Engineering and Technology Labour Market Study

Trends in Continuing Professional Development

Engineers Canada
and
Canadian Council of Technicians and Technologists

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About Engineers Canada

Established in 1936, Engineers Canada is the national organization of the 12 provincial and territorial associations and ordre that regulate the practice of engineering in Canada and license the country's more than 160,000 professional engineers. Engineers Canada serves the associations and ordre, which are its constituent and sole members, by delivering national programs that ensure the highest standards of engineering education, professional qualifications and professional practice.

About the Canadian Council of Technicians and Technologists

The Canadian Council of Technicians and Technologists (CCTT) establishes and maintains national competency standards for certifying members with a 'quality seal of approval' in 14 applied science and engineering technology disciplines: bioscience, industrial, building, instrumentation, chemical, mechanical, civil, mining, electrical, petroleum, electronics, geomatics, forestry, and information technology. CCTT's provincial associations are responsible for issuing these highly regarded credentials, which are recognized by provincial statute in many Canadian provinces.

Contents

Engineering and Technology Labour Market Study

Trends in Continuing Professional Development

Executive Summary

- Continuing professional development is one of the core values associated with the ethic of professionalism. This view is shared by engineers and engineering technology professionals, as well as by a significant majority of their employers.

- In Canada, it is increasingly the norm for professional associations in all regulated and certified fields to have policies that require or expect their members to undertake a minimum amount of continuing professional development training. Many professional bodies prescribe specific types of training.

- Throughout the OECD region, professional associations of engineers and technologists have focused increased attention on continuing professional development, often establishing norms or requirements.

- In Canada, the majority of engineering licensing bodies have mandatory continuing development policies. However, licensing authorities in the larger provinces do not have mandatory policies. At this time, therefore, mandatory policies do not apply to the majority of professional engineers.

- None of the provincial and territorial associations that certify technologists and technicians has a mandatory policy for continuing professional development, although three have voluntary policies, and one association may adopt a mandatory policy.

- Overall, in establishing either requirements or expected norms for continuing professional development, both the engineering profession and the technology professions, lag somewhat behind the majority of regulated professions.

- Notwithstanding relatively weaker policies requirements in engineering and technology professions, participation in continuing professional development is widespread. More than 80% of engineers and engineering technicians and technologists have taken continuing professional development days over the past three years. Participation in continuing professional development was evident across all age groups, peaking at approximately age 39 for technologists and technicians and age 43 for engineers. Non-technical courses were almost as important as technical courses. The most important non-technical field of study was project management.

- On average, engineers and engineering technicians and technologists reported that they took about four days of continuing professional development per year. This is less than half the norm established by those associations that have adopted policies.

- Association policies clearly have an impact on participation in continuing professional development. In Ontario – where there is no formal policy – engineers reported taking 10.4 days of continuing professional development over the past three years. In provinces where associations have established requirements for continuing professional development, the average was 14.1.

- Somewhere between 60% and 75% of engineering and technology employers have policies that support professional development. Employer support for continuing professional development is strong in most industries, but weaker than might be expected the manufacturing sector.

- Participation rates in technical associations are lower than might be expected.

Recommendations:

1. Engineers Canada and the Canadian Council of Technicians and Technologists should update their past scans of continuing professional development standards for other professions in Canada and for engineering and technology professions internationally. Based on these updated scans, the national associations should assess how the Canadian engineering and technology professions stand in relation to these trends.

2. Engineers Canada and the Canadian Council of Technicians and Technologists should explore successful models of continuing professional development used by other professions, especially where those models adopt flexible definitions of eligible continuing professional development activities. The notion of an individually drafted continuing professional development plan – as set out by some of the regulatory bodies in the legal profession – may have particular relevance. In considering the relevance of models used in other professions, the implications of the distinctive characteristics of engineering and technology career paths should be borne in mind.

3. Engineers Canada and the Canadian Council of Technicians and Technologists should undertake a systematic examination of employer policies towards continuing professional development. This study should explore both how association policies should relate to employer policies and how areas of weakness in employer support for continuing professional development could be addressed.

4. Efforts should be made to harmonize the continuing professional development norms and standards of the provincial and territorial associations/ordres.

Introduction

This report examines trends in Continuing Professional Development for professionals, in general, and for engineers and for engineering technologists and technicians, in particular.

This study is part of the *Engineering and Technology Labour Market Study* commissioned by Engineers Canada and the Canadian Council of Technicians and Technologists, with support from Human Resources and Skills Development Canada. Additional information on the Engineering and Technology Labour Market Study is available from the study's website: www.engineerscanada.ca/etlms/index.cfm

The findings presented in this study are based on a national survey of engineering and technology employers (701 respondents), a national survey of engineers, and engineering technicians and technologists (15,585 respondents), interviews with 41 senior engineering executives, and 5 focus groups of engineers, and engineering technicians and technologists. A more detailed description of the methodology is set out in Appendix A.

Continuing Professional Development Trends:

In Canada, it is increasingly common for professional associations in all fields to have policies that require or expect their members to undertake a minimum amount of continuing professional development training throughout their professional careers. Many professional bodies prescribe specific types of training. The following examples of studies and policies show that policies and standards for continuing professional development have become the norm in regulated professions:

- A 1999 study of 343 professional regulatory bodies across Canada found that the majority had continuing professional development policies and that in four out of five of those professions with policies, continuing professional development is mandatory. The study also found that 48% of those professions that did not have continuing professional development policies were planning to introduce such policies.[1]

- Similar results were reported in a 2002 study for the Ontario College of Teachers. That study found that a majority of the 37 statutorily regulated professions in the province had continuing professional development requirements for their members. A 2001 study of professions in Manitoba concluded that "most professional organizations in the Province of Manitoba have, or are currently developing, a program of mandatory professional development."[2]

- In Quebec, the legislation providing for the designation and regulation of professions explicitly confers on regulatory bodies the power to establish requirements and standards for continuing professional development.

[1] Assessment Strategies Inc., *Licensure, Certification, and Continuing Competence Practices among Canadian Regulated Professions, March 1999.*

[2] *Report on Trends in Continuing Professional Development,* for Manitoba Professional Planners Institute, December 2001.

- The law societies in some provinces expect their members to complete a minimum number of hours of formal continuing legal education and self-directed study. In B.C., these requirements are mandatory. In Alberta and Ontario, the requirements come close to being mandatory.[3]

- In all provinces, the institutes/ordres that regulate chartered accountants have formal requirements for continuing professional development, typically around 120 hours over a three-year period. Actuaries must undertake 100 hours of continuing professional development every two years, of which 24 hours must be in structured courses.

- Most of the regulatory bodies for architects have prescribed mandatory requirements for continuing professional development. These can be as high as 70 hours per year, with a portion of these hours assigned to specified courses designated and offered through the regulatory body. In some jurisdictions, mandatory continuing professional development also applies to architectural technologists. For example, in Ontario, architectural technologists must complete 35 hours of continuing professional development training per year.

- Virtually every health profession prescribes continuing professional development requirements to maintain licensure.

Throughout the OECD region, professional associations of engineers and technologists have focused increased attention on continuing professional development. In both the UK and Japan, for example, professional associations have established both requirements and standards for continuing professional development for engineers.[4] In the United States, it is common for state registration boards to make continuing professional development a requirement for maintaining registered status. In Australia, evidence of participation in continuing professional development is required to maintain registration as a Chartered Professional Engineer or as a Chartered Engineering Technologist.

In 2004, Engineers Canada adopted a *Guideline on Continuing Professional Development and Continuing Competence for Professional Engineers*.[5] In that document, Engineers Canada states that:

> "Continuing Professional Development encompasses the planned acquisition of knowledge, experience and skills and the development of personal qualities necessary for the execution of professional and technical duties throughout an engineer's professional life. It encompasses both technical and non-technical skills. CPD is a vital tool for maintaining and developing the professional competence, innovation and creativity of an individual engineer."[6]

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[3] The Alberta Law Society requires that members of the bar consider and plan their continuing professional development and evidence this by retaining a copy of their annual plan, making the plan available to the Law Society on request. Members are also required to demonstrate their adherence to the plan through continuing professional development activities. Non-compliance with this requirement is subject to professional discipline. In Ontario, the 'expectation' is 50 hours of self-study and 12 hours (two days) of formally designated Continuing Legal Education. Members of the Law Society of Upper Canada are required to report to the Society on their fulfillment of this expectation.

[4] Henri Angelino, "Engineering Education and Professional Development in Germany, France and United Kingdom – Examples for Establishing Continuing Professional Development of Engineers in Japan," *National Institute of Informatics Journal*, No. 6 (2003) pp 81-104.

[5] The full document is available at: www.engineerscanada.ca/e/files/guideline_practice_with.pdf

[6] Engineers Canada adopted a *Guideline on Continuing Professional Development and Continuing Competence for Professional Engineers*, p 9.

At the provincial and territorial level, regulatory bodies for professional engineers and certified technologists and technicians differ in how they address continuing professional development:

- All associations that regulate engineers and engineering technicians and technologists set out a general obligation of continuing competence in their codes of professional ethics.

- Most associations/ordres provide continuing professional development training, partner with colleges and universities to provide this training, or actively bring to their members' attention opportunities for continuing professional development.

- Some, but not all, of the regulatory bodies have established mandatory continuing professional development requirements.

Figure Nos. 1a and 1b summarize the current policy situation of the provincial and territorial regulatory bodies.

Figure No. 1a
Continuing Professional Development Policies
of Provincial/Territorial Engineering Associations/Ordres

Provincial/Territorial Association	Continuing Professional Development Policy	Professional Development Hours (PDHs)/ Credits that are Required or Recommended	Continuing Professional Development Categories	
			Formal Activity: structured courses, programs or seminars usually for credit and involve an evaluation process, etc.	Informal Activity: self-directed study, journal reading, seminars, conferences, technical field trips, trade shows, etc.
Association of Professional Engineers and Geoscientists of British Columbia (APEGBC)	Voluntary	• An average of 30 PDHs/year	• Maximum claimable: 20 PDHs/year • Courses should be at least 4 hours in length.	• Maximum claimable: 20 PDHs/year
Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)	Mandatory	• 240 PDHs over 3 years	• 1 PDH/hr and10 PDHs/1 Continuing Education Unit. • Maximum claimable: 30 PDHs/year	• 1 PDH/hour • Maximum claimable: 30 PDHs/year
Association of Professional Engineers Geoscientists of the Province and of Manitoba (APEGM)	Voluntary	• No minimum requirements	• Not specified	• Not specified
Association of Professional Engineers and Geoscientists of New Brunswick (APEGNB)	Mandatory	• 240 PDHs over 3 years	• 1 PDH/hour and 10 PDHs/Continuing Education Unit or 10 PDHs/University Credit • Maximum claimable: 30 PDHs/year	• 1 PDH/2 hours • Maximum claimable: 30 PDHs/year
Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS)	Mandatory	• 240 credits over 3 years • Recommended: 80 PDHs/year	• 1 credit/hour and 10 credits/1 Continuing Education Unit. • Maximum claimable: 30 credits/year	• 1 credit/hour • Maximum claimable: 30 credits/ year
Engineers Nova Scotia	Mandatory starting 2010	• 240 PDHs over 3 years • Minimum of 60 PDHs/year	• 1 PDH/1 hour • Maximum claimable: 40 PDHs/year	• 1 PDH/1 hour. • Maximum claimable: 30 PDHs/year
Engineers PEI	Mandatory	• An average of 80 PDHs/year over 3 years • Minimum of 60 PDHs/year	• 1 PDH/1 hour • Maximum claimable: 30 PDHs/year	• 1 PDH/1hour. • Maximum claimable: 30 PDHs/year
Association of Professional Engineers of Yukon (APEY)	Voluntary	• 240 PDHs over 3 years • Recommended: 80 PDHs/year	• 1 PDH/1 hour • Maximum claimable: 30 PDHs/year	• 1 PDH/1hour • Maximum claimable: 30 PDHs/year
Northwest Territories and Nunavut Geoscientists Association of Professional Engineers, (NAPEG)	Mandatory	• 240 PDHs over 3 years • Recommended: 80 credits/year	• 1 PDH/hour and 10 PDH/ 1 Continuing Education Unit. • Maximum claimable: 30 PDHs/ year	• 1 PDH/2 hours • Maximum claimable: 30 PDHs/year
Ordre des ingénieurs du Québec (OIQ)	Voluntary	• 30 PDHs over 2 years	• Not specified	• Not specified
Professional Engineers and Geoscientists of Newfoundland and Labrador (PEGNL)	Mandatory	• 240 PDHs over 3 years • Minimum of 60 PDHs/year	• 1 PDH/1 hour • Maximum claimable: 40 PDHs/year	• 1 PDH/2 hours • Maximum claimable: 30 PDHs/year
Professional Engineers Ontario (PEO)	No policy	• N/A	• N/A	• N/A

Figure No. 1b
Continuing Professional Development Policies of Provincial/Territorial Technologists and Technicians Associations/Ordres

Provincial/Territorial Association	Continuing Professional Development Policy	Professional Development Hours (PDHs)/ Credits that are Required or Recommended	Continuing Professional Development Categories	
			Formal Activity: structured courses, programs or seminars usually for credit and involve an evaluation process, etc.	Informal Activity: self-directed study, journal reading, seminars, conferences, technical field trips, trade shows, etc.
The Association for Technology Professionals in British Columbia (ASTTBC)	Voluntary	• 20 PDCs/year	• 10 PDCs/40 hours or more. • 5 PDCs for courses less than 40 hours.	• 2 PDCs/8 hours or more. • 1 PDC for less than 8 hours
The Association of Science and Engineering Technology Professionals of Alberta (ASET)	No policy	N/A	N/A	N/A
Certified Technicians and Technologists of Manitoba (CTTAM)	No policy	N/A	N/A	N/A
The Ontario Association of Engineering Technicians and Technologists (OACETT)	No policy	N/A	N/A	N/A
New Brunswick Society Engineering Technicians and Technologists (NBSCETT)	Voluntary	• 100 PDCs/year	• The maximum is 30 PDCs/year	• The maximum is 30 PDCs/year
TechNova: Certified Technology Professionals	Voluntary	• 100 PDCs /year	• 1 PDC/hour. The maximum is 30 PDCs/year PDCs/year	• 1 PDC/hour. The maximum is 30
Association of Certified Engineering Technicians and Technologists of Prince Edward Island (ACETTPEI)	No policy	At the time this report was being prepared, ACETTPEI, was conducting a member survey to determine interest in developing a continuing professional development assurance program. At the date of this report, survey results were running more than 2/3's in favour of a policy that would be similar to Engineers PEI (see Figure No. 1a).		
The Association of Engineering Technicians and Technologists Newfoundland and Labrador (AETTN)	No policy	N/A	N/A	N/A
Saskatchewan Applied Science Technologists and Technicians (SASTT)	No policy	N/A	N/A	N/A
Ordre des Technologues Professionnels Du Quebec	Voluntary	There are specific requirements for the bronze, silver and gold level "ribbons"	Bronze level ribbon: write exam on professional ethics, complete course on technical report writing and be a member of OTPQ for at least 3 years Silver level ribbon: hold the bronze ribbon, be a member of OTPQ and practicing professional technologist for at least 6 years, at least 15 hours of professional development courses Gold level ribbon: hold the silver ribbon, be a member of OTPQ and practicing professional technologist for 10 years, hold a complementary recognized credential	

As can be seen from Figure No. 1a, the majority of engineering regulatory associations have mandatory continuing development policies, although these associations do not represent a majority of professional engineers. The norm to which these associations have gravitated is 80 professional development hours per year, or some variant on this, such as 240 professional development hours over a period of three years.

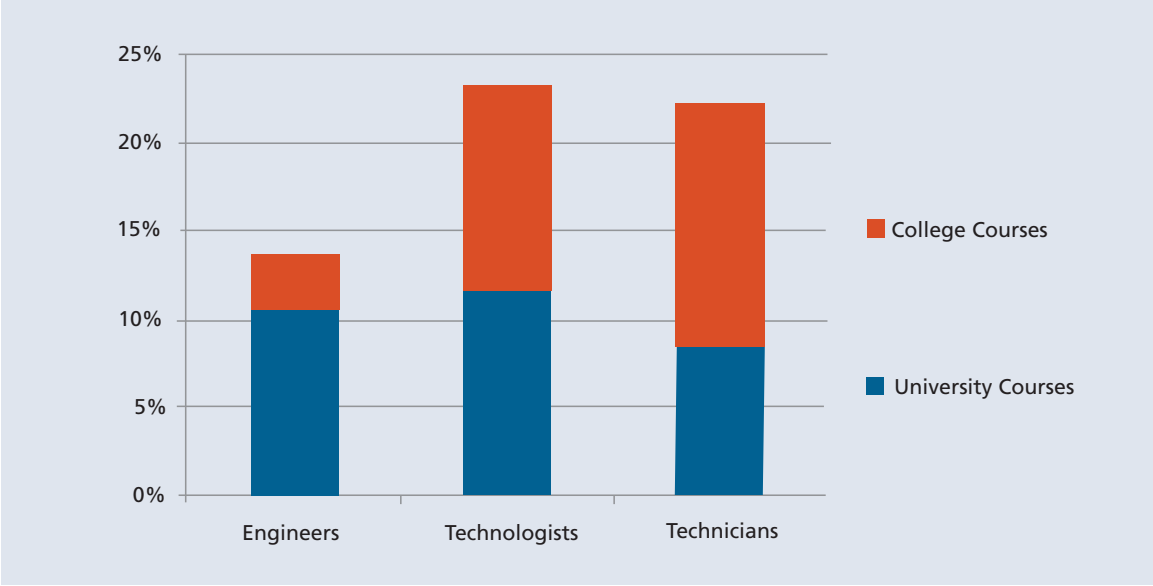
None of the associations that certify technologists and technicians has a mandatory policy, although three have voluntary policies, and one association may adopt a mandatory policy. (See Figure No. 1b). At this time, there does not appear to be any emerging consensus on an appropriate norm for technologists and technicians.

Quantitative Indicators of Trends in Continuing Professional Development:

Survey and interview evidence provide several indicators of the importance of continuing professional development to persons in engineering and technology occupations and to engineering and technology employers:

- *The Survey of Engineers and Engineering Technicians* and Technologists found that, at the time of the survey, 17.4% of respondents were currently enrolled in a university or college course. (See Figure No. 2). Among those in the age group 25-40, the proportion was 24.9%. This represents an extremely high rate of participation in formal, post-secondary training after completion of the initial undergraduate or college training necessary for professional qualification.

Figure No. 2
Percent of Survey Participants Enrolled in College or University Courses at the Time of the Survey
Survey of Engineers and Engineering Technicians and Technologists

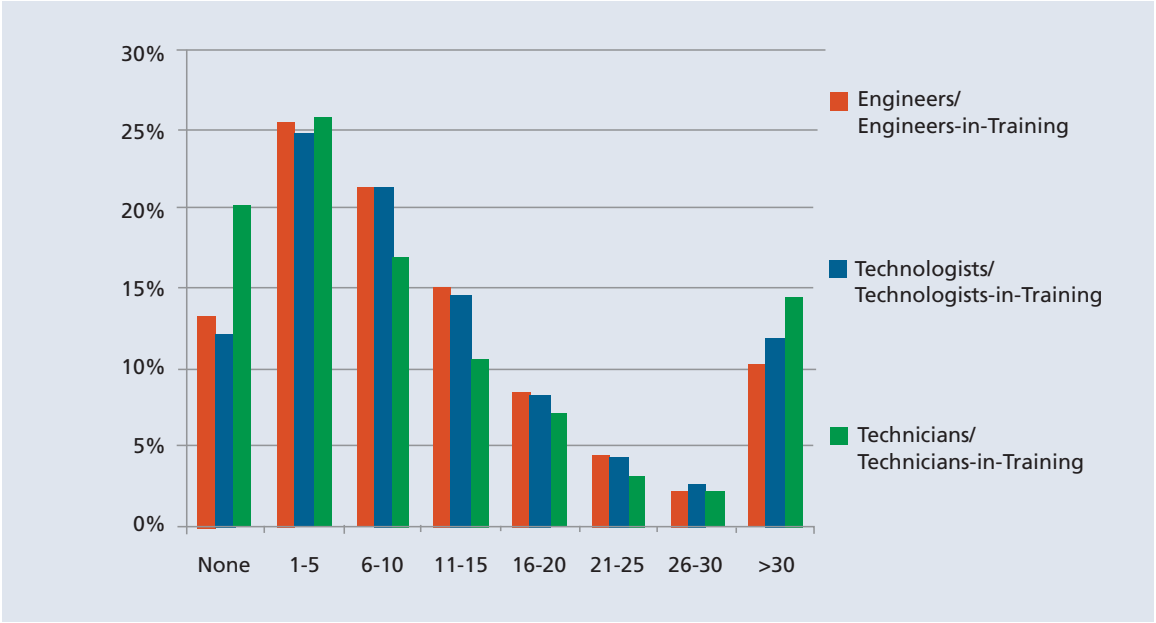


Based on *the 2007 Engineering and Technology Employer Survey*, somewhere between 60% and 75% of engineering and technology employers have formal policies to support or encourage continuing professional development. The most common form of support is partial or full reimbursement for tuition costs or course fees.

- Roughly 84% of survey respondents in the *Survey of Engineers and Engineering Technicians and Technologists* reported that they had participated in continuing professional development training during the past three years. (On an occupation basis, this was 87% of engineers, 88% of technologists, and 80% of technicians).

- On average, survey participants undertook approximately four days of continuing professional development per year. This is the equivalent of just under 2% of paid time, although some individuals may have made up for this time through uncompensated overtime. (See Figure No. 3).

Figure No. 3
Days of Continuing Professional Development in Past Three Years
Survey of Engineers and Engineering Technicians and Technologists

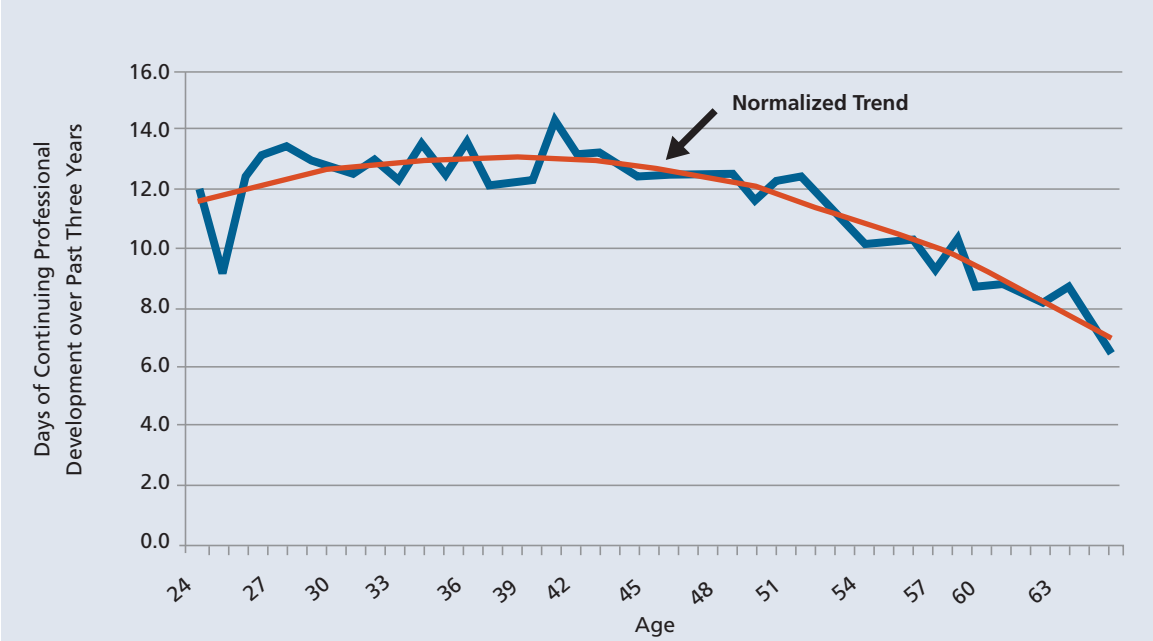


- Based on executive interviews, about 40% of engineering and technology employers have a benchmark expectation for continuing professional development in the range of two to five days per year.

- The propensity to take continuing professional development days is evident across all age groups. The propensity increases until approximately age 39 for technologists and technicians and approximately age 43 for engineers. Thereafter, participation in continuing professional development declines moderately until approximately age 50.

After age 50, the participation rate declines more noticeably, though it remains above an average of two days per year, even among engineering and technology professionals in their sixties. (See Figure No. 4).

Figure No. 4
Days of Continuing Professional Development in Past Three Years by Age
Survey of Engineers and Engineering Technicians and Technologists



- Data from the *2007 Engineering and Technology Employer* Survey suggest that the median expenditure per engineering and technology staff member (of those employers that paid for continuing professional development) was approximately $1,500 per year. However, around one-fifth of responding employers in the employer survey reported average expenditures of more than double this amount.

- Interviews with engineering executives suggest that employer expenditures on continuing professional development – among those employers that support continuing professional development – are around 1-2% of payroll for engineering and technology staff, although some companies commit double this amount. Comparing employer costs, it should be noted, is difficult, since companies differ in how they track the cost of continuing professional development. Some companies include staff time as a cost, while others track only disbursements. Some companies provide in-house continuing professional development, while others rely on third parties. Budgets may be expressed as a percentage of payroll, a fixed amount per person, or a percentage of revenues.

- One fifth to one third of engineering and technology employers provide structured in-house training to their engineering and technology staff.

- It was common for participants in our focus groups and executive interviews to identify continuing professional development as being part of what it means to be a professional.

Continuing professional development is seen by engineering and technology professionals, and also by their employers, as one of the core values associated with the ethic of professionalism.

The Impact of Professional Associations' Policies:

Figure No. 5 summarizes the estimated average number of continuing professional development days taken by engineers, according to their province of residence and groups the provinces in terms of their policy (or lack thereof) on continuing professional development. The comparison shows that the estimated number of days of continuing professional development is generally higher in those provinces that make continuing professional development mandatory.

Figure No. 5
Days of Continuing Professional Development in Past Three Years by Province and Continuing Professional Development Policy of Regulatory Body – Engineers
Survey of Engineers and Engineering Technicians and Technologists

Province	Average No. of Days of Continuing Professional Development Reported over Past Three Years
No Policy:	
• Ontario	10.4
Voluntary:	
• Nova Scotia (voluntary until 2010)	12.4
• Quebec	10.2
• Manitoba	13.4
• British Columbia	12.3
Average (Voluntary):	12.1
Mandatory:	
• Newfoundland	14.1
• New Brunswick	12.3
• Prince Edward Island	15.2
• Saskatchewan	14.8
• Alberta	14.4
Average (Mandatory):	14.1

While factors, other than association policy, may also be affecting the results shown in Figure No. 5, the contrast is sufficiently great to support the view that association policy has had an impact on average participation levels.

Interviews with engineering and technology executives suggest that association policies have an influence on employers' policies and practices. In provinces where engineering associations have established expectations or requirements for continuing professional development, employers who were interviewed were aware of the professional associations' policies and had taken steps to ensure that their own practices were consistent with requirements for maintaining professional licensure. Public sector employers, without exception (among those interviewed), sought to be compliant with the requirements set down by regulatory bodies for maintaining professional licensure.

Sample sizes and response rates[7] in the *2007 Engineering and Technology Employer Survey* allow a comparison of employer policies between Alberta, where the engineering association has a mandatory policy, and Ontario, where the association currently has no formal requirements (See Figure No. 1a for details). As can be seen in Figure No. 6, the impact of association policies appears to be more evident in fostering employer support for generic continuing professional development, including participation in technical associations, than in encouraging employers to financially support additional college or university training. The impact of association policies on employers' practices, while evident, is less marked than the impact on individual engineers.

Figure No. 6
Percent of Employers Reporting a Practice of Policy of Supporting Various Types of Continuing Professional Development - Comparison of Ontario and Alberta
(Percent of All Employers, including Employers that Declined to Answer)
2007 Engineering and Technology Employer Survey

Province	Reimbursement for approved Continuing Professional Development	Encourage and support membership in Technical Associations and attendance at professional development training offered by those associations	Support additional college or university training
Ontario (No Formal Policy)	49%	42%	38%
Alberta (Mandatory Policy)	56%	51%	44%

[7] In both Alberta and Ontario, approximately two-thirds employers that participated in the survey, answered the survey questions dealing with continuing professional development.

The survey data suggest four broad conclusions about association policies:

First, even in the absence of an association policy, there is still considerable support for continuing professional development on the part of many engineering and technology employers and widespread participation in continuing professional development on the part of engineering and technology professionals.

Second, a mandatory policy on continuing professional development appears to increase participation in continuing professional development from an average of about 3.5 days per year to 4.7 days. It is not clear, however, whether this increase arises chiefly from persons being prompted by their association's policy to take advantage of existing employer support or whether their association's policy encourages previously non-supportive employers to support continuing professional development so as to ensure that the registration status of their engineering staff remains in good standing.

Third, even in provinces where continuing professional development is mandatory, the average reported days of continuing professional development (4.7 days per year) falls short of the associations' recommended norm of 80 hours per year (approximately 10 days per year). However, as noted earlier, survey evidence show that many individuals are taking post-secondary courses on their own time, in addition to the continuing professional development days that are supported by their employers. As well, many individuals may undertake self-directed study, outside the framework of a formal course. Survey data suggest, therefore, that continuing professional development policies should be flexible in identifying the acceptable modalities for continuing professional development. A potentially instructive approach can be found in some law societies which expect their members to have a continuing professional development plan that may include a significant proportion of self-directed study.

Fourth, although there are important exceptions, continuing professional development policies are not as formalized in engineering and technology as they are in many other professions. This is especially notable in technology professions where, at present, none of the certifying associations has a formalized policy on continuing professional development. In the engineering profession, the majority of regulatory associations have formal policies. However, the three largest associations – representing more than two-thirds of registered engineers – do not have formal policies.

Technical Associations:

Data from the Survey of *Engineers and Engineering Technicians and Technologists* suggest that 34% of engineers and 22% of technologists and technicians are members of technical associations. Members of technical associations generally reported approximately 1 day more of continuing professional development training than non-members.

There are notable differences in the propensity to take-out a membership in technical associations. Figure No. 7 shows the proportion of survey respondents who are engineers who work in a particular technical field and belong to a technical association. As can be seen, for engineers, the rate of membership in technical associations is above average for metallurgy/materials, mining, petroleum, environmental, civil and other unspecified fields, and below average in electrical/electronics, mechanical, chemical, manufacturing/ industrial, aerospace, and computer engineering.

Figure No. 7
Percent of Engineers working in Particular Engineering Fields
Who are Members of Technical Associations
Survey of Engineers and Engineering Technicians and Technologists

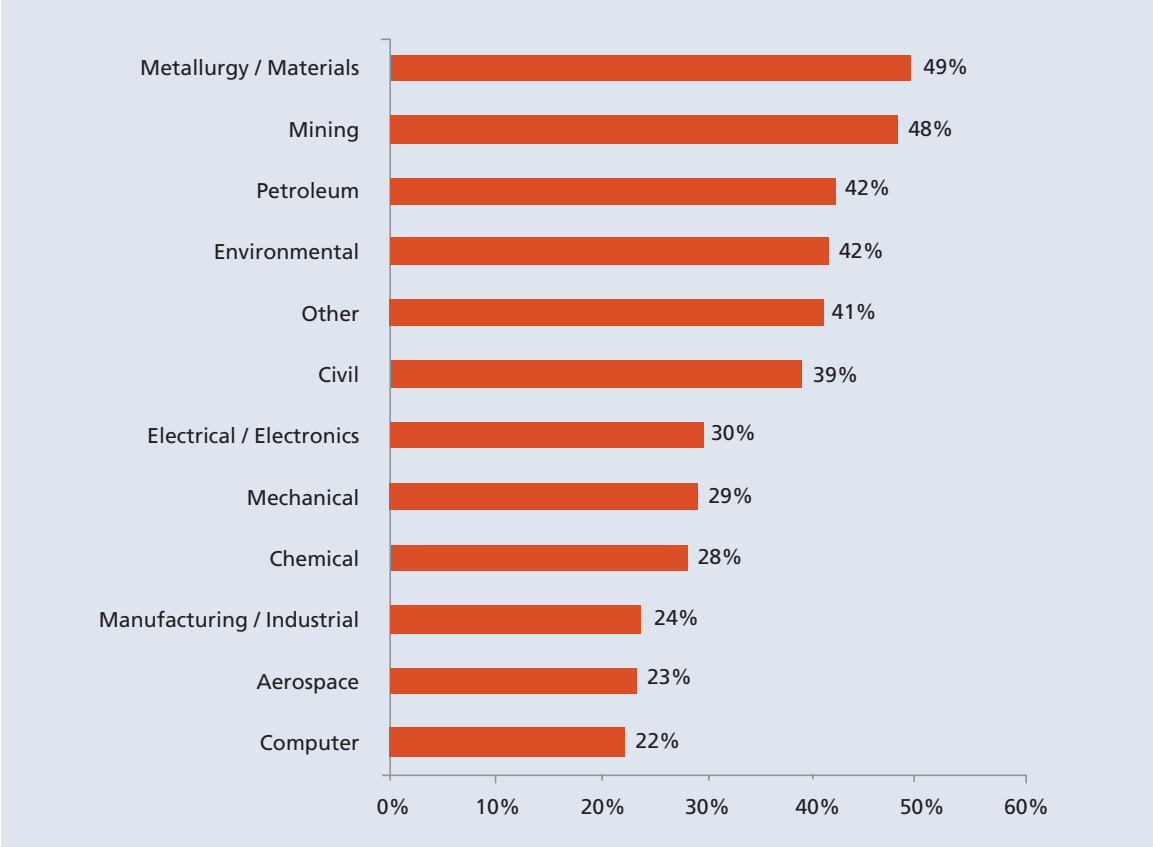
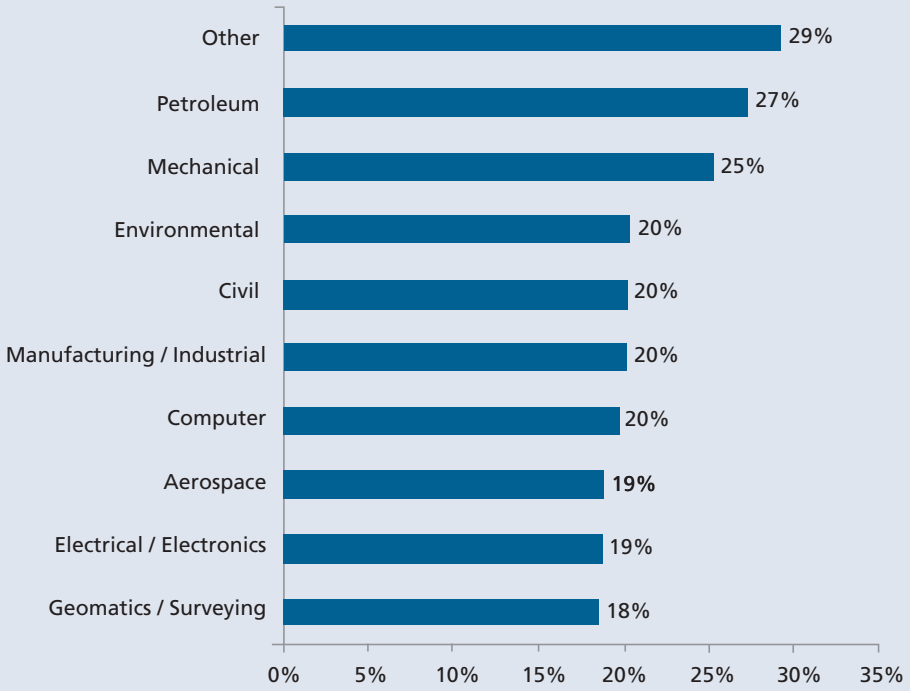


Figure No. 8 reports the same data for engineering technicians and technologists. It is noteworthy that the largest number of respondents reported membership in technical associations that were not identified in the survey. These would include, in particular, associations representing technology fields in the municipal sector or specific industry organizations. The survey data thus suggest, that for many engineering technicians and technologists, industry associations may be more relevant than technical associations.

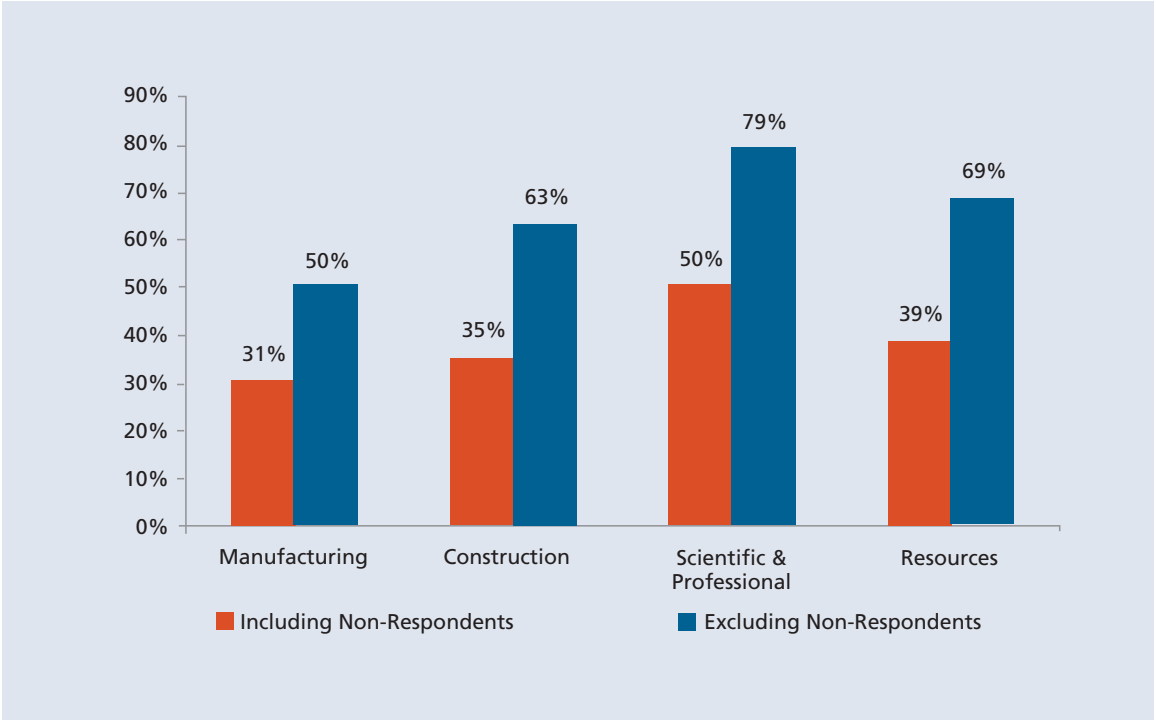
Figure No. 8
Percent of Technicians and Technologists working in Particular Technology Fields
Who are Members of Technical Associations
Survey of Engineers and Engineering Technicians and Technologists



In light of the importance of technical associations as channels for disseminating information on new technologies, higher rates of membership might have been expected. It is especially noteworthy that in information technology and manufacturing, where change is quite rapid, the rate of membership in technical associations is below average for engineers.

Figure No. 9 shows that there are differences across major sectors of the economy in the likelihood of employers supporting membership in technical associations and encouraging participation in their continuing professional development activities. As can be seen in Figure No. 9, the manufacturing sector lags other sectors in its support for membership in technical associations.

Figure No. 9
Percent of Employers in Major Sectors Reporting that they Encourage Membership in Technical Associations and Participation in their Continuing Professional Development Activities
2007 Engineering and Technology Employer Survey



Types of Continuing Professional Development:

Approximately 69% of participants in the *Survey of Engineers and Engineering Technicians and Technologists* reported that they had taken continuing professional development courses in technical subjects; 58% reported taking courses on non-technical topics.

Figure No. 10 shows the broad categories of technical training taken by engineering and technology professionals.

Figure No. 10
Types of Technical Training taken by Survey Respondents
Survey of Engineers and Engineering Technicians and Technologists

Engineering or technology training, not related to a supplier	37%
Regulations and codes	28%
Supplier-related engineering or technology training	27%
Engineering or technology software, including CAD	26%
Other technical training	25%
Quality control	14%

Figure No. 11 summarizes the types of non-technical courses. The importance of 'project management' is particularly noteworthy. This is consistent with interview evidence which stress the project leadership role of engineers and senior technologists. The importance of project management is also consistent with other survey data that underscore the importance of managerial roles in career paths.

Figure No. 11
Types of Non-Technical Training Taken by Survey Respondents
Survey of Engineers and Engineering Technicians and Technologists

Project management	27%
Teamwork	21%
Personnel management	16%
Other non-technical training	16%
Office software products, excluding engineering or technology software	16%
Problem-solving skills	12%
Asset management, preventive maintenance	12%
Negotiation skills	11%
Written communication	11%
Presentation skills	11%
Contract and administration	11%
Oral communication	10%
Financial analysis	9%
English or French language update	8%
Working with other non-technical people	8%
Cross-cultural skills	6%
Additional language other than French or English	4%

Summary Picture of Continuing Professional Development:

Since the early 1990s, in the majority of regulated professions in Canada, there has been a trend to set expectations or requirements for continuing professional development. This trend is reflected in the engineering profession where a majority of regulatory associations/ordres have polices that require continuing professional development as a condition for maintaining registration. These associations, however, do not account for a majority of registered professional engineers. None of the associations representing engineering technicians and technologists has, as yet, established continuing professional development requirements or expectations. Overall, therefore, both the engineering profession and the technology professions, lag somewhat behind the majority of regulated professions.

Notwithstanding a somewhat weaker policy environment, survey data shows widespread participation in continuing professional development. On average, however, participation rates in continuing professional development are less than half the norm established by those associations which have

instituted mandatory policies. Nevertheless, association policies clearly have an impact. Participation rates in provinces where there are mandatory policies are notably higher than where there is no policy. A large majority of engineering and technology employers have formal policies to support or encourage continuing professional development. Stronger association policies may encourage greater utilization of the support that these employer policies provide.

Policies on continuing professional development need to take account of the range of options open to engineering and technology professionals. Rigid definitions risk under-estimating the actual levels of involvement and promoting types of continuing professional development that may not be consistent with the career goals of engineering and technology professionals or with the human resource development goals of their employers.

There are challenges which both the engineering and the technology professions need to address. Participation rates in continuing professional development appear to fall short of what might be expected, based on the importance attributed to continuing professional development and trends in other professions. In some fields, participation rates in technical associations is also lower than might be expected. Employer support for continuing professional development is strong in some industries, but weaker than might be expected in others, notably in the manufacturing sector.

Recommendations:

1. Engineers Canada and the Canadian Council of Technicians and Technologists should update their past scans of continuing professional development standards for other professions in Canada and for engineering and technology professions internationally. Based on these updated scans, the national associations should assess how the Canadian engineering and technology professions stand in relation to these trends.

2. Engineers Canada and the Canadian Council of Technicians and Technologists should explore successful models of continuing professional development used by other professions, especially where those models adopt flexible definitions of eligible continuing professional development activities. The notion of an individually drafted continuing professional development plan – as set out by some of the regulatory bodies in the legal profession – may have particular relevance. In considering the relevance of models used in other professions, the implications of the distinctive characteristics of engineering and technology career paths should be borne in mind.

3. Engineers Canada and the Canadian Council of Technicians and Technologists should undertake a systematic examination of employer policies towards continuing professional development. This study should explore both how association policies should relate to employer policies and how areas of weakness in employer support for continuing professional development could be addressed.

4 Efforts should be made to harmonize the continuing professional development norms and standards of the provincial and territorial associations/ordres.

Appendix A
Methodology

Employer Survey:

The *2007 Engineering and Technology Employer Survey* was a web-based survey on engineering and technology intensive employers. The survey was conducted in 2007 and early 2008. A total of 701 valid responses were received. Of these respondents, 339 (48%) conducted operations in more than one province, at the time of the survey. In total, the respondents reported that they employed 23,367 engineers, 10,285 technologists, and 8,276 technicians. Based on the 2006 Census, the respondents to the survey accounted for approximately 11.6% of the total estimated employment of engineers and 7.1% of technicians and technologists.

More detailed information on the survey sample is available in the report, *2007 Engineering and Technology Employer Survey*, which is available on the Engineering and Technology Labour Market Study website: http://www.engineerscanada.ca/etlms/index.cfm

Employee Survey:

The Survey of Engineers and Engineering Technicians and Technologists was conducted throughout 2008. A total of 15,585 persons participated in the survey. These comprised 8,700 respondents with an undergraduate degree in engineering (earned either in Canada or abroad), 5,809 persons with a Canadian or external college qualification (and no university qualification), 490 persons with a university science degree (and no other qualification), 547 persons with a graduate degree in engineering (but who did not report an undergraduate degree[8]), and 312 persons whose qualifications could not be determined. Approximately 85% of the survey respondents reported that they were working in engineering or technology when they completed the survey. The regional, gender and age distribution of respondents approximates the *Census* distribution. Among respondents with an undergraduate degree in engineering, 87.9% were either licensed or registered with their professional association as engineers-in-training. Among respondents with a college qualification in technology, 62% held a technologist or technician certification.

More detailed information on the survey sample is available in the report, *Survey of Engineers and Engineering Technicians and Technologists*, which is available on the Engineering and Technology Labour Market Study website: http://www.engineerscanada.ca/etlms/index.cfm

Executive Interviews:

Figure No. 12 summarizes the regional and industry distribution of the executive interviews. Persons interviewed were generally chief engineers, chief technology officers, CEO's or directors of human resources. The interviews were conducted in the spring and summer of 2008.

[8] The respondents who reported a graduate qualification in engineering, but no undergraduate degree probably reported only their highest degree.

Employer Survey:

Figure No. 12
Regional and Industry Distribution of Executive Interviews

	Consulting	Manufacturing	Government	Oil & Gas	Other	Total
Atlantic	2		2		3	7
Quebec	5	2	1			8
Ontario	4	1	2		1	8
Manitoba-Saskatchewan	1	2	3			6
Alberta	2		1	3	1	7
British Columbia	2	1	1		1	5
Total	16	6	10	3	6	41

The interview protocol is reproduced at the end of this appendix.

Focus Groups:

A total of 65 engineers, technologists and technicians participated in the five focus groups. The regional and occupational distribution of these participants is summarized in Figure No. 13. The focus groups were conducted in the winter and spring of 2008.

Figure No. 13
Regional and Occupational Distribution of Focus Group Participants

	Engineers	Technologists	Technicians	Total
Toronto (February 21, 2008)	8	3	2	13
Fredericton (February 26, 2008)	7	6	1	14
Vancouver (March 12, 2008)	6	6	0	12
Calgary (March 26, 2008)	9	3	0	12
Montreal (July 3, 2008)	5	9		14
Total	35	27	3	65

The focus group protocol is reproduced at the end of this appendix.

Executive Interview Outline

1. What are your firm's policies regarding continuing professional development for engineers, technologists and technicians? Do you have a budget allocation for continuing professional development? Do you have a benchmark in terms of the number of days allowed for continuing professional development? Does your company maintain records on the continuing professional development of its engineering and technology employees? Do requirements by professional associations for continuing professional development affect your company/ organization's policies or practices?

2. Do your engineers or technicians/technologists tend to belong to professional associations (i.e., the provincial and territorial associations that undertake licensure of engineers or certification of technicians/technologists)? Are there any advantages to you, as an employer, that you associate with your engineers or technicians/technologists having membership in professional associations (e.g., differences in professional attitudes, differences in involvement in continuing professional development, etc.)? Does your company subsidize membership fees?, sponsor association activities, or subsidize attendance at association conferences, seminars, etc.?

3. Do your engineers or technologists tend to belong to technical associations? (e.g., Canadian Society for Civil Engineering, Canadian Society for Chemical Engineering, Institute of Electrical and Electronics Engineers – IEEE, etc.)? If so, does your company subsidize membership fees, sponsor association activities, or subsidize attendance at association conferences, seminars, etc.?

4. What channels does your company rely on for continuing professional development for engineering and technology employees? (e.g., University-based professional development centres, colleges, private seminars, technical associations, in-house seminars, etc.). Does your company/organization have a preference for any particular channel?

5. Are there any broad trends that you observe in terms of the strengths or weaknesses of the skills of recent graduates? - technical skills, non-technical skills?

6. Should participation in continuing professional development be a requirement for renewal of an engineers professional license? for renewal of a technologist's or technician's certification? (Note: this is a requirement in some provinces.)

7. In terms of supporting the cost of continuing professional development, where do you see the balance across individual responsibility, employer responsibility, and government support (through the tax system)?

8. In your experience, have there been any trends in shifting responsibilities between engineers and technologists? between technologists and technicians? between technologists and technicians, on the one hand, and tradespersons on the other? If so, what is behind these changes? (e.g., cost pressures, differences in training, internationally trained professionals who are educated as technologists, but employed as technicians)

9. Do you see any implications of these shifting responsibilities for the system licensing engineers or certifying technicians or technologists?

10. What is your company's policy towards professional licensure for engineers and professional certification for technologists and technicians? Do you provide financial support for annual registration or membership fees?

    - If policy is to require licensure and certification: what are the main reasons that you require licensure and certification?

    - If policy is to prefer licensure and certification: what are the main reasons that you encourage licensure and certification? Why do you opt for a policy of encouraging, rather than requiring?

    - If policy is mixed, i.e., require for some employees, but not for all: what factors determine where you draw the line between requiring licensure or certification vs. not requiring?

    - If policy is non-supportive: why does your company not see value in licensure or certification?

    - Have there been any changes in your company's policy or attitude towards licensure or certification? If so, what was behind these changes?

Focus Group Discussion Outline

1.	Introductions • Background to the study • Purpose of Focus Group • Introduction of participants
2.	Please describe the types of responsibilities undertaken by engineers, and technologists in work places with which you are familiar.
3.	Do you see any changes in the respective roles of engineers and technologists? In particular, are there functions or responsibilities that were formerly undertaken, mainly by engineers, which are now increasingly undertaken by technologists? Has there been any movement in the opposite direction? Are these changes more evident in some technical fields or disciplines? Are these changes more evident in some industries?
4.	Do you see any changes in the respective roles of technologists and technicians vis à vis one another and vis à vis the skilled trades? Are these differences between technologists and technicians becoming more or less pronounced, in practice? Are these changes more evident in some technical fields or disciplines? Are these changes more evident in some industries?
5.	Break
6.	What factors are behind the changes in the roles and shifting work boundaries? • cost pressures? • business organization models? • differences in training? • internationally trained professionals who are educated as engineers, but employed as technologists? • technology? Are these factors more important in some industries or in some technical fields?
7.	Do you see any trends in shifting roles and work responsibilities between engineers/ technologists/technicians on the one hand and other science-based professionals, e.g., computer science graduates, life sciences graduates, mathematics graduates, etc.

Appendix B
Members of Steering Committee

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Order des Technologues Professionels du Quebec

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