey and suggest that graduates were hit harder in that province. There does, however, seem to be a point in both surveys that in the environment of sluggish income gains overall, university recruits have in particular seen minimal gains in nominal earnings and that has entailed some real income losses compared to previously graduating cohorts.

Early results of the tax-linkage project of the EPRI confirm university graduates are doing quite well in the labour market. Those early results also suggest the possibility that the survey results that have informed opinion to date on the linkages between education and employment and income results may be somewhat misleading as they tend to look only in the near-term. An example is the results for the University of Ottawa, released in late 2014 (Rosanne Tamburri, "New study shows strong labour-market outcomes for university graduates", University Affairs, January 21, 2015 provides a summary). Bachelor graduates from 1998 to 2010 were followed through 2011. Social science and humanities graduates did quite well income-wise over the 13-year period. Humanities graduates started with similar salaries and also enjoyed substantial income gains over the 13 years, but not to the same extent as in social sciences. Health graduates started with higher incomes but did not see as much of an increase as either social science or humanities. Graduates in mathematics and natural sciences, engineering and information technology tended to have higher salaries but also, especially in the last case, greater cyclicalities. The key message is that graduates in all the general disciplines did quite well in the labour market, including the humanities graduates. Indeed, there is a general form of convergence in the earnings over time across many of the disciplines. This sort of information is not revealed in the nearer-term surveys that examine only one or two years out from graduation. A similar process of earnings convergence has been observed in the U.S. where a 10-year longitudinal study "showed that the wage differentials that formerly existed between liberal arts majors and more "career-oriented" majors largely disappeared over the decade" (Stephen J. Toope, "I Love You, Please Change", Canadian Council of Chief Executives, October 2014).

- **Not all university graduates are faring well in the labour market**

Lemieux (2014) asks the question why there are so many reports of university graduates struggling in the labour market when the average returns to a university education remain so strong. First,

earnings vary greatly by field of study. Engineering students, for example, make much more (at least early in their careers as historically we have not tracked earnings further out into graduates' careers). Further, Lemieux finds that working in a field closely related to studies bolsters income. Putting the two together, Lemieux finds that graduates in some disciplines, like Arts, working in a field largely unrelated to their studies, can have quite weak earnings, perhaps little more than high school graduates.

The National Graduates Survey shows earnings of 2009-10 graduates working full-time in 2013 by field of study. The median gross earnings of a bachelor graduate was \$53,000. The earnings of graduates in the following fields fell more than \$10,000 short of the median: visual and performing arts and communications technologies (\$38,000), biological and biomedical sciences (\$37,400) and parks, recreation, leisure and fitness studies (\$41,500). If those figures don't sound that bad, keep in mind there is a wide distribution around the median. For example, the earnings of the 25th percentile in visual and performing arts and communications technologies was only \$27,000 and that of biological and biomedical science \$32,000. These are similar to the gross earnings in the respective fields for college graduates at the 25th percentile and indeed the college graduates made more in visual and performing arts and communications technologies.

At the other end of the earnings distribution, graduates in the following fields made more than \$10,000 above the median: legal professions and studies (\$96,000), natural resources and conservation (\$65,000) and medicine (the average was deemed too unreliable to be published but the 25th and 75th percentage were, respectively, \$70,000 and \$250,000). Business management is not on the high income list, likely because it is combined with public administration where earnings are likely lower. As the two fields are highly unrelated, this again speaks to the need for greater precision on graduate surveys.

D. Emerging Employer Preferences Revealed

Individual Canadian businesses likely have great stores of information on the numbers and types of workers they are looking for and the skill sets being desired. Some of this information is beginning to be made available and this shows promise for what better information could do to improve skills matching. Organizations such as the CCCE, the Association of Professional Recruiters, Workopolis and the Conference Board have recently asked members what skill sets they are seeking in recruits. It is interesting that the emphasis is less on experience and subject-specific knowledge (perhaps the latter being taken a bit for granted in the recruits). The businesses' revealed priorities are essentially what in university-speak is referred to as outcomes-based education or competency-based education. Here the reference is not just to outcomes or competencies around a particular discipline, but much broader.

These surveys show that businesses place great value on things such as recruits being able to communicate well in written and oral fashion, being effective in groups and being able to problem solve. The CCCE survey results are representative of what the various associations have found. In descending order of priority, the CCCE (CCCE 2014) members ranked by importance the attributes they evaluate potential entry-level hires on as follow: people skills/relationship building; communication skills; problem solving skills; analytical abilities; leadership skills; industry-specific knowledge & experience; functional knowledge; technological literacy; project management skills and; creative thinking.

There is a close mapping of these characteristics sought after by business and the interest many universities are showing in changing university education from a focus on discipline-specific knowledge to the broader focus on outcomes.

At the same time universities shift to some degree to outcomes or competencies, it would be helpful to have more precise definitions of the competencies business links to various positions. Such a step would be useful for the information of students and universities and would improve skills matching. Yet to date, employers' descriptions of competencies sought are general. They are not typically applied to particular job vacancies. According to the Canada West Foundation (Janet Lane and Naomi Christensen, "Competence is the Best Credential," Canada West Foundation, April 2015), Canada lags other western countries in the business development of competencies.

For colleges, there is a growing network of competency agreements with business. That might not develop along the same formal lines with universities as they do not have the same mission of job preparation for their students. But the finer specification of what employers are looking for could nonetheless help shape university curriculum, approaches to teaching and students' choices and job preparation.

It would also be insightful to know more specifically how business feels university recruits stack up against the attributes sought. That is addressed below.

Part 2: University Perspectives

A. Competency-Based or Outcomes-Based Education

The concept of competency-based education (CBE) is not new although it has received growing attention in recent years. Also called Outcomes-Based Education (OBE) or Tuning, recent discussions of competencies owe some currency to converging fiscal and educational realities. Increasingly, universities, governments and employers are recognizing that students are facing a future characterized by uncertain and rapid change. As an example of such expectations, Workopolis estimates that if recent trends hold, people entering the workforce now can expect to hold roughly 15 jobs in their careers. These jobs may well reflect a nature of work that does not exist today. In contrast, Statistics Canada has found that two-thirds of Canadian Baby Boomers entered their fifties holding down jobs they had been in for at least 12 years with the same employer (Peter Harris, "How many jobs do Canadians hold", Workopolis, December 4, 2014).

The challenge to institutions to prepare students and support the economy in this environment of constant change is outlined clearly in the University of Toronto Task Force on University Relations and Context: "We must prepare our students for jobs that do not yet exist, to make discoveries that we have not even imagined and to take on roles for which they cannot ready themselves ahead of time."

The focus on developing broad fundamental competencies has taken root within this context of uncertainty and change. We have also witnessed unprecedented university enrolment and an escalation of institutional costs that have, in recent years, been accompanied by a constrained economic environment. Hence the need to improve educational models that are more accountable to the public interest and, at the same time, are more adaptive to current realities, in which students have transferable, broad-based skills. Stakeholders want to know that a degree provides what they want and/or need as a foundation for the future – for individuals and for society in general. In short, "Learning outcomes matter because, increasingly, the public, employers, and students all need to be

reassured that a degree signifies the acquisition of a particular body of knowledge and skills rather than sitting through a particular number of hours of classes.” (Alex Usher, MOOCS vs. Learning Outcomes, February 26, 2013).

Descriptions of competency-based learning, having surfaced in government reports, university strategic plans and in the academic literature, are varied and somewhat different. HEQCO has been researching competencies and conducting some pilot projects in recent years. Although their 2014 literature review makes it clear that consensus is lacking about CBE, they identify characteristics of competency-based education models that distinguish them from traditional models. They indicate that CBE programs are generally based on precisely stated student outcomes or competencies that specify what the student will be able to do upon completion of the program; they are organized around carefully designed student learning activities that are completion-based rather than time-based and that allow for considerable instructor feedback, rather than instructor-delivered teaching; and they tend to provide extensive work-place opportunities (Brian Abner, Oksana Bartosh and Charles Ungerleider, Productivity Implications of a Shift to Competency-Based Education: An environmental scan and review of the relevant literature, ” Directions Evidence and Policy Research Group, LLP, with the assistance of Robert Tiffin P. 4 – 5).

Through a literature review and research of seven American competency-based programs, HEQCO identified four broad sets of skills that underpin the various competency-based education models they reviewed: 1. Discipline knowledge: solve equations, know concepts. 2. Basic cognitive skills: literacy, numeracy. 3. Higher order cognitive skills: problem solving, critical thinking, communication. 4. Personality (soft) skills: persistence, initiative, determination, attitude.

Perceived benefits of CBE to students and institutions, as identified by HEQCO, include “transparency and accountability, possible transfer of credits from one CBE program/institution to another, relevance to the needs of the labour market, focus on the individual students’ needs, and acknowledgment of prior experiences and knowledge students bring to the programs.” (p. 5). Benefits to employers are also significant. CBE enables institutions and students to assess and identify student abilities and competencies which allows employers to better match those skills with the competencies and skills they need.

As with any educational model, CBE is not without its problems. Some of the criticisms identified by HEQCO include: a perception of a lack of coherence in the approach, pressure to graduate students in a timely manner; the reductionist nature of competency curricula; difficulty designing curricula; lack of instructor knowledge; and difficulty of assessment design. These issues are particularly problematic in identifying and assessing the ‘soft skills’ that are on the list of desired competencies of employers and institutions alike. Soft skills, including basic and higher order cognitive skills, personality skills, written and oral communication and ‘creative competencies’ in general, are by nature subjective and/or measured on a sliding scale.

B. How do Canadian university graduates fare on general competencies?

There is little information on how Canadian university graduates fare on general competencies because they are not taught at a broad systemic level nor, as a result, are they generally tested. Nevertheless, research studies and data from the OECD, the British Columbia Baccalaureate survey, the CCCE and other sources shed some light on competencies of Canadians after graduating from university.

- **The OECD's PIAAC and PISA**

The OECD's Programme of International Assessment of Adult Competencies (PIAAC) provides some information on the competency level of Canadian adults. On the positive side, Canadian adults do better than the OECD average on problem solving in technology-rich environments and are more engaged in information and computer technologies. But Canadians are only at the OECD average in literacy and below the average in numeracy. Canada has a higher portion of adults in the bottom category for both literacy and numeracy than the OECD average.

PIAAC results can be viewed by level of education. Canadian university graduates fare middle-of-the-road among developed countries (PIAAC Pan-Canadian Report, Key Findings). It has been argued that the Canadian results are quite favourable if one takes out non-Canadian born students. This may be a useful analytical device and helps put the spotlight on an area for policy attention. However, the usefulness of looking only at the results for Canadian born is questionable. The reality is that the field of university graduates available as recruits for Canadian businesses features a mix of Canadian-born with a substantial portion of non-Canadian born. Many of the Canadian born came to Canada in recent years for their university education.

The findings of the OECD's Programme of International Student Assessment (PISA), a standardized test given to 15-year-olds in 65 countries to evaluate competency in mathematics, reading and science has suggested that only three, five and seven countries exceeded the Canadian averages in 2012 for mathematics, reading and science respectively, suggesting that competencies of 15 year olds are quite good. A troubling feature of the PISA scores is that Canada's results in mathematics and science have declined steadily since the current test was first given in 2003, a trend evident in most provinces. It is also worrying that in an economically and socially advanced country with mandatory schooling until age 16 that 13 per cent of boys and 14 per cent of girls in Canada are classified as "low achievers" in the OECD study. Despite these declines, Canada has remained among the high achieving countries in the PISA results.

There are of course many differences between the PIAAC and PISA tests and this makes it difficult and perhaps even unreliable to make inferences from one to the other. However, it does stand out that Canada's PISA scores are quite good from an international perspective whereas Canada's PIAAC results for university graduates are not. On the surface this would appear to suggest that the value-added from the university experience in Canada may not be that high. Looked at from the perspective of a production function, the inputs, being the high school students, seem to be of high quality in competencies whereas the output, as measured by PIAAC, is unremarkable.

- **The British Columbia Baccaalaureate Graduates Survey**

The B.C. 2014 Baccaalaureate Graduates Survey (BGS) provides a perspective from university graduates on competencies. The survey reflects almost 8,900 respondents who graduated with a BA in 2012. The largest portion of the graduates (41 percent) had an Arts and Sciences degree. While almost half of the respondents (49 percent) had enrolled in further studies, the vast majority (89 percent) of the graduates surveyed were in the labour force. The question is whether they think their skills on the competencies are serving them well in work. Interestingly, there is a fair degree of satisfaction on that front. A large majority of those who are employed reported that the knowledge and skills they acquired during their BA were very or somewhat useful to them in their work. Although the survey does not

include employers, it seems logical to presume that their employers would also be fairly satisfied with their competencies, as otherwise the graduates would likely feel discomfort in their work situations (<http://outcomes.bcstats.gov.bc.ca/AnnualSurveys/BGS.aspx>).

- **Employer Surveys on Competencies of Recruits and Employees**

As indicated above, a number of business organizations have conducted employer surveys, contributing to an emerging portrait of the kinds of skills and competencies that businesses, in the 21st Century, are seeking. While specific skills identified may differ among the surveys, there are also significant similarities among the skills they seek and value. (HEQCO-EPRI Skills for Success Project: Development Framework, Draft paper made available at HEQCO-EPRI Symposium, Ottawa, September 29, 2015). In the fall of 2013, the Canadian Council of Chief executives conducted a survey of major Canadian employers on their skills needs and human resources priorities. The 2014 survey report provides employers' perspectives on their overall satisfaction with recruits, based on the participation of more than 100 companies. The preliminary report indicated that the companies were fairly satisfied with the preparedness of recent college and university graduates although a large employer noted "a growing and noteworthy difference, or gap, in the quality of students, programs and schools" in the Canadian post-secondary system. Referring to the quality of post-secondary programs across the country, another respondent said "there is a broad spectrum" adding that, "Some [students] are well-equipped and ready for the workplace, even without experience, while others simply cannot contribute yet." The survey did not measure satisfaction of employers on specific competencies. (Canadian Council of Chief Executives, Preliminary survey report: the skill needs of major Canadian employers, January 2014).

A Conference Board survey of employers asked questions about satisfaction with particular competencies. In their report 'How Canada Performs,' the Board concludes that employers have concerns about the "essential, innovation, and employability skills of graduates." Their employer survey found that "over 70 per cent of employers observed gaps in job candidates' and recent hires' critical thinking and problem-solving skills. Between one-third and one-half also said that they are seeing deficits in literacy, communication (e.g. writing and speaking), and teamwork skills among recent graduates and job candidates." (http://www.conferenceboard.ca/press/newsrelease/14-11-04/shortfalls_in_key_skills_prompt_need_for_improvements_in_post_secondary_education_sector.aspx).

- **The OECD's Assessment of Higher Education Learning Outcomes (AHELO) and The Learning Outcomes Assessment Consortium**

From the available assessments it is not possible to make firm conclusions on the abilities of Canada's university graduates in general competencies. There is enough indication to sense that there may be a problem that warrants addressing. However, the exact nature and extent of the problem is not well known. The Ontario Ministry of Training, Colleges and Universities (MTCU) seems to share the conclusion that there is a need for more formal and precise assessments of learning outcomes. MTCU makes such a call in "Strengthening Ontario's Centres of Creativity, Innovation, and Knowledge." "Assessing formal learning outcomes – the skills and competencies that institutions develop in their graduates – is an emerging international trend, and the possibilities are being explored in Ontario. Through HEQCO, several Ontario university engineering programs are participating in the OECD's Assessment of Higher Education Learning Outcomes (AHELO) feasibility study, exploring how quality

learning could be measured across countries.” (Ministry of Training, Colleges & Universities, ‘Strengthening Ontario’s Centres of Creativity, innovation and knowledge: A discussion paper on innovation to make our university and college system stronger, 2012).

The Learning Outcomes Assessment Consortium, an initiative funded by HEQCO that involves three universities (Queen’s University, University of Guelph and University of Toronto) and three colleges in a three year pilot project to assess transferable learning outcomes, specifically critical thinking, problem solving, written communication and lifelong learning. A Queen’s summary report (July, 2015) demonstrates that if you teach and test things like critical thinking and ability to work in groups, students score better on tests of such things. But so far such pilots are not able to discern whether these skills help students get and keep good jobs.

- **Competency Training Needs to Start Before Students Reach University**

Universities can certainly be expected to advance students’ skills in areas such as literacy and numeracy. They should not, however, be saddled with filling gaps on basic skills left by high schools. The competency agenda has been a focus for K-12 education for many years. While the PISA scores for Canadian 15-year-olds are reasonably high from an international perspective, there is tremendous variation across provinces. Further, scores in mathematics have been trending down in recent years. Deficiencies like this need to be addressed at the K-12 level if universities are to succeed in graduating students with proficiency in the competencies.

C. CBE in Professional and non-Professional programs

Outcomes or competency-based education has been a part of the Canadian educational environment for many years. Canadian Colleges have been “mandated to follow the outcomes-based Provincial Program Standard since the 1990s” (Liu, p.9) and the K-12 sector has implemented competency-based educational approaches in its focus on developing 21st Century skills for more than two decades. Universities have also had experience with competency or outcomes-based learning through their professionally accredited programs, such as nursing, engineering, law, business and medicine, which require that specific standards are met on the part of the program and on the part of students to receive the professional accreditation. These programs, some of which are at the graduate level, are based on pre-designated competencies or outcomes that are deemed to be necessary to graduate from the program and work in the particular field. By contrast, general undergraduate Arts and Sciences programs are less characterized by the requirement that students meet pre-designated competencies and standardized outcomes.

Central to education based on competencies or outcomes, is the issue of measurement. Typically, university performance is measured by enrolment and graduation figures and resource inputs. OBE suggests also measuring quality of universities by outcomes. Given the usefulness of outcomes-based learning in some spheres, coupled with the widespread perception that soft skills are important and necessary life skills for the 21st Century, an important question to consider is, what, if anything, can Arts and Sciences education gain from the outcomes / competencies-based approaches seen elsewhere and, if so, how might it be implemented?

- **Professional programs**

Coverage and testing of a standardized skill set is done for accreditation in most professional programs. The skills tested generally include competencies that are specific to the profession as well as broad competencies that are important to do the work well. Accredited programs can be at the undergraduate or graduate level. Professional programs in universities also typically feature a number of close, ongoing associations with businesses and business representation as well as opportunities for co-op placements, or other forms of workplace experience.

Engineering education, for example, is based on a broad and specific set of competencies. The Canadian Engineering Accreditation Board accredits Canadian undergraduate engineering programs that meet the educational standards that are acceptable for professional engineers in Canada. Competencies are established and implemented in engineering programs across the country to comply with the following: “The engineering profession expects of its members competence in engineering as well as an understanding of the effects of engineering on society. Thus, accredited engineering programs must contain not only adequate mathematics, science, and engineering curriculum content but must also develop communication skills, an understanding of the environmental, cultural, economic, and social impacts of engineering on society, the concepts of sustainable development, and the capacity for life-long learning.”

(http://www.engineerscanada.ca/sites/default/files/2014_accreditation_criteria_and_procedures_v06.pdf).

In the early 1990s The Royal College of Physicians and Surgeons of Canada developed CanMEDS, a competency-based framework that describes the core knowledge, skills and abilities of specialist physicians. CanMEDS is an educational framework based on seven roles that lead to optimal health care outcomes: medical expert (central role), communicator, collaborator, manager, health advocate, scholar and professional. These roles, which include discipline specific skills as well as related ‘soft skills’, have been integrated into accreditation standards, training objectives, teaching and assessment. The model has been adapted around the world in the health profession and other professions (<http://www.royalcollege.ca/portal/page/portal/rc/resources/aboutcanmeds>).

The CanMEDS experience sheds light on some of the realities educators face in implementing CBE models. The program has been embraced by medical institutional and organizational policy-makers as well as by some medical educators as a valuable teaching and evaluation tool. Yet, as in other disciplines, a number of factors have hampered its full implementation at the curricular level including achieving competency-based results within the traditional time-based teaching structure; training faculty in the effective use of the competency-based education; and evaluating residents’ achievement of the competencies.

The Queen’s School of Business, which includes undergraduate and graduate level programs, provides a broad competency-based approach with a pioneering focus on team-based and experiential learning. The outcomes to be achieved in every program are identified. The competencies taught encompass hard and soft skills such as the ability to communicate and work in teams. While most of the competencies are embedded in each program and sometimes across programs, some are also taught in dedicated courses (e.g. communications). The school canvasses business (particularly those that might hire their graduates) to assess the competencies sought and identifies the gaps. They then amend the outcomes approaches to fill those gaps.

- **Non-professional programs**

If universities were to shift focus to outcomes or competencies, the greater change would likely be felt in the non-professional programs. The typical Arts and Sciences university program, especially in first year or two of an undergraduate degree, is not structured in a way that maximizes the development of competencies. Students generally attend large lecture-style classes, course selection is very broad even within a discipline, there is little standardization among courses for soft skills competencies such that attention to competencies (even literacy) is instructor dependent, instruction is time-based with credits based on hours in class, and there is no deliberate measurement or assessment of these competencies. Placing greater institutional emphasis on competencies and outcomes for Arts and Sciences students could, however, strengthen student perceptions of the skills they are learning in university and, at the same time, mitigate some of the issues currently standing between graduates and their future employers.

One point of resistance to embracing CBE is its connection to preparing students for the world of work. Some view this as separate and perhaps even at odds with liberal education. But in its review of CBE experiences, HEQCO cites some American universities where competencies have been explicitly incorporated into liberal arts education (Abner, B., Bartosh, O., Ungerleider, C., & Tiffin, R. (2014). *Productivity Implications of a Shift to Competency-Based Education: An environmental scan and review of the relevant literature*. Toronto: Higher Education Quality Council of Ontario).

Few, if any, Canadian universities have implemented CBE on a broad, comprehensive basis. Nevertheless, the principles underlying CBE have been more explicitly set out in a number of jurisdictions and provinces and quite a few pilot projects are underway.

The 2010 Quality Assurance Framework processes, overseen by the Council of Ontario Universities (COU), require that departments articulate learning outcomes that are in line with the university's mission and goals as well as the University Degree Level Expectations (UDLEs). Although programs are audited every eight years it seems there are wide discrepancies in application and evaluation and, as well, considerable faculty resistance. (Liu, Q. (2015). *Outcomes-Based Education Initiatives in Ontario Postsecondary Education: Case Studies*. Toronto: Higher Education Quality Council of Ontario).

One of the broader applications of CBE or OBE is underway at the University of Victoria (UVic). UVic has developed a competency framework to help students assess their curricular and co-curricular learning outcomes. Their competency framework has three components: (i) ten core competencies, (ii) discipline specific competencies, and (iii) intercultural competencies. The core competencies, the key capabilities that would be of interest to any type of organization looking to hire, or engage a student, are: personal management, communication, managing information, research and analysis, project and task management, teamwork, commitment to quality, professional behaviour, social responsibility and continuous learning. The discipline specific competencies, developed in consultation with discipline faculty, relate to each of the academic disciplines at the University, be it philosophy or mechanical engineering. The intercultural competencies refer to a set of capabilities that relate to improved effectiveness in intercultural encounters – whether they be abroad, or in any diverse workplace in Canada or globally. Specifically they are intercultural motivation and knowledge, strategic thinking and appropriate behaviour. Senior university administrators report that among the challenges of implementing CBE throughout the university are: resistance of faculty focused on teaching discipline-specific material and uncertainty over how to test the competencies. On the former, it was pointed out that tangible evidence of the benefits of CBE would be valuable to convince intransigent faculty.

The CBE pilot project mentioned above at Queen's University is being applied in the Faculty of Arts & Science (psychology, drama and physics) and the Faculty of Engineering. The competencies of focus are critical thinking, problem-solving, written communication and lifelong learning skills.

The University of Toronto (U of T) is moving to a competencies reporting strategy. Upon graduation, students have a co-curricular record, much like a transcript that is validated by the university that records co-curricular experiences and the competencies that flow from that. The record provides students with the language to express what competencies they have learned or acquired from their various activities.

These examples and others suggest that there are opportunities to use competencies as a basis for navigating educational progress and there is some recognition of their value. But the limited implementation of CBE principles also demonstrates that the general use of strict competency-based educational models is not taking root. "What is equally clear from the literature, and from our case studies, is that as competency-based programs move to the university sector, it is not useful to describe them as either CBE or non-CBE. A more appropriate approach is to recognize that there is a continuum and that what may be identified as a CBE program can contain elements associated with traditional, non-competency-based education." (Abner, B., Bartosh, O., Ungerleider, C., & Tiffin, R. (2014). *Productivity Implications of a Shift to Competency-Based Education: An environmental scan and review of the relevant literature*. Toronto: Higher Education Quality Council of Ontario).

D. Where is the Evidence of the Benefits of Competency-Based Education?

Outcomes or competencies may better align with business interests than traditional models and the value of developing competencies in students makes sense intuitively. But is there credible evidence that such a focus in university education would well serve the graduates (and the businesses that hire them)? Does this help skills/knowledge be retained? Does it help graduates weather and even take advantage of the inevitable shifts in the labour market over the time of their working life?

The focus in this section on these questions is on competencies training and testing at universities. But a question could also be posed to the business perspective. One presumes the business interest in the so-called "soft skills" is based upon solid evidence of their best interests, but is that the case?

HEQCO's examination of the literature on CBE has found that, "little information is available regarding the productivity of the CBE approach." They also found little agreement on the definition and interpretations of the concepts of 'competence' and 'competencies,' and in the understanding of the objectives for competency based education. They leave no doubt about the lack of availability of supporting evidence: "While the entire genetic structure of competency-based education leads to the expectation that competency-based education can be relied upon to provide job-ready skills and competencies, there is no comprehensive evidence that this is the case." (Abner, B., Bartosh, O., Ungerleider, C., & Tiffin, R. (2014). *Productivity Implications of a Shift to Competency-Based Education: An environmental scan and review of the relevant literature*. Toronto: Higher Education Quality Council of Ontario).

We do not view this as an argument to abandon the investigation or use of competency-based approaches, however. As universities begin to shift toward greater emphasis on outcomes and competencies, the time is right to put in place systems to measure the results. At least then we may

have answers on its effectiveness in the future. If, for example, there were an identifier for students who have been exposed to a competencies- or outcomes-based learning approach, the EPRI tax linkage program could test whether, over time, they are doing better in the labour market than their peers who were not exposed to that sort of learning. Of course in reality the testing could be complicated if, as HEQCO suggests, the reality is less CBE or non-CBE but rather a continuum along the focus on competencies.

E. The Way Forward for Competencies to Bolster Long-Term Economic Returns to University Education

There seems tremendous potential for a greater focus on general competencies to bridge the interests of business, universities and students in a manner that would yield strong benefits to all parties and Canadians at large. While promising progress has been made on many fronts in recent years, the potential remains largely untapped and untested. This final section provides a number of suggestions for the various stakeholders to capture more fully the benefits of competency- or outcomes- based education. It also describes an initiative being designed to promote better alignment between the skills and competencies necessary for the modern workplace and the education provided in Canada's postsecondary institutions.

Improving data, understanding what skills are needed, and improving assessment of graduates' skills are fundamental to any attempt to better align the interests of businesses and postsecondary institutions and all stakeholders have a role to play. While there have been recent improvements in the information available on the competencies employers want and on where and what kinds of jobs are available, there are gaping holes. We need better information on the relationship between labour demand and supply and graduates' outcomes; we need longitudinal data that assesses how graduates fare well into the future and we need to ensure that the results make their way to parents, students and educators. We also need a better understanding of the specific skills that lead to successful outcomes in the workforce, with measures for success based on employment and income as well as job / career satisfaction, and we need these results to be used to inform some of the outcomes of postsecondary programs. Finally, we need postsecondary institutions to do a better job of measuring and credentialing the general cognitive and transferable skills that have been identified as important to the labour force, and identifying which teaching practices and schooling experiences most help in the development of these skills.

A group consisting of educators and representatives of organizations and institutions has recently come together to develop a research project based on the potential for aligning the competencies needed in the modern workplace with the education provided in Canada's postsecondary institutions. The project consists of developing a strategy to test general competencies of students at various times prior to, during and after their postsecondary experience to determine the influence of those competencies on their post-graduation outcomes (including employment, income, life satisfaction, resilience, et cetera). The test results would ultimately be intended to be used to inform the education process in postsecondary institutions, including colleges and universities.

Some progress is being made in better matching skill development and skill requirements across Canada. But much more would be accomplished through a coordinated strategy involving all of the stakeholders, including provincial and territorial governments, business, education institutions and the Federal government. A new skills agenda is simply too important to the future of Canada to be left to piecemeal, uncoordinated strategies and actions.

The following lists specific roles for each of the major players:

Business

- Provide more specific and detailed information on current and anticipated labour market needs
- Provide competency profiles for available jobs.
- Provide more detailed assessments of university graduates' skills in the competencies business seeks and support universities in their efforts to evolve to more competency-based learning.
- Work with universities and schools to encourage more females to study in the STEM disciplines and other areas where there is under-representation.
- Continue to expand the availability of experiential learning opportunities (co-ops, internships, involvement in projects et cetera).
- Recognize that a fair amount of job-specific training must be provided to new university recruits. With a greater focus of universities on competencies, it is hoped that little general training on competencies will be needed. But universities will not, and likely should not, dedicate their programs to teaching specific job skills.
- The Roundtable to improve school-to-work transitions established in April 2015 by the CCCE, with 13 college and university Presidents, is a wonderful opportunity to exploit new information to improve the link between universities and business. In addition to focusing on work-related learning, labour market information and research, the areas identified in the Roundtable's first discussion, they could usefully collaborate in the following additional areas: identifying the competencies employers seek (which could fall under the category of labour market information); embedding outcomes or competency based learning through university programs; reaching back together to secondary schools and their students on competencies and supporting more active and successful involvement of females in certain disciplines.

Governments

- Support the needed research on CBE.
- Collect, co-ordinate and disseminate more useful labour market information, particularly on labour demand and the labour market performance of university graduates. An agency should be in charge of collating, disseminating and communicating, in appropriate fashion, information on how university graduates in the various disciplines are faring in the labour market. Of course, as a first step, the quality of that information should be improved. Existing surveys of university graduates (such as the B.C. and Ontario surveys and the National Graduates Survey) could be improved. But it seems that over time and with the right kind of support, the more useful way to proceed would be to expand the income tax linkage project of the EPRI to a pan-Canadian basis. This project has the advantage of providing labour market outcomes of graduates over longer periods of time. Indeed, consideration should be given to the EPRI project becoming a regular Statistics Canada product.
- Along with addressing the more general issue of why recent (highly educated) immigrants struggle to integrate into the Canadian labour market, work with universities and business to determine why non-Canadian born university graduates in general have poor results on competency tests (such as PIAAC) and the degree to which that worsens their labour market outcomes. And of course then design approaches to remedy the problem.

High Schools

- Raise the standard of teaching and testing of general competencies so universities can focus on advancement rather than remediation.
- Work with universities and business to attract and retain more females in the STEM disciplines and other fields of under-representation.
- As improved information becomes available on university programs and school-to-work transitions, ensure this information is made available in appropriate format and fora to students and their parents. As referred to above, recent work by The Learning Partnership has demonstrated the keen interest of students in university and business but the weak knowledge base from which they base decisions.

Universities

Recognizing that, as HEQCO suggests, CBE is likely to be a continuum, there are a number of steps universities could take to bolster the teaching and testing of competencies. Some seem quite minor, others more profound and likely challenging to put in place. Some ideas follow:

- Do a better job describing, packaging and “selling” the competencies university graduates have accumulated over their university experience rather than focusing more exclusively on discipline-specific knowledge.
- Provide students with the tools and learning they need to understand and articulate their competencies for themselves and for their potential employers.
- Address areas that are significantly behind in the development of competencies. This could be at the faculty, department or individual course level. For example, very large classrooms with multiple choice exams and no written assignments (or assignments that do not receive adequate feedback) should be targeted.
- Develop outcomes for every course and construct assessment mechanisms that are based on those competencies.
- Develop new courses and programs that are designed around desired competencies.
- Create foundation year programs for all students that include a core curriculum based on the teaching and assessment of the competencies universities want, be it in science, humanities, social science, language, arts, or a combination thereof. Kings College at Dalhousie University and the McMaster Arts and Sciences Programs are examples. A firmer hand (or at least firmer guidelines) may be required to ensure students take certain courses before graduation. For example, as the Dodge Task Force on STEM emphasized, it is more a matter of exposing more students to STEM courses than having more STEM specialists. Communications or critical thinking courses, or at least mini-courses, may be in order regardless of the discipline.
- Measure student competencies at various points in their academic and post academic career: Upon entrance to university to identify student skills from K-12; during university and at graduation to identify the increments from their university experience; and post-graduation at points during their working lives to identify which competencies from their education may have depreciated and which competencies might have been added through work.
- Make a satisfactory result of competency testing a requirement for a degree.
- Conduct more research in Canada and internationally on the effect of greater emphasis on competencies on employment, earnings and lifelong success in the labour market. One way to test this in Canada is to create identifiers for students following a CBE approach and then

compare their post-graduation labour market experience to a control group. However, if as HEQCO suggests, CBE will be a continuum rather than a simple case of CBE or non-CBE, such testing may be more complex. At the moment that is less of an issue as there are distinct CBE pilot projects. In general the results are being tested through the students' university years (the Queen's project for example). Testing of those in the pilot projects against a control group could be extended beyond graduation.

- Identify and implement the required incentives to promote CBE. Evidence of its success for students would certainly be a strong incentive to convince intransigent faculty. Changes to funding models would also be in order. They should move away from a simple focus on enrolment and graduation and capture quality, at least as measured by outcomes.
- Develop better models for the testing of general competencies. Some standardizing in the approach across institutions would be of considerable value.
- Consideration should be given to the extension of accreditation boards to non-professional programs. That would address the need for standardization. It might also be an effective way to reduce resistance to CBE from within universities. Few would want to jeopardize their programs from being accredited.
- Switch from an emphasis on time (students devote a certain number of hours to a program) to outcomes (students must pass a set of pre-defined outcomes to complete a program).
- It is most likely that the evolution toward CBE will proceed as an expansion of pilot projects rather than a wholesale adoption across universities. This seems appropriate at this stage when there is little evidence of the results. Indeed, the pilot project approach will help measure the results.