

Pathways to education and work in Ontario and Canada

By: Leesa Wheelahan
Gavin Moodie
Eric Lavigne
Jinli Yang
Amanda Brijmohan
Ruth Childs



Department of Leadership, Higher and Adult Education
Ontario Institute for Studies in Education
252 Bloor Street West,
Toronto, ON, M5S 1V6 Canada
www.oise.utoronto.ca/lhae

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¹ The list of tables for the appendices can be found at the beginning of the appendices

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Introduction

This report investigates the nature of pathways within postsecondary education and between postsecondary education and the labour market in Ontario and Canada. It explores the extent to which students stay within the same field of education when they undertake a second postsecondary education qualification, and the links between their qualifications and the labour market in different fields of education. It uses the 2013 National Graduate Survey produced by Statistics Canada which surveyed students who graduated from their program in 2009 and 2010. Graduates were surveyed in 2013, at least two years after they had graduated.

The development of educational pathways between colleges and universities is a priority of the Ontario government and of other provincial governments in Canada (Council of Ministers of Education Canada, 2009a, 2009b). Alberta, British Columbia, New Brunswick, Newfoundland and Labrador, and Ontario have established councils to facilitate educational pathways and credit transfer, while other provinces have established policies to facilitate agreements between postsecondary education (PSE) institutions about credit transfer and articulation (CMEC 2009b; ACCC 2011; AUCC & CICan 2014).

Governments invest in pathways and in systemic policies and frameworks to support their development because they see pathways as means to ends. These ends are to increase the proportion of the population who have higher-level qualifications in response to demands for higher-level skills in the workforce, and to support social inclusion. In support of these broad objectives, educational pathways aim to achieve three key goals in modern postsecondary education systems (Wheelahan, 2009). The first is to align educational outcomes with national economic goals. The second is to increase the efficiency of education systems by reducing costs to government and time and costs to students when they undertake higher-level qualifications by maximizing credit for prior learning. The third is to support equity and promote social inclusion by providing opportunities for disadvantaged groups by mediating access to higher levels of education (OECD 1998; Raffe, 1998; Young, 2001). The emphasis in policy is on:

- Developing linear pathways within fields of education that link lower level qualifications to higher level qualifications within the same field of education; and
- Developing pathways from colleges to universities as a way of increasing access to higher-level studies, occupational pathways and social inclusion.

The assumption underpinning these policies is that educational pathways will inexorably lead to occupational progression and promote lifelong learning by facilitating access to and movement between education and work. Consequently, the focus in policy is to increase the number of educational pathways between qualifications within fields of education, and these policies do not differentiate between different fields of education, or the labour markets these qualifications serve.

This report tests these policy objectives by exploring the nature of educational pathways and the links between educational pathways and the labour market in Ontario, and it compares these outcomes with Canada as a whole. Its purpose is to inform policy and practices at the departmental level within PSE institutions, at the institutional level and at the system level as a whole. It finds that the extent to which students stay within the same field of education when they undertake a second PSE qualification varies quite widely between fields of education, but that overall, pathways within fields of education are quite modest. Most students change their field of

education in most fields when they undertake a second PSE qualification. There are a small number of fields of study where a majority stay within that field when they undertake a second PSE qualification. Moreover, while college to university pathways are important, so too are pathways between colleges, pathways from universities to colleges, and pathways between universities. Indeed, the pathway used by most students is between qualifications within universities. These pathways show different types of patterns, reflecting the different ways students use qualifications in each sector and field and the different roles that qualifications serve in the labour market. Some fields of education support industries where there are strong occupational ladders between lower and high skilled occupations (usually where occupations are regulated), while others support industries with much weaker occupational ladders (usually where occupations are unregulated). Students and employers use qualifications differently depending on whether the occupation is regulated or unregulated and this is reflected in differences between fields of education and between educational sectors.

There are significant policy implications from the findings of this report for policy and practice. First, it suggests that policy needs to support a wider range of pathways beyond linear pathways that link lower and higher level qualifications within the same field of education. Second, it suggests that we need a much better understanding of the way that educational pathways are linked to the labour market, and the way students use pathways to support their careers.

The next section outlines what we know about educational pathways in Canada, while the following one outlines the conceptual framework that was used to design the research and the research questions. After this is a discussion of the methods and this is followed by an analysis of broad fields of education in Canada and Ontario. The following section analyses more narrowly defined fields of education based on whether qualifications support regulated or unregulated occupations and it includes an analysis of links between fields of education and the labour market. A discussion of the results follows, focusing particularly on policy implications. The main body of the report presents only a brief discussion of the methods used to design the research and summary data on educational pathways in Canada and Ontario. Appendices are attached to the report that present a detailed explanation of the methods and a detailed examination of each field of education, including by educational sector and level of qualification and the links between fields of education and qualifications and the labour market.

What do we know about educational pathways in Canada and Ontario?

There is considerable research in Canada on student pathways between colleges and universities and the factors that support or inhibit student mobility (Boggs & Trick, 2009; Finnie et al. 2011; FitzGibbon, 2014; Kerr, McCloy, & Liu, 2010; Trick, 2013; Skolnik, 2004, 2009, 2010, 2011, 2012, 2013a, 2013b; Lang, 2009; Clark et al. 2009; Floyd et al. 2005). There are also reports that explore the types of institutions college graduates go to when they do a second PSE qualification, their demographic and socio-economic profile, and their aspirations and experiences of transition (Kerr *et al.*, 2010). Colleges Ontario (2009) explain that fewer college graduates in Ontario have pathways to universities compared to other provinces, and they discuss the different types of pathways college students undertake (college to college, college to university and university to college); students' reasons for undertaking a second PSE qualification; and, the universities that college graduates enrol in when they enter a degree in a university. They also discuss the main qualifications by program field that provide the source of college graduates to universities and the destinations they go to by program field. The issue has also been considered by the College-

University Consortium Council² (CCI Research Inc, 2011) and by the Ontario Undergraduate Student Alliance (Camman, Hamade, & Zhou, 2014). However, these analyses, while very helpful, do not show whether students stay within the same field when they undertake a second PSE qualification.

Most of the Canadian and international literature on pathways focuses on pathways from college to universities, although increasingly it is recognised that pathways are more complex (Harris, Rainey, & Sumner, 2006; Trick, 2013). The grade point average and retention rates of college students who articulate to university has also been explored, and this shows that they achieve outcomes that are similar to, or just below, 'direct entry' students to universities, and similar rates of retention (Trick, 2013; Kerr *et al.*, 2010; Wheelahan, 2005).

Graduates' labour market outcomes in Canada have also been explored, as has the 'problem' of the 'skills match or mismatch' (Bayard & Greenlee, 2009; Boudarbat & Chernoff, 2009; Conway & Montgomery, 2014; Finnie, 2004; Frenette, 2014; Lefebvre & Merrigan, 2010; McDaniel *et al.* 2013; Munro, 2014; Plesca & Summerfield, 2014; Stuckey & Munro, 2013; Sweetman & McBride, 2004; Walters, 2009; Walters & Frank, 2010). However, these studies focus on the occupational pathways that students seek based on their highest or most recent qualification and field of education and not on links between fields of education and labour market outcomes.

Overall, there has been very little published on the connections between qualifications within fields of education and the links between educational pathways and occupational pathways. In part this is because of the difficulty in obtaining accurate data in Ontario and Canada (Kerr *et al.*, 2010). In the long run, data will be available as most provinces including Ontario are introducing universal student numbers and this will provide policy makers and practitioners with rich data about educational pathways, and show how students use their qualifications to enter the labour market or seek a higher skilled position. Ontario has only recently expanded the Ontario Education Number (OEN) to encompass postsecondary education and thus extend its prior coverage of schools, and it will take some years before the data are able to provide insights into students' trajectories as they complete multiple PSE qualifications.

The conceptual design for this project draws on literature on pathways within fields of education from an Australian research project that was led by two members of our research team (Wheelahan, Moodie, & Buchanan, 2012). This is outlined in the next section.

Purpose of qualifications and links to pathways

Broadly speaking, qualifications serve three purposes (Gallacher, Ingram, & Reeve, 2012), and lifelong learning policies are predicated on the effective fulfilment of these purposes:

1. *In the labour market:* qualifications help guide entry into the workforce and into higher occupational levels once graduates are employed.
2. *In education:* qualifications are a transition to higher-level studies. All qualifications should provide students with the knowledge and skills needed to study at a higher level in their field.
3. *In society:* qualifications widen access to tertiary education and support social mobility by supporting disadvantaged students to enter higher-level studies and occupations.

² The Ontario Council on Articulation and Transfer (ONCAT) was established in 2011 as the successor to the College-University Consortium Council.

All three are needed to support both educational and occupational progression, to strengthen the links between qualifications and jobs, and to support social inclusion and social mobility (Deissinger, Aff, Fuller, & Helms, 2013). However, qualifications differ in the way they serve these purposes and this is largely related to how they are used in the labour market (CEDEFOP, 2013). The key findings from the Australian research are that: educational pathways are shaped by the relationship between qualifications and the labour market; the nature and structure of pathways differs between industries; and, a uniform approach to policy based on one type of pathway from lower to higher-level qualifications within the same field of education is unlikely to be effective (Wheelahan *et al.*, 2012; Moodie, Fredman, Bexley, & Wheelahan, 2013a, 2013b). Pathways need to take into account how qualifications are linked to the labour market, and the way in which different fields of education meet the three purposes of qualifications.

Employers and graduates use qualifications in the labour market in two main ways: as a signal or as a screen. Qualifications in regulated labour markets are mainly used to signal the specific knowledge and skills graduates need for the job. The 'match' between the qualification and job is usually tight, with most graduates working in the job associated with their qualification. Qualifications are usually developed by the professional or occupational body to specify (or signal) the knowledge, skills and attributes required to work in and progress in the occupation. In contrast, qualifications in unregulated labour markets are mainly used to screen applicants who have the level of general aptitude needed to do the job. For example, an employer may specify that applicants must have a diploma or a degree, rather than a specific qualification related to a specific occupation. While there may be a body of knowledge required by graduates in these fields, it is often very broad and educational institutions may take broad advice in developing the curriculum, but they have greater discretion compared to regulated occupations.

The extent to which qualifications in regulated or unregulated occupations are related to occupational pathways depends on the extent to which labour markets are segmented. The Australian research found that where there were strong occupational pathways there were strong educational pathways to support those occupational pathways (for example, from practical to registered nurse, but not from nurse to medical doctor) (Moodie *et al.*, 2013a). In contrast, while electrician and electrical engineer are in the same broad field of education and both are regulated occupations, there is not a strong educational pathway from one to the other in Australia, because not many electricians become engineers and the occupational pathway is weak.

The Australian research found two different patterns for educational pathways in unregulated occupations. The first, exemplified by business studies, found high levels of student progression within the field of education, but a very loose connection between the qualification and occupation with many graduates working in a different field from their qualification upon graduation. Graduates from college level qualifications often undertook a degree because they needed a degree to compete effectively in the job market and employers used the level of qualification as a screen for suitable applicants (Karmel, Mlotkowski, & Awodeyi, 2008). The second, exemplified by the liberal arts and sciences, showed very weak articulation within the field of education so when most graduates undertook a second qualification it was usually in a different field, and very weak links to occupations with employers using the level of qualification to screen suitable applicants.

The Australian research identified four broad qualification types. They vary in how the qualifications are linked to each other and to the labour market.

- Strong links between qualifications within the field of education, but weak links to jobs associated with the qualification, exemplified by business;
- Strong links between qualifications within the field of education, and strong links to jobs associated with the qualification, exemplified by nursing;
- Weak links between qualifications within the field of education, and strong links to jobs associated with the qualification, exemplified by engineering; and
- Weak links between qualifications within the field of education, and weak links to jobs associated with the qualification, exemplified by the liberal arts and sciences.

The Australian findings suggest that a more differentiated approach to developing pathways is needed; each type of qualification would emphasise their three purposes in different ways, depending on their relationship to the labour market and whether the qualifications were used as a signal or screen in that field. The research did not find that one type of qualification or pathway was better than the other. For example, the liberal arts and sciences still do mediate entry to and progression in the labour market, but they do so in a different way compared to regulated occupations. The emphasis in the liberal arts and sciences is on the broad knowledge and skills that graduates develop, whereas the emphasis in regulated occupations is on the knowledge, skills and attributes that are specified by the professional and occupational bodies as preconditions for practice in their fields.

This project used the Australian research as a starting point for exploring the nature of pathways within PSE and between PSE and the labour market in Ontario and Canada. There are similarities between Canada and Australia because both are liberal market economies, both are federations with Westminster systems of government, and both have two sectors of PSE (a college and university sector). However, we did not expect the findings to be identical given the differences in the design of PSE in Canada and Australia and because of differences in their economies, despite their broad similarities. We also expected some differences between Ontario and Canada given the differences in PSE systems between Canadian provinces and differences in the composition and nature of provincial economies. The two key research questions guiding the project were:

1. What patterns are there in graduates' progression within postsecondary education by field of education and level?
2. Is graduates' progression within postsecondary education related to occupational progression and to whether employers use qualifications as a signal or screen?

Overall, we found weaker pathways within fields of education in Canada and Ontario compared to Australia, but similar relations between regulated and unregulated occupations and qualifications.

Summary of methods

Data used to inform this study were derived from the 2013 National Graduate Survey (NGS). The NGS was designed to investigate relationships between post-secondary education and the labour market by examining factors such as programs of study, qualification level, and their effect on student pathways to employment (Statistics Canada, 2014). A stratified sample of 28,715 graduates was drawn from a population of 431,921 graduates who had graduated or completed the requirements for a degree, diploma, or certificate from a Canadian public postsecondary education institution in 2009/2010. Graduates were interviewed by Statistics Canada in 2013. Using the application of a weight variable provided by Statistics Canada, we were able to obtain the weighted estimates for the entire population. The team considered only graduates with prior Canadian qualifications, excluding from analysis graduates with prior qualifications outside Canada, mostly the USA.

The team accessed the NGS through Statistics Canada's Real Time Remote Access (RTRA) system, and this imposed limitations on our access to the data. The first limitation was that we could not compute the standard errors associated with the data, because the RTRA does not give users direct access to its data sets and forbids users from running customised programs to calculate standard errors. Instead, we were provided with the Approximate Sampling Variability Tables for typical population proportions. This allowed us to arbitrarily estimate confidence intervals from these values. We erred on the side of caution and as a consequence our estimates of confidence intervals are conservative and probably wider than would be the case if we were able to calculate precise confidence intervals.

The second limitation comes from a rounding procedure applied by the RTRA system. As data are produced, the RTRA system applies a controlled random rounding program and rounds all numbers by an interval of 20. This is meant to prevent identification of individuals in smaller samples. Given these limitations, we compared our results in using the RTRA to a more limited analysis we were able to run using the publicly available NGS file that comprises a smaller data set. Unfortunately, the public NGS data set does not contain key variables of interest to this project such as field of education or prior qualification, but in comparing other dimensions such as qualification level, we were able to determine that the differences between our findings and the public NGS were quite small, including the difference between standard errors which was a maximum of 0.3% in Ontario tables and 0.2% in Canada tables. Appendix 7 presents tables showing the confidence intervals we derived for the extent to which graduates' 2009/2010 qualification was in the same field as their prior qualifications.

Results for fields with small values and differences amounting to a few percentages should not be considered material. In our analysis we concentrated on fields with high numbers of graduates. The findings should be regarded as showing the broad trajectory rather than precise conclusions. Given the limitations in accessing the data, we are not claiming a misplaced precision, but the analysis here does allow us to explore broad differences between fields of education, between sectors, and between Ontario and Canada.

A detailed explanation of the method is provided in an Appendix and specific points are added as they arise in the analysis.

A note on terminology: the term ‘transfer’ is used in this report to denote all students who moved from one postsecondary education qualification to another, with or without a formal articulation and credit transfer agreement between institutions. This differs from the definition used by ONCAT, which defines transfer as:

The movement of a student from one postsecondary institution to another with credit granted by the receiving institution for courses taken at the sending institution

Provides academic mobility for students while maintaining the quality of educational programs and credentials.

(https://www.ontransfer.ca/index_en.php?page=glossary#letter_t)

Consequently, the way we have used the term ‘transfer’ in this report is much broader than ONCAT’s definition.

We have also used the term ‘pathway’ in a broad sense, to denote all graduates who proceed to a subsequent PSE qualification after they have completed an initial PSE qualification.

Broad fields and subfields

We have used Statistics Canada’s primary groupings of instructional programs as the basis of analysis. We refer to these as ‘broad fields’. We have also constructed our own, narrower fields of education using Statistics Canada’s categories, and we refer to these as ‘subfields’. This is explained in more depth in the Methods in the appendices.

Educational pathways within Ontario and Canada

The biggest educational pathways in Ontario and Canada are within the college and university sectors respectively rather than between the sectors. College graduates whose prior qualification was from a Canadian university were 12.7% of all postsecondary education graduates with a prior Canadian postsecondary education qualification in Ontario, compared to the 8.7% of college graduates who had a prior Canadian university qualification in all of Canada (

Table 1). University graduates whose prior qualification was from a Canadian college were only 16.6% of all graduates with a prior Canadian postsecondary qualification in Ontario, a little over half the 29.3% of university graduates with a prior Canadian college qualification in all of Canada. By far the biggest pathway in Ontario was university to university, which comprised 53.1% of all graduates with a prior Canadian qualification, rather bigger than the 43.1% for all of Canada.

Table 1: Graduates with prior PSE qualifications from a Canadian institution, by pathway, Ontario

Pathway	Ontario		Canada
	Number	% of transfers	% of transfers
College graduates who transferred from a Canadian college	9,640	17.5	18.9
College graduates who transferred from a Canadian university	7,020	12.7	8.7
Sub total college graduates who had transferred from a Canadian institution	16,660	30.3	27.6
University graduates who transferred from a Canadian college	9,160	16.6	29.3
University graduates who transferred from a Canadian university	29,240	53.1	43.1
Sub total university graduates who had transferred from a Canadian institution	38,400	69.7	72.4
Total graduates who had transferred from a Canadian institution	55,060	100.0	100.0

Sending and receiving fields of education

Fields of education differ in size, and whether they are a *sending field of education* or a *receiving field of education*. This is illustrated in Table 2. It shows the share of graduates in each field of education in 2009/2010 in Ontario and Canada. This shows, for example, that business, and social and behavioural sciences and languages (Soc sci) were the biggest fields in Ontario because they had the largest share of graduates in 2009/2010 (21% in business and 17% social science in Ontario). Business was the biggest field in Canada (23%), and while health was the next biggest (15%), social science (14%) and engineering (14%) were not far behind. The business field had roughly the same share of graduates who reported having a prior Canadian PSE qualification as its share of graduates overall (21% in Ontario and 26% in Canada). However, the percentage of graduates in 2009/2010 whose prior qualification was *from* business is proportionally lower. Only 15% of graduates in 2009/2010 said that their prior qualification was from business in Ontario, and 18% in Canada. This means that the business field of education receives proportionally more students who undertake a second PSE qualification than it sends. This is still quite high compared to other fields of education, but nonetheless is still lower than the business field of education's

share of graduates overall. It is an important field of education both for sending students and receiving students because it is so big, but nonetheless, it sends more students than it receives.

There are three fields of education that stand out as sending fields in Ontario and Canada. They are humanities, physical sciences and social science. Humanities had only a 10% share of graduates in 2009/2010 in Ontario (7% in Canada); 8% of students with a prior qualification (6% in Canada), but it supplied 16% of graduates' prior qualifications prior to 2009/2010 (16% in Canada). Physical sciences is similar: it provided 7% of graduates in 2009/2010 in Ontario (5% in Canada); 5% of graduates with a prior qualification (4% in Canada); but 11% of graduates' prior qualifications in Ontario were from physical sciences (11% in Canada). Social sciences is notable because it is a relatively big field in both Ontario and Canada, yet it supplies relatively more graduates in Ontario compared to other fields, while it provides a proportionate share in Canada. Social sciences had 17% of graduates in Ontario in 2009/2010 (14% in Canada); 16% of graduates who reported that they had a prior PSE qualification (15% in Canada); but 21% of graduates of graduates' prior qualifications in Ontario were from social science (16% in Canada).

Table 2: Field's share of graduates; graduates with a prior qualification (receiving field); and, prior field (sending field), Ontario and Canada

Field	Ontario			Canada		
	% share of graduates in 2009/10	% share of graduates with prior qual	Prior field as % of all prior fields	% share of graduates in 2009/10	% share of students with prior qual	Prior field as % of all prior fields
Ag	1	1	1	2	2	2
Eng	11	9	10	14	9	9
Bus	21	21	15	23	26	18
Ed	7	15	2	7	13	4
Health	14	16	11	15	16	11
Hum	10	8	16	7	6	16
Info sci	2	3	3	3	3	3
Other	2	2	0	1	1	1
Pers serv	4	2	4	5	3	4
Physical sci	7	5	11	5	4	11
Soc sci	17	16	21	14	15	16
Arts	4	3	5	4	3	5
Total	100	100	100	100	100	100

While relatively small in absolute terms compared to other fields of education, the Education field of education in Ontario and Canada has proportionally more graduates with a prior qualification; however, the Education field provided very few graduates' prior qualifications in 2009/2010. In Ontario, the Education field's share of graduates in 2009/2010 was 7% (7% in Canada); and of these 15% reported having a prior PSE qualification (13% in Canada). Yet, the Education field provided only 2% of all graduates' qualifications prior to 2009/2010 in Ontario (4% in Canada). It is a receiving field of education. So too (but less starkly) is the engineering field in Canada, while engineering in Ontario is roughly proportionate in its share of graduates; share of students with a prior qualification; and, provision of graduates with prior qualifications overall. The other fields are also roughly proportionate in their share of graduates; share of students with a prior qualification; and provision of graduates with prior qualifications overall.

This analysis shows differences between the fields of education and whether they are sending or receiving fields, however this may differ between sectors. As will become apparent in later

analyses, business provides a pathway from college to university, but physical science does not because its main pathway is from one university qualification to another.

Prior qualification history of graduates in 2009/2010 by broad fields of education

The next set of tables broadly summarizes the prior qualification history of graduates in 2009/2010 by broad fields of education as defined by Statistics Canada. They compare outcomes in Ontario and Canada (all provinces). All the tables show (reading from left to right) the field of education of graduates' qualification in 2009/2010; the percentage of graduates within each field of education who had a prior Canadian PSE qualification; of those who had a prior Canadian PSE qualification, the percentage of graduates whose prior qualification was in the same field of education as their current qualification; and in the last two columns, the most common alternative field of education that had the highest percentage of graduates' prior qualifications. These last two columns show the field as well as the percentage of graduates who come from the alternative field.

Table 3 includes both college and university graduates in Ontario and Canada. It shows that while 41% of graduates in Canada had a prior Canadian PSE qualification, only 35% of graduates in Ontario did so. There are some notable differences between big fields of education in Ontario and Canada. In Ontario, 35% of graduates from business had a prior qualification, compared to 45% of business graduates in Canada as a whole. There is a similar difference in social science; some 33% of social science graduates in Ontario had a prior Canadian PSE qualification, compared to 44% in Canada.

Table 3: 2009/2010 graduates who had a prior college or university qualification, by broad field of education (Ontario vs. Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior qual	% of grads with prior qual in same field	Alternative highest sourced broad field	% of grads with prior qual in alternative highest broad field
Ag	1,680	37	32	Physical Sci/ Soc Sci*	19*
Eng	18,200	27	54	Physical sci	13
Bus	33,140	35	36	Soc sci	24
Ed	10,600	77	9	Hum	30
Health	21,560	40	46	Physical sci	15
Hum	15,540	28	37	Soc sci	31
Info sci	3,860	39	32	Eng	19
Other	2,820	31	0	Bus	45
Pers serv	6,800	13	35	Hum	26
Physical sci	10,940	26	62	Eng	12
Soc sci	27,120	33	46	Hum	16
Arts	6,940	23	58	Hum	16
Total	159,200	35	38		
Canada					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior qual	% of grads with prior qual in same field	Alternative highest sourced broad field	% of grads with prior qual in alternative highest broad field
Ag	7,300	42	28	Physical sci	18
Eng	61,980	27	47	Physical sci	13
Bus	101,340	45	42	Soc sci	15
Ed	29,820	76	17	Hum	31
Health	64,120	44	41	Physical sci	16
Hum	29,900	34	40	Soc sci	23
Info sci	11,280	40	34	Hum	15
Other	5,260	41	1	Bus	32
Pers serv	21,580	25	30	Eng	17
Physical sci	22,620	33	61	Health	11
Soc sci	60,300	44	38	Hum	23
Arts	16,420	33	58	Hum	17
Total	431,920	41	38		

*= The percentage applies to the multiple fields that are noted.

College graduates prior qualifications by field of education

Table 4 shows the percentage of college graduates who had a prior qualification from a college or from a university in Canada and Ontario. It reports on students' current PSE qualification by field of education and their prior field of education. There are a number of similarities between the two; in both Canada and Ontario, some 28% of college graduates reported that they had a prior PSE qualification. The percentage of college graduates whose prior qualification was in the same field is also similar – some 33% of Ontario college graduates who had a prior PSE qualification had obtained it in the same field as their current qualification, while 30% of Canadian college graduates who had a prior PSE qualification had obtained it in the same field as their current qualification. The outcomes in some big fields such as business and social sciences are similar in Ontario and Canada. However there are some notable differences: in engineering, which is a large field of education, more Ontario college graduates reported that they had a prior PSE qualification than in Canada, but of those with a prior qualification, similar percentages reported that their prior PSE qualification was in engineering. Similar percentages of college graduates who graduated with a health qualification in 2009/2010 reported they had a prior PSE qualification, but health graduates in Ontario were more likely to report that it was in the same field.

Table 5 shows the percentage of college graduates by field of education in Ontario and Canada who had a prior college qualification. While the percentage of college graduates with a prior college qualification are similar in Ontario (16%) and Canada (19%), there is a higher percentage of Ontario graduates (42%) who have their qualification in the same field of education compared to graduates in Canada overall (33%). However, these pathways within fields of study are still relatively modest. The strongest educational pathways within colleges in Ontario are in engineering and personal services, which are two relatively big fields. Engineering is a strong educational pathway in Canada, while personal services is relatively weak. Compared to other fields, the health field in colleges in Ontario and Canada are big fields, and have a relatively high percentage of graduates who have a prior college qualification, although they differ in the extent to which they are likely to have undertaken their prior college qualification in health. Health is a somewhat stronger education pathway between college qualifications in Ontario than in Canada.

Table 6 shows the percentage of college graduates by field of education who had a prior university qualification in Ontario (12%) and Canada (9%). This is a more modest pathway compared to the pathway between college qualifications. Social science stands out in both Ontario and Canada as a big field of education that also provides a relatively stronger pathway compared to other fields. Some 20% of social science college graduates in Ontario had a prior university qualification, and of these approximately 54% were from social science. In Canada, about 16% of social science college graduates had a prior university qualification, and of these about 42% were from social science. It may well be that these graduates are undertaking a more applied social science program in college to complement their university degree (such as the graduate certificates offered by Ontario's colleges), but further research would be needed to confirm this. Social science is also a relatively stronger 'alternative source' field for college graduates with a prior university qualification in several fields of education in both Ontario and Canada. Most business college graduates who had a prior university qualification undertook their university qualification in a different field of education, with social science providing almost half of all business college graduates with a prior university qualification in Ontario, and about a third for Canada as a whole.

Table 4: 2009/2010 College Graduates who had a prior Canadian College or University qualification, by field of education (Ontario vs. Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of college grads with a prior qual	% of college grads with prior qual in same field	Alternative highest sourced broad field	% of grads with prior qual in alternative highest broad field
Ag	800	30	17	Hum/Soc Sci*	25
Eng	10,560	30	46	Info sci	13
Bus	16,680	27	23	Soc sci	24
Ed	820	54	0	Hum/Soc Sci*	32
Health	9,940	35	40	Physical sci	19
Hum	2,080	15	25	Soc sci	25
Info sci	920	28	15	Eng	31
Other	1,580	18	0	Bus	100
Pers serv	6,480	11	33	Hum	28
Physical sci	400	10	0	Hum	50
Soc sci	6,860	38	38	Bus	24
Arts	3,400	18	43	Hum	27
Total	60,520	28	33		

Canada					
Field of ed graduated in 2009/2010	No. of grads	% of college grads with A prior qual	% of college grads with prior qual in same field	Alternative highest sourced broad field	% of grads with prior qual in alternative highest broad field
Ag	3,740	29	22	Eng/Bus*	13
Eng	43,040	22	42	Pers serv	10
Bus	44,500	30	26	Soc sci	16
Ed	3,540	42	4	Hum	28
Health	32,800	33	29	Bus	18
Hum	3,260	19	19	Pers Serv/Soc Sci*	19
Info sci	4,160	29	22	Eng	15
Other	1,840	16	0	Bus	93
Pers serv	19,980	23	30	Eng	20
Physical sci	1,280	14	33	Hum	22
Soc sci	13,120	35	30	Bus	23
Arts	6,940	21	39	Hum	24
Total	178,200	28	30		

*= The percentage applies to the multiple fields that are noted.

Table 5: 2009/2010 College graduates who had a prior Canadian college qualification, by field of education (Ontario vs. Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior college Qual	% of grads with prior college qual in Same Field	Alternative highest Sourced Broad Field	% of college grads with college prior qual in alternative highest broad field
Ag	800	13	20	Bus/Health/Hum/Pers Serv*	20
Eng	10,560	20	64	Info Sci/Pers Serv*	10
Bus	16,680	14	34	Health	26
Ed	820	17	0	Health	43
Health	9,940	25	48	Bus	19
Hum	2,080	7	29	Health	43
Info sci	920	17	25	Eng	38
Other	1,580	18	0	Bus	100
Pers serv	6,480	6	63	Eng	16
Physical sci	400	10	0	Hum/Arts*	50
Soc sci	6,860	17	20	Bus	45
Arts	3,400	11	44	Hum	28
Total	60,520	16	42		

Canada					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior college Qual	% of grads with prior college qual in Same Field	Alternative highest Sourced Broad Field	% of college grads with college prior qual in alternative highest broad field
Ag	3,740	20	24	Eng	16
Eng	43,040	17	51	Pers serv	13
Bus	44,500	19	28	Eng	22
Ed	3,540	23	0	Soc sci	20
Health	32,800	24	33	Bus	22
Hum	3,260	10	19	Pers serv	38
Info sci	4,160	18	24	Eng	22
Other	1,840	15	0	Bus	100
Pers serv	19,980	18	37	Eng	25
Physical sci	1,280	11	29	Hum	29
Soc sci	13,120	19	20	Bus	35
Arts	6,940	14	39	Hum	24
Total	178,200	19	33		

Table 6: College graduates who had a prior Canadian university qualification, by field of education (Ontario vs. Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior uni qual	% of grads with prior uni qual in same field	Alternative highest sourced broad field	% of grads with Prior Qual in alternative highest broad field
Ag	800	18	14	Soc sci	43
Eng	10,560	10	11	Physical sci	31
Bus	16,680	13	12	Soc sci	48
Ed	820	37	0	Hum	47
Health	9,940	10	18	Physical sci	66
Hum	2,080	9	22	Soc sci	44
Info sci	920	11	0	Soc sci	40
Other	1,580	0	0	n/a	n/a
Pers serv	6,480	5	0	Hum	53
Physical sci	400	0	0	n/a	n/a
Soc sci	6,860	20	54	Hum	27
Arts	3,400	7	42	Hum	25
Total	60,520	12	21		

Canada					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior uni qual	% of grads with prior uni qual in same field	Alternative highest sourced broad field	% of grads with Prior Qual in alternative highest broad field
Ag	3,740	10	17	Soc sci	22
Eng	43,040	5	12	Physical sci	19
Bus	44,500	11	23	Soc sci	35
Ed	3,540	19	9	Hum	41
Health	32,800	9	19	Physical sci	33
Hum	3,260	9	20	Soc sci	33
Info sci	4,160	11	17	Soc sci	22
Other	1,840	1	0	Hum	100
Pers serv	19,980	5	6	Hum	25
Physical sci	1,280	3	50	Ag	50
Soc sci	13,120	16	42	Hum	24
Arts	6,940	7	40	Hum	24
Total	178,200	9	22		

University graduates prior qualifications by field of education

Table 7 shows the percentage of university graduates who had prior qualification from a college or from a university in Canada and Ontario. It reports on students' prior PSE qualification by field of education and their current field of education. It shows that the percentage of university graduates who had a prior PSE qualification was higher for Canada (51%) than for Ontario (40%). However, of those who had a prior PSE qualification, a similar percentage of graduates in Canada and Ontario had a prior qualification in the same field as their current qualification – about 40%. However, fields of education differ in the extent to which graduates had a prior PSE qualification, and whether it was in the same field. The two biggest fields of education in both Ontario and Canada are social sciences and business. In both fields, a higher percentage of university graduates in Canada had a prior PSE qualification compared to Ontario, while a similar percentage of business graduates had a prior PSE qualification in the same field. Somewhat more social science graduates in Ontario had a prior qualification in the same field compared to Canada. These are both very broad 'vocational' fields, but they are not tied tightly to specific occupations (see later discussion). Physical sciences and arts in Ontario and Canada had somewhat fewer graduates who had a prior PSE qualification, but a high percentage of these graduates had a prior PSE qualification in the same field as their current qualification. A higher percentage of university health graduates in Canada had a prior qualification compared to Ontario, but a similar percentage of those had a prior PSE qualification in the health field. The education field had the highest percentage of students with a prior PSE qualification, with a very low percentage of these graduates having a prior PSE qualification in the same field.

Table 8 shows only 9% of university graduates had a prior college qualification in Ontario, while 21% of university graduates in Canada overall had a prior college qualification demonstrating that college to university pathways are much weaker in Ontario compared to Canada overall. However, of those university graduates who do have a prior college qualification, a similar percentage has a prior qualification within the same field – a relatively modest 37% for Ontario and 39% for Canada overall. This differs by fields of education within Ontario and Canada, and between Ontario and Canada. For example, in business, a big field of education, some 14% of graduates in Ontario have a prior college qualification, but of these about 70% have a prior college qualification in business. In contrast, about 28% of university business graduates in Canada have a prior college qualification, and of these 56% had prior college qualification in business. This is quite a strong pathway compared to other fields of study in both Ontario and Canada. In contrast, there is a relatively low percentage of university social science graduates with a prior college qualification, and of these, very few have a prior social science college qualification. A modest percentage of those in health in Ontario and Canada have a prior college qualification, but quite high percentages of these come from health qualifications in college. More university arts graduates in Canada have a prior college qualification compared to Ontario, but in both Ontario and Canada a high percentage of those who have a prior college qualification are from arts.

Table 9 shows a similar percentage of university graduates in 2009/2010 had a prior university qualification in both Ontario and Canada (about 30%), but that a higher percentage of these graduates in Canada overall (42%) undertook their prior university qualification in the same field compared to Ontario (33%). This is relatively modest in both Ontario and Canada. About 20% of university engineering graduates had a prior university qualification in both Ontario and Canada, and in both cases about two thirds of these graduates had a prior university qualification in engineering. Education had the highest percentage of university graduates with a prior university qualification in both Ontario and Canada, but very low percentages of those had a prior university qualification in education.

Table 7: 2009/2010 University graduates who had a prior Canadian College or University Qualification, by field of education (Ontario vs. Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior PSE qual	% of grads with prior PSE qual in same field	Alternative highest sourced broad field	% of grads with prior PSE qual in alternative highest broad field
Ag	880	43	42	Physical sci	26
Eng	7,620	24	67	Physical sci	16
Bus	16,340	43	44	Soc sci	24
Ed	9,720	79	9	Hum	30
Health	11,620	45	50	Physical sci	13
Hum	13,440	30	38	Soc sci	32
Info sci	2,920	42	35	Hum	18
Other	1,240	48	0	Hum	47
Pers serv	320	44	43	Soc sci	43
Physical sci	10,540	27	63	Eng	12
Soc sci	20,020	32	49	Hum	16
Arts	3,540	28	67	Hum	10
Total	98,200	39	40		

Canada					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior PSE qual	% of grads with prior PSE qual in same field	Alternative highest sourced broad field	% of grads with prior PSE qual in alternative highest broad field
Ag	3,520	55	32	Physical sci	26
Eng	18,820	38	54	Physical sci	24
Bus	56,280	56	49	Soc sci	14
Ed	26,120	81	18	Hum	32
Health	31,180	59	46	Physical sci	19
Hum	26,560	35	41	Soc sci	23
Info sci	7,100	45	39	Hum	16
Other	3,400	54	1	Hum	26
Pers serv	1,520	54	29	Soc sci	22
Physical sci	21,280	34	62	Health	12
Soc sci	46,820	46	39	Hum	24
Arts	9,440	44	61	Hum	14
Total	252,040	51	41		

Table 8: 2009/2010 University graduates who had a prior Canadian College qualification, by field of education (Ontario vs Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior college qual	% of grads with prior college qual in same field	Alternative highest sourced broad field	% of Grads with prior college qual in alternative highest broad field
Ag	880	7	100	n/a	n/a
Eng	7,620	5	61	Pers serv/Physical Sci	17
Bus	16,340	14	70	Pers serv	12
Ed	9,720	4	0	Eng	56
Health	11,620	10	52	Pers serv	23
Hum	13,440	16	6	Soc sci	47
Info sci	2,920	6	22	Eng	44
Other	1,240	0	0	n/a	n/a
Pers serv	320	25	75	Hum	25
Physical sci	10,540	4	0	Hum	48
Soc sci	20,020	8	20	Hum	26
Arts	3,540	14	79	Soc sci	8
Total	98,200	9	37		

Canada					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior college qual	% of grads with prior college qual in same field	Alternative highest sourced broad field	% of Grads with prior college qual in alternative highest broad field
Ag	3,520	20	34	Health/Phys Sci	17
Eng	18,820	18	40	Physical sci	37
Bus	56,280	28	56	Hum	14
Ed	26,120	13	7	Hum	36
Health	31,180	22	51	Physical sci	19
Hum	26,560	18	25	Soc sci	32
Info sci	7,100	14	40	Eng	21
Other	3,400	26	0	Bus	32
Pers serv	1,520	33	44	Soc sci	16
Physical sci	21,280	11	42	Health	25
Soc sci	46,820	21	19	Hum	37
Arts	9,440	24	65	Hum	12
Total	252,040	21	39		

Table 9: 2009/2010 University graduates who had a prior Canadian university qualification by field of education (Ontario vs. Canada)

Ontario					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior uni Qual	% of grads with prior uni qual in same field	Alternative highest sourced broad field	% of grads with prior qual in alternative highest broad field
Ag	880	36	31	Physical sci	31
Eng	7,620	20	68	Physical sci	16
Bus	16,340	29	31	Eng	11
Ed	9,720	76	10	Hum	31
Health	11,620	35	49	Physical sci	16
Hum	13,440	14	76	Soc sci	13
Info sci	2,920	36	38	Hum	21
Other	1,240	48	0	Hum	47
Pers serv	320	19	0	Soc sci	100
Physical sci	10,540	23	74	Eng	7
Soc sci	20,020	24	58	Hum	13
Arts	3,540	14	56	Hum	20
Total	98,200	30	33		

Canada					
Field of ed graduated in 2009/2010	No. of grads	% of grads with a prior uni Qual	% of grads with prior uni qual in same field	Alternative highest sourced broad field	% of grads with prior qual in alternative highest broad field
Ag	3,520	35	31	Physical sci	31
Eng	18,820	20	66	Physical sci	12
Bus	56,280	28	41	Soc sci	23
Ed	26,120	68	19	Hum	31
Health	31,180	37	43	Physical sci	20
Hum	26,560	17	58	Soc sci	14
Info sci	7,100	32	39	Hum	19
Other	3,400	28	2	Soc sci	33
Pers serv	1,520	21	6	Soc sci	31
Physical sci	21,280	23	71	Health/Eng	6
Soc sci	46,820	25	56	Hum	14
Arts	9,440	19	56	Hum	15
Total	252,040	30	42		

Links between educational pathways, occupational pathways and the labour market

This section explores the connection between educational pathways and occupational pathways. It explores in more depth the relationship between qualifications in particular fields of education and the labour market and it draws some conclusions about whether qualifications in particular fields of education are used as a screen or a signal in the labour market.

Generally speaking, the links between qualifications and occupations are quite loose in Ontario and in Canada but this differs by broad field of education. Overall, some 43% of PSE graduates in Ontario (40% in Canada) said that they could have taken steps to obtain a licence to practice, register with a regulatory college/professional association, or obtain a professional designation, and of those who could have take these steps, some 50% did so (55% in Canada). Fields such as engineering and health, where a high proportion of occupations are regulated, reported much higher levels of licencing. Overall, about 68% of graduates in Ontario (73% in Canada) said that their employer required a qualification in a specific field of education, and this again varied by broad field broad education. However, these data do not specify whether employers required a *specific qualification* such as those required for regulated occupations, or a broad field such as a social science or business qualification.

About 35% of PSE graduates in Ontario (31% in Canada) said they felt they were overqualified for the main job they held in 2013. This ranged from 42% in humanities (41% in Canada), 45% in physical sciences (36% in Canada), and 39% in business (35% in Canada), to 21% in health (21% in Canada) and 30% in engineering (26% in Canada). Graduates from fields with regulated occupations (such as engineering and health) report that their qualification is more closely related to their occupation than do graduates from fields such as social science, physical sciences and humanities. Similar percentages of graduates from colleges (36%) in Ontario (32% in Canada) said they felt overqualified for their main job, while 35% of graduates from bachelor degrees and first professional degrees said they felt overqualified for their main job (31% in Canada).

Links between subfields and educational pathways

Previously, this report has analysed educational pathways by broad fields of education which are the primary groupings used by Statistics Canada to group educational programs. This report adopts Statistics Canada's primary groupings for many purposes, including the categorization of qualifications that graduates had before their graduation in 2009-10. However, Statistics Canada's primary groups differ in the extent to which they comprise relatively homogenous groups of qualifications that have similar requirements in knowledge, skills and attributes and links to the labour market. For example, lawyer qualifications are included in the primary group '04 Social and behavioural sciences and law' which includes many qualifications that do not lead to legal practice. Similarly, the primary group '10 Health and related fields' includes many qualifications that lead to a range of occupations such as medical doctor and nurse, but also qualifications in the subgrouping '31. Parks, recreation, leisure and fitness studies'. Consequently, while Statistics Canada's primary groupings are helpful because they provide a framework for analysing broad educational pathways, they are less helpful in understanding connections between narrower fields of education and the labour market.

Consequently, we used Statistics Canada’s broad fields to identify narrower subfields, and we linked subfields depending on their internal coherence and the nature of their links to the labour market. For example, the narrower business field that we have identified here excludes accounting and computer science, and public administration and social service professions. It includes the narrower field (field 52) Business management, marketing and related support services, but even here we narrowed this field to exclude nine subcategories such as “Administrative assistant and secretarial science, general”, “Parts, warehousing and inventory management operations”, “traffic, customs and transportation clerk/technician” and so forth. This is presented in detail in Table 45 in the appendices.

We sought to identify patterns in student progression between qualifications by analysing the prior qualifications of selected groups of graduates at graduation in 2009-10. We identified two salient characteristics: whether the qualification is relevant to a specific occupation or has more general application, and whether an occupation is regulated or not. The team therefore analysed a variety of qualifications which are different on these characteristics, which are shown in Table 10. Our methods, detailed findings and discussion are the appendices.

Table 10: qualifications at graduation in 2009-10 in subfields chosen for analysis

Category of qualification	Orientation	Regulated?
Business	Occupational	No
Engineering practitioner	Occupational	Yes
Humanities	General	No
Law practitioner	Occupational	Yes
Medicine	Occupational	Yes
Nurse practical	Occupational	Yes
Nurse registered	Occupational	Yes
Physical and life sciences	General	No
Technician	Occupational	No
Trade	Occupational	Yes

Rather than present a discussion of each occupational field presented in Table 10, we identified three streams, each with two examples, that represent different relationships between occupational orientation and regulated occupations. This is outlined in Table 11. The first stream is regulated occupations that include programs such as Nursing Registered and Engineering practitioner. These occupations are regulated either by a statutory body or by a professional body, and registration with the professional body is a precondition for practice in that field. The second stream is entitled ‘focused’ and includes fields of study such as business and technician that are vocationally oriented because their purpose is to prepare individuals for a field of practice, but programs mostly do not require accreditation by a statutory or professional body and mostly do not require individuals to register with a professional or occupational body as a condition of practice. The third stream is called ‘broad’ and programs in this stream have a broader orientation and include most of the academic disciplines such as the humanities and physical sciences. Generally speaking, their principal purpose is to induct students into the disciplinary body of knowledge rather than a vocational field of practice, and mostly they are not accredited by a statutory or professional body or require individuals to register with a professional body as a condition of practice.

Table 11: Links between field of education & labour market in subfields

Stream	Regulated?	Orientation	Subfields
1. Regulated	Yes	Occupational	Nurse registered Engineering practitioner
2. Focused	No	Occupational	Business Technician
3. Broad	No	General	Humanities Physical & life sciences

Nursing registered and engineering practitioner are both (mostly) bachelor degree-level occupationally focused occupations that are regulated. In our Nursing registered subfield, 20% of graduates are from college or CEGEP diplomas or certificates for Canada as a whole, while only 3% graduated with these qualifications in Ontario. Some 6% of our Nursing registered subfield graduated from graduate degrees in Canada in 2009/2010, compared to 13% in Ontario. About 72% of graduates in our Nursing registered subfield are at the bachelor degree level in Canada, compared to 84% in Ontario. In both Canada and Ontario, about 66% of graduates from our Engineering practitioner subfield held bachelor degrees, and about 28% held graduate degrees. Tiny percentages held qualifications below bachelor degree.

The business and technician subfields are fields of study that are occupationally focused but mostly unregulated. Our business subfield includes Quebec trade/vocational diploma or certificates (9% in Canada, 0% in Ontario); college or CEGEP diplomas or certificates (32% in Canada, 46% in Ontario); university diploma or certificate below bachelor level (9% in Canada, 0% in Ontario); bachelor's degree or first professional degree (37% in Canada, 41% in Ontario);, and graduate degrees (12% in Canada, 13% in Ontario). Our technician subfield mostly consists of college level qualifications. In Canada, about 26% of graduates in our Technician subfield graduated with a Quebec trade/vocational diploma or certificate in 2009/2010, and about 69% with a College or CEGEP diploma or certificate. In contrast, there were no graduates coded as graduating with a Quebec trade/vocational diploma or certificate in Ontario, and 94% were reported as having a College or CEGEP diploma or certificate.

The humanities, and physical and life sciences subfields are two fields with a general orientation and are mostly not regulated, and mostly offered at university qualification level. The percentage in our Humanities subfield includes graduates with college or CEGEP diplomas or certificates (11% in Canada, 13% in Ontario); University diploma or certificate below bachelor level (5% in Canada, 1% in Ontario); bachelor's degree or first professional degree (72% in Canada, 73% in Ontario); and, graduate degrees (12% in Canada, 13% in Ontario). There are even fewer graduates in the physical and life sciences subfield who report graduating with a college or CEGEP diploma or certificate (3% in Canada, less than 1% in Ontario); or with a university diploma or certificate below bachelor level (1% in Canada, 0% in Ontario). Most came from bachelor degrees or first professional degrees (71% in Canada, 77% in Ontario), with graduate degrees the next biggest category (24% in Canada, 22% in Ontario).

Table 12 shows the number of graduates in each subfield of study in Ontario and in Canada, the percentage of graduates who have a prior PSE qualification from a public Canadian PSE institution, and of those who have a prior Canadian PSE qualification, the percentage of those who have it in the same field. In this case, when we consider prior PSE qualifications, we were only able to determine if the prior qualification came from the same the broad field of education that the subfield comes from. For example, in Ontario about 38% of Registered Nurses report that they have a prior PSE qualification (48% in Canada), and of these about 61% report that that prior qualification was in the broad Health field of study as defined by Statistics Canada (53% in Canada). Again, we can only use Table 12 to draw broad conclusions about general trajectories rather than determine precise outcomes, particularly in the smaller subfields. However, overall, Table 12 shows different patterns in the nature of educational pathways between the subfields.

The registered nursing subfield in Ontario is quite small, but the numbers for Canada are much larger and we can be more confident about these results. They show that in Canada a high percentage of registered nurses have a prior Canadian PSE qualification, and that of that many of these have a prior qualification from the broad health field (53% in Canada). Not as many engineering practitioner graduates have prior PSE qualifications as in nursing in either Ontario or Canada, but the educational pathway within the broad engineering field is strong, with 74% of engineering practitioner graduates in Ontario who have a prior qualification reporting that it was in the broad engineering field (57% in Canada).

Table 12: Subfields – percentage with prior Canadian PSE qualifications & % prior qualifications in same broad field of study

Stream	Subfields	# grads Ontario	% prior PSE qual Ontario	% in same field Ontario	# grads Canada	% prior PSE qual Canada	% in same field Canada
1. Regulated	Nurse registered	2,580	38	61	10,360	48	53
	Engineering practitioner	6,960	20	74	16,100	34	57
2. Focused	Business	26,360	32	39	84,000	45	44
	Technician	8,040	36	48	30,920	23	43
3. Broad	Humanities	15,140	27	38	28,900	33	40
	Physical & life sciences	6,980	26	67	17,020	34	64

Overall, the regulated subfields have stronger educational pathways *within* fields of study compared to the focused and broad subfields. The exception is physical and life sciences in Ontario and Canada. The percentage of those in physical and life sciences who have a prior Canadian PSE qualification is about the same as those in humanities in Ontario, but the percentage who have their prior qualification in the same broad field is much higher than in humanities. Putting physical and life sciences to one side, the prior study pathways of graduates in the two focused fields (business and technician) is broadly similar to humanities in Ontario. Similar percentages have prior PSE qualifications, while those from the technician field are more likely to report their prior qualification was in the same broad field of education. There is more variation in the

percentages between these subfields who report having a prior PSE qualification in Canada, but the percentage who report that their prior qualification was in the same broad field is similar.

Pathways between colleges and universities in subfields

The Appendix entitled 'Prior qualifications of graduates in selected fields: Ontario and Canada' provides more detailed data than is discussed in this report about the nature of educational pathways within the subfields of education. However, the extent to which the subfields provide educational ladders from college or CEGEP diplomas or certificates to bachelor degrees warrants further discussion because it shows important differences within and between fields, and because educational pathways from colleges to universities are an important aspect of occupational and social mobility. The discussion in this section is on pathways from college or CEGEP diplomas or certificates to bachelor degrees or first professional degrees.

The two regulated occupations examined here (Registered Nurse and Engineering Practitioner) differ between each other by the percentage of graduates who report prior PSE Canadian qualifications. They also differ between provinces. In Canada, some 29% of Engineering practitioners who graduated with a bachelor degree or first professional degree in 2009/2010 reported that had a prior Canadian PSE qualification, and of these some 85% reported that they had a college or CEGEP diploma or certificate. In contrast, in Ontario, only 4% of Engineering practitioner graduates with a bachelor degree in 2009/2010 reported that they had a prior Canadian PSE qualification, with a negligible number coming from colleges. Colleges in all of Canada seem to provide a pathway into engineering, but not in Ontario. Nursing seems to have quite a strong pathway between the college and university sectors in Ontario and Canada. Some 48% of registered nurses in Canada who graduated with a bachelor's degree or first professional degree in 2009/2010 reported that they had a prior Canadian PSE qualification, compared to 31% in Ontario. However, some 52% of registered nursing bachelor degree graduates with a prior PSE qualification in Ontario reported that their prior qualification was a college or CEGEP diploma or certificate (although these percentages must be interpreted with caution given the relatively small size of the field).

In the two occupationally focused subfields examined here, business and technicians, only the business subfield can be examined for the extent to which it provides a pathway from the college to the university sector.³ Some 44% of graduates with a bachelor degree or first professional degree in the business subfield in Canada reported that they had a prior Canadian PSE qualification, compared to 23% in Ontario. However, of the 23% of graduates in Ontario who reported a prior Canadian PSE qualification, some 89% said that their previous qualification was a college or CEGEP certificate of diploma, demonstrating that this is an important pathway from college to university in Ontario.

The two broad fields, humanities and physical and life sciences also differ between each other. Some 28% of humanities graduates with a bachelor's degree or first professional degree in Canada reported that that had a prior Canadian PSE qualification, which is not too much different from the 23% in Ontario. Of the Ontario humanities bachelor degree graduates, about 80% report that their

³ To determine whether the technician field provided a pathway to university, we would need to examine the extent to which university graduates report that their prior qualification was a technician level qualification. While possible, these data would be very difficult to extract.

prior qualification was a college or CEGEP diploma or certificate. Almost 50% of this group undertook their college or CEGEP diploma or certificate in the broad social science field of education, while another 40% came from the broad business field of education. While the numbers start to be quite small at this level of analysis and should be interpreted with caution, this may suggest that in Ontario, students use these vocationally focused fields of education to enter the broad, general field of humanities, reflecting the relative absence of the humanities field in Ontario colleges. It is quite different in the physical and life sciences subfield of education which has very few pathways from colleges and CEGEPs to universities. In Canada, some 19% of graduates in physical and life sciences subfield with a bachelor's degree or first professional degree report that they had a prior Canadian PSE qualification, compared to only 9% in Ontario. The physical and life sciences is a tiny field in colleges and CEGEPs in Canada and in Ontario; only 3% of graduates in Canada in 2009/2010 graduated with a college or CEGEP diploma or certificate, compared to less than 1% in Ontario. Given these low numbers we didn't analyse the percentage of Ontario graduates whose prior qualification was a college or CEGEP diploma, as the numbers would be negligible.

Links between subfields and the labour market

Table 13 shows different dimensions of the relationship between subfields and the labour market. The column 'recognition' shows the percentage of graduates who said that they could take steps to gain formal occupational recognition for their qualification, and the percentage of those who having said they could do so, did so. For example, 83% of registered nurses said that they could have taken steps to gain formal recognition of their qualification, and of those who said they could do so, 99% went on to gain formal recognition. The corresponding percentages for Canada were that 85% of registered nurses said that they could gain formal recognition for their qualification, and of those who said they could, 98% did so. Table 13 shows that the regulated occupations of registered nurse and engineering practitioner were much more likely to say that they could gain formal recognition for their qualification and were much more likely to seek recognition, compared to the occupationally focused qualifications in the subfields of business and technician. In turn, the subfields of business and technician were more likely to say they could gain formal recognition compared to humanities and physical and life sciences, which are broad fields with a general orientation rather than being oriented to occupations. However, there is one surprising finding in Table 13; while 74% of engineering practitioner graduates in Ontario said they could gain recognition for their engineering qualification, of these only 35% did so. In contrast, a similar percentage of Engineering practitioner graduates in Canada said that they could gain recognition, and of these about 71% went on to gain recognition.

Table 13: Links between subfields, occupational regulation, match between qualification & job requirements, & match between qualification & skills required for job

Stream	Regulated?	Orientation	Subfield	Recognition		Job finding		Related to work	
				Ontario	Canada	Ontario	Canada	Ontario	Canada
1. Reg	Yes	Occ	Nurse Registered	83 / 99	85/98	0.9	1.2	3	2.9
			Engineering practitioner	74 / 35	77/71	1.2	1.2	2.5	2.6
2. Foc	No	Occ	Business	52 / 22	41/33	1.6	1.5	2.3	2.4
			Technician	56 / 27	48/34	1.8	1.8	2.4	2.4
			Humanities	19 / 61	15/51	1.6	1.6	1.9	1.9
3. Broad	No	Gen	Physical & life sciences	13 / 22	20/26	1.5	1.4	1.9	2.1

The columns 'Job finding' in Table 13 shows graduates' answer to the question asked by Statistics Canada in the National Graduate Survey, 'When you were selected for this job, what level of education was needed to get the job?'⁴ Statistics Canada reported four values of interest to our project: No education requirements specified; Respondent has less than required (which we scored as -1); Respondent has the same as required (which we scored as 1); and, Respondent has more than required (which we scored as 2). Where graduates said that there were no education requirements specified, we scored that as 3 as they were presumably more overqualified. The process we used and associated limitations with this approach are discussed in the appendices. However, overall, this approach provides a useful indicator of the match between graduates qualifications and whether that was matched to the requirements of the job. The closest match is 1, which indicates that graduates had the same level of education as required for their job. Overall, those in the regulated occupations reported a closer match to their job than did those in the focused or broad streams. However, there are not great differences between the focused stream and the broad stream, even though the former is occupationally focused, while the latter is not.

The column 'Related to work' in Table 13 refers to the extent to which graduates felt that their main job was closely related to their qualification. In 2013, the National Graduates Survey asked 2009-10 graduates: 'How closely is the (main) job you held last week related to your certificate, diploma or degree? Is it closely related, somewhat related, not related at all, don't know? For the purposes of this analysis we allocated 'Closely related' answers with a score of 3, 'Somewhat related' with a score of 2, 'Not related at all' with a score of 1, and 'Don't know' answers were ignored. We then multiplied the number of graduates who gave answers by the score for each answer to give a weighted score and then calculated a mean for each group of graduates. Again, the process we used and associated limitations with this approach are discussed in the appendices. However, overall, this approach provides a broad indicator of whether graduates felt that there was a 'mismatch' between their qualification and job. The appendices provide much more detail on the percentages of graduates in different fields who said they felt under or over

⁴ Statistics Canada used graduates highest level of study graduates had completed at the time of graduation in 2009/2010 to derive the variable which reported whether graduates had more, the same or less education than required for their job. It may well be that a small proportion of graduates completed a lower level qualification in 2009/2010 compared to their prior qualifications, but overall, this is still a useful broad indicator of the match between graduates' qualification and work. This is discussed in more depth in the appendices.

qualified for their jobs, while we focus in this discussion on perceptions of mismatch between graduates' qualifications and jobs. In this case, the closer the score to 3, the closer the match between the qualification and the job. Those in the regulated occupations in our subfields report the closest match, followed by those in occupationally focused fields, with those in the broad general fields in our subfields reporting the weakest match.

Summary

The preceding discussion demonstrates that differences between the subfields are the result of a complex interplay between the structure of PSE in Canada and Ontario and the structures of the labour market. Generally speaking, educational pathways between colleges and universities are weaker in Ontario than they are in Canada as a whole, and this is particularly stark in the engineering practitioner subfield. The differences between Ontario and Canada demonstrated between the subfields in the above analysis and between the broad fields in the preceding analysis seem to be a function of the difference between Ontario's system of PSE compared to the rest of Canada. This shows that the structure of the PSE sectors does affect students' opportunities.

However, when we examine the links between the subfields and the labour market, the differences between Ontario and Canada diminish, and the differences between the types of qualifications become more apparent. The key difference between the subfields of education is whether they support regulated occupations or unregulated occupations. The occupationally focused and broad qualifications with a general orientation are similar to each other, demonstrating that they play similar roles in mediating access to the labour market, compared to the regulated occupations which have a tighter fit between the qualification and occupation associated with the qualification. The occupationally focused and broad qualifications do differ on some dimensions however. Educational pathways (particularly from college to university) seem to be somewhat stronger for the occupationally focused qualifications than for the broad qualifications, although this should not be overstated. While more graduates in the occupationally focused qualifications say they could seek recognition for their qualification, not many do so, and employer requirements for the level of qualification needed for the job were similar for each. However, graduates in the broad fields reported a higher level of mismatch between their qualification and their job than did those in occupationally focused qualifications; while graduates with occupationally focused qualifications reported a higher level of mismatch between their qualification and job than did those with regulated occupations.

The broad conclusion we draw from this analysis is that qualifications in the regulated occupations are used as a signal by employers that graduates have the specific knowledge, skills and attributes required for entry into the labour market. Qualifications in the occupationally focused and broad fields are used in a similar way, but both are used as screens for entry into the labour market. Employers use qualifications to screen applicants in or out for consideration. However, while qualifications in both types of fields are used in similar ways to access the labour market, the 'match' between the qualification and the requirements of the job are weakest for those in the broad fields. The match between qualifications and the requirements of the job are strongest for the regulated occupations.

Discussion

We draw two broad conclusions from this analysis. First, the structures of PSE make a difference in mediating educational pathways, particularly from college to university. Second, the structures of the labour market shape the way employers and graduates use qualifications. The relationship between these two factors shape how students use educational pathways to further study and to the labour market.

While overall in Canada and in Ontario the biggest educational pathway is from one university qualification to another, followed by one college qualification to another, college graduates in Ontario do not have the same opportunities as college graduates in other provinces to undertake bachelor degrees in universities. Moreover, the data show that educational pathways within fields of education in Ontario and Canada are quite modest. The extent to which students stay within the same field of study when they undertake a second PSE qualification varies and overall, the links between qualifications within fields of study are weak. In most fields, students change their field of study when they undertake a second PSE qualification. There are a small number of fields of study where a majority stay within that field when they undertake a second PSE qualification. The link between qualifications and fields of study differs between colleges and universities in some fields, reflecting the different ways students use qualifications in each sector and field.

The more nuanced analysis for Ontario and Canada using subfields has shown that while the four types of pathways found in Australia seem to describe pathways between colleges and universities in Ontario and Canada (and thus provides a useful tool for developing pathways), it is less able to describe pathways within sectors. The four types of pathways are stronger when narrower fields of education are used, rather than Statistics Canada's primary groupings. Narrower fields show more clearly the links between related areas. Using Statistics Canada's primary groupings results in pathways that are more heterogeneous. However, the key principle from the Australian study holds in this study as well, that educational pathways are differentiated by the type of relationship they have to the labour market.

The main differentiating factor between qualifications is whether they are used as a signal or as a screen in the labour market. As discussed in the previous section, the match between qualifications and occupations is tightest in regulated occupations and qualifications are used as a signal, but relatively weak in both the occupationally focused and general fields of education and qualifications are used as a screen. Policy discourses and debates often focus on the need to make PSE qualifications more relevant to work, but this analysis shows that trying to tie qualifications more tightly to work is misplaced. If this were the policy objective, then the focus should be on regulating occupations rather than seeking to link qualifications to occupations more tightly. However, arguably, governments in liberal market economies such as Canada are reluctant to take that path. Tying qualifications more tightly to occupations when those qualifications are used as a screen by employers runs the risk of narrowing the types of jobs graduates can get. It is precisely because they signal broader knowledge, skills and attributes that graduates are able to use them to seek employment. Overall, it seems that broad vocational fields such as business and social science play a similar role to the liberal arts and sciences in the past – they are used as proxies for the kinds of knowledge, skills and attributes that employers require.

Graduates and employers use occupationally focused pathways such as business and broader pathways with general orientations such as humanities and physical sciences in similar ways in

accessing educational pathways as well as the labour market. As well as being broad based qualifications used to enter the labour market, they are also 'transition qualifications' to further PSE studies. As discussed earlier, the humanities, physical sciences and social sciences are all 'sending fields of education', while social sciences and business are 'receiving fields of education'. Business receives proportionally more students than it sends, but because it is such a big field of education in both Ontario and Canada, in effect it plays both a sending and receiving role.

A key difference between the liberal arts and sciences on the one hand and business and social science on the other, is that even though both kinds of qualifications are used to access the labour market in similar ways, that nonetheless graduates from humanities and sciences report their qualifications are not as relevant to their job as those from the occupationally focused fields, while the occupationally focused fields report that their qualifications are not as relevant to their jobs as those from regulated occupations. Given the rationale and nature of qualifications in the humanities and sciences it is to be expected that the 'fit' between their subject matter and employment is not as tight as it is between occupationally focused qualifications; what is surprising is that they mediate access to the labour market in similar ways. The solution is not to make humanities and sciences qualifications more like occupationally focused qualifications (or the reverse) but instead, to take into account the different purposes of qualifications.

This analysis allows us to revisit the three purposes of qualifications. It shows that qualifications can meet the three purposes in different ways, and this has implications for policy and for the design of qualifications and educational pathways.

1. As a mechanism to enter the labour market or to move to a higher occupational level. All qualifications need to provide access to the labour market and they do, although they do so in different ways. The way they are designed needs to reflect the different ways in which they act as qualifications for the labour market.
2. As a transition to higher-level qualifications. All qualifications need to provide students with the knowledge and skills they need to study at a higher level in their field. The nature of the knowledge (whether it is more or less tightly specified) will differ according to whether it is related to a regulated or unregulated occupation.
3. To widen access to higher education. All qualifications should have as one of their objectives supporting students from disadvantaged backgrounds to enter higher-level studies.

In achieving these three purposes, qualifications must reflect the changing nature of work which includes the need to use higher level and more abstract knowledge as the basis of occupational progression, and they need to help students contribute to their family, community and society as the enabling conditions for effective contributions at work. The way in which qualifications meet these three purposes will be different and their design should reflect this.

This analysis has implications for the design of curriculum and qualifications. Pathways in regulated fields such as nursing need to emphasise the capacity to study at a higher level within the field to support occupational pathways from lower to higher skilled occupations. However, pathways in regulated fields where there are not strong pathways (such as from engineering in colleges to universities in Ontario) will need to take a different approach and focus on developing pathways in cognate areas (for example, from electrical trades to business studies). Pathways in occupationally focused fields such as business and social science need to emphasise the

educational purpose of qualifications because students use them as a transition to higher-level studies as well as to the labour market. Students need to leave these qualifications equipped to study at a higher level. This is also true for graduates in the humanities and sciences; given that they play a role as sending fields and less so as receiving fields, they can best support student progression by ensuring that students are equipped for higher level studies. Graduates from these fields who don't intend to pursue higher level studies in the same field (for example, to a masters or PhD in humanities or physical sciences) need supported pathways that will help them access related fields of education that may be more vocationally focused (for example, to social sciences or business).

The above analysis also has implications for policy about pathways at jurisdictional, institutional and departmental levels. Policies which seek more pathways based on linear connections between qualifications within the same field of education do not reflect the different kinds of pathways that are needed to reflect the different relationships between qualifications and the labour market. The implication is that a uniform policy on educational pathways will not achieve policy objectives. Policy to promote, develop and support pathways needs to reflect the different relationships between qualifications and jobs, and the different emphasis qualifications in different types of fields of education place on the three purposes of qualifications.

The three purposes of qualifications can be used to evaluate qualifications and pathways within fields of education. The analysis in this report has been able to shed light on the extent to which qualifications and fields of education support the first two purposes – to access or progress in the labour market; and to access further PSE studies. However the third objective, to support social inclusion and social mobility, was not analysed in this report and this is an important focus for future research.

References

- Association of Canadian Community Colleges. (2011). *Transferability and Post-secondary Pathways – The Role of Canadian Colleges and Institutes*. Ontario.<<http://www.accc.ca/ftp/pubs/studies/201104TransferabilityReport.pdf> > viewed 9 May 2011.
- Association of Universities and Colleges of Canada, & Colleges and Institutes Canada. (2014). *A Framework for Collaboration* Ottawa.< <http://www.collegesinstitutes.ca/wp-content/uploads/2014/09/Framework-for-Collaboration-EN-Sept2014.pdf> >
- Bayard, Justin, & Greenlee, Edith. (2009). *Graduating in Canada: Profile, Labour Market Outcomes and Student Debt of the Class of 2005*. Ottawa: Culture, Tourism and the Centre for Education Statistics, Statistics Canada.< <http://www.statcan.gc.ca/pub/81-595-m/81-595-m2009074-eng.htm> > viewed 1 September 2014.
- Boggs, Andrew M., & Trick, David W. (2009). *Making College-University Cooperation Work: Ontario in a National and International Context*. Toronto: Higher Education Quality Council of Ontario.< <http://www.heqco.ca/SiteCollectionDocuments/Making College-University Cooperation Work.pdf> > viewed 1 May 2014.
- Boudarbat, Brahim, & Chernoff, Victor. (2009). *The Determinants of Education-Job Match among Canadian University Graduates*. Bonn: Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor < <http://ftp.iza.org/dp4513.pdf> > viewed 2 September 2014s.
- Camman, Richard, Hamade, Stéphane, & Zhou, Amy. (2014). *Student mobility and credit transfer pathways policy paper*. Toronto: Ontario Undergraduate Student Alliance.< <http://www.ousa.ca/research-centre> > viewed 21 January 2015.
- CCI Research Inc. (2011). *College-University Student Mobility Report*. Toronto: College-University Consortium Council.< http://oncat.ca/files_docs/content/pdf/en/oncat_research_reports/oncat_research_report_s_10.pdf > viewed 1 September 2014.
- CEDEFOP. (2013). *The role of qualifications in governing occupations and professions*. Luxemburg: Publications Office of the European Union.<<http://www.cedefop.europa.eu/EN/publications/21922.aspx>> viewed 9 October 2013.
- Clark, Ian D., Moran, Greg, Skolnik, Michael L., & Trick, David. (2009). *Academic Transformation: The Forces Reshaping Higher Education in Ontario*. Montreal and Kingston: McGill-Queens University Press
- Colleges Ontario. (2009). *Student mobility between Ontario's colleges and universities*. Toronto.< http://www.collegesontario.org/research/student-mobility/Student_Mobility_09.pdf > viewed 21 January 2015.
- Conway, Chris, & Montgomery, Sara. (2014). *Labour Market Outcomes: Summary Results of a Survey of 2006 and 2007 Canadian University Baccalaureate Graduates*. Kingston, Ontario: Queens University.< <http://www.queensu.ca/irp/index/NGOSLabourMarketWeb.pdf> > viewed 1 September 2014.
- Council of Ministers of Education Canada. (2009a). *CMEC Ministerial Statement on Credit Transfer in Canada*. Toronto.< <http://www.cmec.ca/Publications/Lists/Publications/Attachments/216/ministerial-statement-credit-transfer-2009.pdf> > viewed 3 September 2014.

- Council of Ministers of Education Canada. (2009b). *Report of the CMEC Working Group on Credit Transfer*. Toronto.<
<http://www.cmec.ca/Publications/Lists/Publications/Attachments/217/credit-transfer-group-report-2009.pdf> > viewed 3 September 2014.
- Deissinger, Thomas, Aff, Josef, Fuller, Alison, & Helms, Christian (Eds.). (2013). *Hybrid qualifications: structure and problems in the context of European VET policy*. Bern: Peter Lang
- Finnie, Ross. (2004). The School-to-Work Transition of Canadian Post-secondary Graduates: A dynamic analysis. *Journal of Higher Education Policy and Management*, 26(1), 35-58
- Finnie, Ross, Childs, Stephen, & Wismer, Andrew. (2011). *Access to Postsecondary Education: How Ontario Compares*. Toronto: Higher Education Quality Council of Ontario.<
<http://www.heqco.ca/SiteCollectionDocuments/AccessENG.pdf> > viewed 2 May 2014.
- FitzGibbon, John. (2014). *Learning Outcomes and Credit Transfer: Examples, Issues and Possibilities*. Vancouver: British Columbia Council on Admissions and Transfer.<
<http://www.bccat.ca/pubs/Learning Outcomes and Credit Transfer Feb2014.pdf> > viewed 29 April 2014.
- Floyd, Deborah L., Skolnik, Michael L., & Walker, Kenneth P. (2005). *The Community College Baccalaureate: Emerging Trends and Policy Issues*. Sterling, Virginia: Stylus Publishing
- Frenette, Marc. (2014). *An Investment of a Lifetime? The Long-term Labour Market Premiums Associated with a Postsecondary Education*: Statistics Canada.<
<http://www5.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=11F0019MIE2014359&lang=eng-formatdisp> > viewed 5 March 2014.
- Gallacher, Jim, Ingram, Robert, & Reeve, Fiona. (2012). Are vocational qualifications vocational? In Matthias Pilz (Ed.), *The Future of Vocational Education and Training in a Changing World*. Wiesbaden: Springer VS
- Harris, Roger, Rainey, Linda, & Sumner, Robert (2006). *Crazy paving or stepping stones? Learning pathways within and between vocational education and training and higher education*. Adelaide: National Centre for Vocational Education Research.<
<http://www.ncver.edu.au/publications/1722.html>.
- Karmel, Tom, Mlotkowski, Peter, & Awodeyi, Tomi. (2008). *Is VET vocational? The relevance of training to the occupations of vocational education and training graduates*. Adelaide: National Centre for Vocational Education Research.<
<http://www.ncver.edu.au/publications/2013.html>> viewed 5 August 2009.
- Kerr, Angelika, McCloy, Ursula, & Liu, Shu-Hui. (2010). *Forging Pathways: Students Who Transfer Between Ontario Colleges and Universities*. Toronto: Higher Education Quality Council of Ontario.<
<http://www.heqco.ca/SiteCollectionDocuments/ForgingPathwaysENG.pdf> > viewed 21 May 2014.
- Lang, Daniel W. (2009). Articulation, transfer, and student choice in a binary post-secondary system *Higher Education*, 57(2)
- Lefebvre, Pierre, & Merrigan, Philip. (2010). *Labour Outcomes of Graduates and Dropouts of High School and Post-secondary Education: Evidence for Canadian 24- to 26-year-olds in 2005*.<
<http://econpapers.repec.org/paper/lvllacir/1045.htm> > viewed 1 September 2014.
- McDaniel, Susan A., Watt-Malcolm, Bonnie, & Wong, Lloyd. (2013). *Is the Math Sufficient? Aging Workforce and the Future Labour Market in Canada*: The Prentice Institute, University of Lethbridge.<

- http://www.uleth.ca/prenticeinstitute/sites/prenticeinstitute/files/KnowledgeSynthesis_full_report--McDaniel_Watt-Malcolm_Wong.pdf > viewed 2 September 2014.
- Moodie, Gavin, Fredman, Nick, Bexley, Emmaline, & Wheelahan, Leesa. (2013a). *Vocational education's variable links to vocations*. Adelaide: National Centre for Vocational Education Research. < <http://www.ncver.edu.au/wps/wcm/connect/95ca1f5b-25e9-40d4-9f14-1323b760839f/Variable-links-to-vocations-2689.pdf?MOD=AJPERES&CACHEID=95ca1f5b-25e9-40d4-9f14-1323b760839f> > viewed 5 March 2014.
- Moodie, Gavin, Fredman, Nick, Bexley, Emmaline, & Wheelahan, Leesa. (2013b). *Vocational education's weak effects on vocations*. Adelaide: National Centre for Vocational Education Research
- Munro, Daniel. (2014). *Skills and Higher Education in Canada: Towards Excellence and Equity*. Ottawa: Canada 2020. < http://canada2020.ca/wp-content/uploads/2014/05/2014_Canada2020_Paper-Series_Education_FINAL.pdf > viewed 5 June 2014.
- Organisation for Economic Co-operation and Development. (1998). *Redefining Tertiary Education*. Paris: OECD
- Plesca, Miana, & Summerfield, Fraser. (2014). *Skill Demand, Supply, and Mismatch in the Canadian Economy Knowledge Synthesis Report*: University of Guelph. < <http://goo.gl/OmdoBC> > viewed 23 April 2015.
- Raffe, David. (1998). Conclusion: Where are pathways going? Conceptual and methodological lessons from the pathways study *Pathways in Vocational and Technical Education and Training* (pp. 375-394). Organisation for Economic Co-operation and Development
- Skolnik, Michael K. (2004). The Relationship of the Community College to Other Providers of Post-secondary and Adult Education in Canada and Implications for Public Policy *Higher Education Perspectives*, 1(1) < <http://hep.oise.utoronto.ca/index.php/hep/article/view/574/653> > viewed 7 May 2014.
- Skolnik, Michael K. (2009). Theorizing About the Emergence of the Community College Baccalaureate *Community College Journal of Research and Practice*, 33(2), 125 - 150
- Skolnik, Michael K. (2010). A Look Back at the Decision on the Transfer Function at the Founding of Ontario's Colleges of Applied Arts and Technology. *Canadian Journal of Higher Education*, 40(2), 1-17
- Skolnik, Michael K. (2011). Reconceptualizing the Relationship Between Community Colleges and Universities Using a Conceptual Framework Drawn From the Study of Jurisdictional Conflict Between Professions. *Community College Review*, 39(4), 352-375
- Skolnik, Michael K. (2012). *Rethinking the system of credentials awarded by Ontario's colleges of applied arts & technology*: Colleges Ontario. <<http://www.collegesontario.org/research/degree-granting.html>> viewed 15 January 2014.
- Skolnik, Michael K. (2013a). An Historical Perspective on the Idea of Institutional Diversity and Differentiation in Ontario Higher Education. *College Quarterly*, 16(2)
- Skolnik, Michael K. (2013b). Reflections on the nature and status of the applied baccalaureate degree: drawing upon the Canadian experience. In Nancy Remington & Rodald Remington (Eds.), *Alternative pathways to the baccalaureate*. Sterling, Virginia: Stylus

- Statistics Canada. (2014). *National Graduates Survey, 2013*, . Ottawa.<
<http://www.statcan.gc.ca/daily-quotidien/140331/dq140331f-eng.htm> > viewed 15 May 2014.
- Stuckey, James, & Munro, Daniel. (2013). *The need to make skills work: The cost of Ontario's skills gap*. Ottawa: The Conference Board of Canada.< <http://www.conferenceboard.ca/e-library/abstract.aspx?did=5563> > viewed 14 July 2014.
- Sweetman, Arthur, & McBride, Stephan. (2004). *Postsecondary Field of Study and the Canadian Labour Market Outcomes of Immigrants and Non-Immigrants* Ottawa: Statistics Canada.<
<http://publications.gc.ca/Collection/Statcan/11F0019MIE/11F0019MIE2004233.pdf> > viewed 13 March 2014.
- Trick, David. (2013). *College-to-University Transfer Arrangements and Undergraduate Education: Ontario in a National and International Context*. Toronto: Higher Education Quality Council of Ontario.< <http://www.heqco.ca/SiteCollectionDocuments/Transfer Arrangements Trick ENG.pdf> > viewed 29 April 2014.
- Walters, David. (2009). A Comparison of the Labour Market Outcomes of Postsecondary Graduates of Various Levels and Fields over a Four-Cohort Period. *Canadian Journal of Sociology*, 29(1), 1-27
- Walters, David, & Frank, Kristyn. (2010). *Exploring the alignment between postsecondary education programs and labour market outcomes in Ontario*. Toronto: Higher Education Quality Council of Ontario.<http://books2.scholarsportal.info.myaccess.library.utoronto.ca/viewdoc.html?id=/ebooks/ebooks0/gibson_cppc/2011-08-17/1/10425676> viewed 20 January 2014.
- Wheelahan, Leesa. (2005). *Griffith University TAFE Links Committee: Student progress & retention by basis of admission for 2002, 2003 & 2004 commencing students*. Brisbane: Griffith University
- Wheelahan, Leesa. (2009). *Programs and Pathways*. Adelaide: Australian Qualifications Framework Council < <http://www.aqf.edu.au/wp-content/uploads/2013/06/Pathways-Final-Report-Programs-and-pathways.pdf> > viewed 17 May 2012.
- Wheelahan, Leesa, Moodie, Gavin, & Buchanan, John. (2012). *Revitalising the vocational in flows of learning and labour*. Adelaide: National Centre for Vocational Education Research.<<http://www.ncver.edu.au/publications/2535>> viewed 30 October 2012.
- Young, Michael. (2001). *The role of national qualifications frameworks in promoting lifelong learning* (Discussion paper). Paris: Organisation of Economic Co-operation and Development