Essential Skills for Success

... in College Postsecondary and Apprenticeship Programming

Part of the Learner Skill Attainment Framework Initiative

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Project Overview

Learner Skill Attainment Framework

The *Learner Skill Attainment Framework Initiative* was undertaken by the College Sector Committee for Adult Upgrading (CSC) early in 2007 to develop a framework for measuring learner skill attainment in three key areas: Reading Text, Document Use and Numeracy. The resulting framework would enable Literacy and Basic Skills (LBS) and Academic Upgrading (AU) programs in Ontario to track learners' progress towards identified goals on a consistent scale in meaningful increments that relate to those goals. Programs would be able to demonstrate learner skill attainment more accurately, and ultimately, program effectiveness.

The need for an assessment framework had been clearly established by a prior research project*, Learner Skill Attainment*, which examined the effectiveness and relevance of the current LBS/AU assessment approach within the broader context of Employment Ontario (See **Appendix A**) and the government's Continuous Improvement Performance Management System (See **Appendix B**). The purpose of this earlier project was to develop an assessment approach appropriate to the goal-directed, outcome-based nature of LBS/AU while balancing the need for valid, reliable and practical assessment practices.

The literacy field in Ontario has long supported the need for a more valid, reliable and manageable approach to assessment. In particular, the field suggested the need for a new assessment language and approach that would:

- describe learning outcomes in terms of what learners will be able to do or where learners will be able to go at the completion of their training
- describe gains in skills and knowledge in a meaningful way to key stakeholders such as Apprenticeship, Job Connect, Labour Adjustment Advisory and Ontario Works
- clearly link LBS/AU to other models in use
- enhance the role of LBS/AU as a key player in skills training in Ontario

Transition Paths

A key feature of the Framework was the notion of "transition paths," also endorsed by the field through the prior research project. Transition paths would need to be distinct, defined in part by the core skills and key tasks that are unique to each path thereby facilitating the transition of students to their next step destinations. Although LBS/AU programs have traditionally focused on learner goals such as employment, or further education and training, the goals were not explicitly linked to specific learning outcomes or individual skills. Defining goals for learning within the broader educational/training environment of Ontario would provide a sound structure for the framework and assist in identifying specific areas of knowledge and specialized skills tied to those goals.

To date, five transition paths have been identified:

1. Foundations for Independence
2. Employment
3. Secondary School Credit
4. Postsecondary
5. Apprenticeship

Transition paths 4 and 5 relate specifically to colleges.

The framework is based on the Essential Skills/IALS scales which are nationally recognized and therefore provide a common assessment language for all stakeholders. The federal government has invested significant resources into the development of the nine Essential Skills, and several LBS agencies delivering workforce preparation have already made great strides integrating them into their programs.

Survey: Essential Skills for Transition

To develop the transition paths, it was critical to identify what students need to know and be able to do in order to help them make the successful transition to their next steps. The knowledge and skills they require very much depend the demands placed on them in their roles as learners, workers, family members and citizens. For students whose goal is further education or training, those demands include meeting specific prerequisites or credentials required for entry to postsecondary or Apprenticeship programming.

The notion of learner transition is not new to front line deliverers of Academic Upgrading programming. AU math programs, for example, are specifically tailored to students' most popular postsecondary destinations such as Health Sciences, Business or Technology. Because LBS/AU programs are learner-centred and goal-directed, students' short-term and long-term goals are always taken into account. The framework initiative, however, afforded a special opportunity to conduct a more intense and systematic examination of students' next steps requirements.

The most effective means of gathering information on next step expectations and requirements was to survey a cross section of faculty from postsecondary and Apprenticeship programs. The survey would identify core skills and key tasks associated with successful transition. This vital information could then be integrated into current Academic Upgrading curriculum and assessments ensuring that students have the strategies and skills they need to cope with the variety, volume, and complexity of text and numerical concepts they encounter at the next level.

Survey Methodology

A team of three consultants was contracted in January 2007 to develop questionnaires for postsecondary and Apprenticeship faculty, with additional input from the CSC Advisory Group and CSC Executive Director. A literature review was conducted to supplement the teams' Essential Skills background, gather data for the development of the survey and identify possible issues that might arise in the interview process. See **Appendix C** for a summary of the literature review and **Appendix D** for references.

It was agreed that the questionnaires would be "exploratory" in nature to get a general overview of faculty's understanding of and support for all nine Essential Skills. The questionnaires would identify how Essential Skills are used in first year postsecondary and Apprenticeship programs with a particular focus on Reading Text, Document and Numeracy since these are the Essential Skills that will be formally assessed as per the CIPMS model. For this reason, an instructive element was built into the questionnaires using explanatory details such as definitions, terminology and examples. The questionnaires were designed to yield data that would assist in the development of the transition paths to postsecondary and

Apprenticeship programming, i.e. to identify the core skills and key tasks that lead to successful transition to these destinations.

Time constraints allowed for a small but sufficient sample that would provide critical insight into the role of Essential Skills in postsecondary and Apprenticeship programming. Most of the interviews were conducted in person or by phone. The questionnaires were designed to gather qualitative and quantitative information so interviewees were encouraged to provide anecdotal comments as much as possible. Interviewees were also asked to rank a number of items such as Essential Skills and types of texts according to their importance using a 5 point scale with a "not applicable" option if the example didn't apply. It should be noted that time constraints also prevented a formal field test of the questionnaire.

Participation in Survey

During the spring of 2007, a total of 23 interviews was conducted with postsecondary and Apprenticeship faculty at 11 colleges representing all regions of the province. Two additional interviews were conducted with faculty from Pre-Apprenticeship and General Arts and Science. Although not included in the report, the results of these two surveys have been useful for comparative purposes.

Colleges that participated in the interviews:

- Canadore
- Confederation
- Conestoga
- Durham
- Fanshawe
- Loyalist
- Niagara
- St. Clair
- St. Lawrence
- Seneca
- Sheridan

The team also tried to cover a broad spectrum of postsecondary and Apprenticeship programs.

<u>Postsecondary programs</u> surveyed:

Health Sciences

- Biotechnology
- Personal Support Worker Program
- Human Services Worker; and Child and Youth Worker
- Practical Nurse
- Human Services Foundation (certificate)

Business

- Human Resources Management
- Business – Accounting
- Business – Administration

Technology

- Electrical Apprenticeship Co-op Diploma Program
- Construction Engineering Technology
- Environmental Protection and Compliance

Apprenticeship programs surveyed:

Construction Sector

- Construction Electrician

Industrial Sector

- Industrial Electrician
- Precision Metal Fabricator

Motive Power Sector

- Automotive Service Technician
- Small Engine/Marine Engine Technician
- Truck and Coach Technician

Service Sector

- Early Childhood Educator

Survey Results

Although the survey sample was small, an impressive amount of data was gathered, thanks in large part to the faculty who contributed substantial time and expertise to the interview process. Unfortunately, in trying to organize the data for the report, much of the "flavour" of the original comments and observations has been lost. To regain the richness and depth of interviewees' insights, the raw data has been compiled in two thorough and well organized documents: **Appendix D** (postsecondary) and **Appendix E** (Apprenticeship). We urge readers to review and consult these documents, which provide a further breakdown of results, to gain a better understanding of Essential Skills and their relevance to college postsecondary and Apprenticeship programming.

The postsecondary and Apprenticeship results are recorded separately to demonstrate the uniqueness of each transition path. The reality for most colleges, however, is that AU programs serve students bound for both postsecondary and Apprenticeship in the same classroom. To address issues like this that have implications for classroom management, data was examined for recurring themes or common patterns and displayed accordingly. It should be noted also that a small number of responses do reflect regional situations or differences across the province; the vast majority of comments, however, apply to students and colleges throughout Ontario.

Profile of the typical individual attracted to the programs surveyed

Postsecondary Comments

Interviewees were asked to provide a profile of students enrolled in their postsecondary programs. One question asked interviewees to estimate the number of students in their programs who entered directly from high school, as opposed to those who had been out of high school for some length of time. Responses indicated that approximately 72% of students were direct entrants from high school, while approximately 28% were non-direct high school entrants.

Below are the comments (in no particular order) related to the typical student profile:

- some single parents and mature students
- students making career changes
- students who bring a wide variety of experience with them
- younger students in need of career advice
- students who enjoy hands-on work
- students using the program to "ladder" into other programs
- students for whom curiosity is an attribute
- students who did not make it into their first program of choice
- students who are innovative thinkers not just "number crunchers"
- students with people skills, and students who have a special affinity for their career choice

One interviewee noted differences in the profiles of part time and full time students. Part time students tend to be older students who are looking for a career change while full time students tend to be younger, often with unrealistic expectations about their program.

Apprenticeship Comments

As with the postsecondary programs surveyed, Apprenticeship faculty were also asked to provide a profile of students enrolled in their programs. Responses indicated that approximately 68% of apprentices were direct entrants from high school, while approximately 32% were non-direct high school entrants. These figures closely mirror the postsecondary estimates. One interviewee indicated that the direct high school entrants were often OYAP graduates.

Below are comments related to student profile:

- dexterous, hands-on oriented
- technically able
- good eye-hand coordination
- male with mechanical aptitude
- average to low-average student in high school
- weak math and English skills
- have been in low-paying jobs after high school
- limited interpersonal skills
- with the exception of the Early Childhood Educator Apprenticeship Program, approximately 98% of apprentices in the programs surveyed are male.

For the Construction Electrician Apprenticeship, the profile was somewhat different than in the other Apprenticeship programs surveyed:

- An increasing number of apprentices have some postsecondary education (university or college) and are realizing the potential for a career in the trades.
- Many are embarking on a second career.

For the Early Childhood Educator Apprenticeship, the profile again was different. This may be partly due to the fact that the program is located in the GTA.

- Many are mature students who enjoy working with children.
- The majority [in the GTA] are immigrant women who have degrees and were professionals (teachers, engineers, biologists) in their home country.
- Approximately 25% are younger and have been working in the field but are unqualified.

Skills that prepare students for future employment

Interviewees were asked to identify skills that their students were developing that prepared them for future employment. This question was intended to elicit responses that went beyond the vocational skills (which obviously prepare students for employment) to address the more generic or “soft skills” that students are gaining. In some cases, the responses mentioned one or more of the nine Essential Skills.

Responses from both postsecondary and Apprenticeship interviewees shared some similarities. Both identified “team work” as a highly valued skill. Communication skills were also common to both areas, but with a slightly different focus.

Figure 1 below summarizes the most frequent responses:

FIGURE 1: Skills That Prepare Students for Future Employment	
Postsecondary	**Apprenticeship**
team work	team work
communication skills, e.g. reading, presentation skills, professional writing, academic writing	verbal communication skills
interpersonal skills, people skills	interpersonal skills with respect to co-workers and customers
critical thinking skills	critical thinking skills
analytical skills	analytical skills
time management	time management, especially in the shop but also to balance school, work, and life outside of school
research skills	research skills, often with respect to online manuals and manufacturers' publications
math/numeracy skills	general math background

Other skills that were mentioned by postsecondary faculty include vocational, technical, laboratory, observation, conflict management, problem solving, lifelong learning, stress management, customer service, entrepreneurial skills, and social skills. Qualities such as maturity and strong work ethic were also mentioned.

Other skills that were mentioned by Apprenticeship faculty include computer literacy, self-direction, professionalism, negotiation skills, and responsibility. Knowledge related to the legalities of the profession was mentioned by one interviewee. Some interviewees also noted that pride in workmanship and a good work ethic were attitudes that students were developing through their Apprenticeship training.

Typical reasons why students are not successful in postsecondary or Apprenticeship

Interviewees were asked to provide reasons why their first semester (or Level 1) students were not successful. There were some parallels in the responses of postsecondary and Apprenticeship faculty which are summarized in **Figure 2** below:

FIGURE 2: Reasons Why Students Are Not Successful	
Postsecondary	**Apprenticeship**
***unprepared academically students, the reality of the program doesn't match the expectations	lack of reading comprehension and basic math skills
***issues with maturity, poor work ethic, lack of self-discipline, heavy emphasis on self	lack of ethics, responsibility, pride in workmanship
heavy work load in postsecondary programming	overwhelmed at the beginning by the workload
poor attendance	poor attendance (for a variety of reasons)
lack of family or financial support	personal/family commitments and/or financial hardship
failing to submit or complete work	lack of responsibility
poor time-management skills	lack of time devoted to studies
poor organizational skills	poor work and study habits
second language issues (particularly verbal)	second language issues (verbal/written)
lack of motivation/interest	lack of motivation/desire to learn

***** 58% of postsecondary respondents cited these first two reasons

Other reasons that postsecondary students are not successful include a lack of suitability to the program or college, expectations of students not matching the reality of the postsecondary program, an inability to cope with failing grades, and an inability to apply prior knowledge. Interviewees also noted that students "off the line," i.e. from industry are often more successful and that brighter students sometimes disengage when they see that other students need too much "hand holding."

Interestingly, two Apprenticeship interviewees commented that a lack of success is not usually due to academic difficulties but to other causes such as personal issues, time management or motivation. Several responses indicated that with good reading skills and a sound grasp of basic math skills, most students can be successful: “If they have a basic level of academics, it will allow them to get through, but they also need the related [non-academic] skills.”

A final, noteworthy comment from one Apprenticeship interviewee described an increasing problem related to employers, which may be particular to that individual’s trade and region of the province. Employers can be unwilling to release students for the in-school training because those employers can’t afford to give up the apprentices, i.e. the apprentices are needed to work. Some who start their in-school training are unsuccessful simply because they aren’t able to attend regularly due to employer constraints.

> The attitude that often prevails in this trade is that, “If you can’t do anything else, be a mechanic”, but because of the increasing technical requirements, it can be hard for some people to be successful.
>
> *Apprenticeship Interviewee*

Essential Skills

There is very strong support for Essential Skills among the 23 postsecondary and Apprenticeship teaching staff who were interviewed. This is evident in such comments and observations as, “high marks from high school don’t always mean they (students) are successful,” and “we need a better filter than grade 12 to help determine potential for success.”

Overall there is a great deal of consistency regarding the degree of importance of the Essential Skills as they relate to postsecondary and Apprenticeship programs in colleges. See **Figure 3** below. Reading Text was identified as the most important Essential Skill for both postsecondary and Apprenticeship programming, although there were actually five skills vying for top position in postsecondary. Writing and Document Use, on the other hand, show an interesting, if imperfect, reversal.

FIGURE 3: Essential Skills by Degree of Importance

Postsecondary	*Ave.*	Apprenticeship	*Ave.*
Reading Text	**4.6**	**Reading Text**	**4.9**
Writing	**4.6**	***Document Use***	**4.6**
Continuous Learning	**4.6**	**Continuous Learning**	**4.5**
Working with Others	**4.6**	**Working with Others**	**4.4**
Thinking Skills	**4.6**	**Thinking Skills**	**4.4**
Document Use	**4.3**	**Oral Communications**	**4.3**
Numeracy	**4.2**	**Numeracy**	**4.2**
Oral Communications	**4.2**	***Writing***	**3.9**
Computer Use	**3.6**	**Computer Use**	**3.8**

Section A: Types of Text

Postsecondary and Apprenticeship teaching staff were also asked to indicate the degree of importance of different types of text. With the exception of lecture notes, there was strong consistency in the responses – both in the order and in the average score. See **Figure 4** below:

FIGURE 4: Types of Text by Degree of Importance			
Postsecondary	***Ave.***	**Apprenticeship**	***Ave.***
text books	**4.6**	**reference materials**	**4.7**
lecture notes	**4.2**	**text books**	**4.5**
reference materials	**4.1**	**shop policies, practices or procedures**	**4.5**
virtual text	**4.0**	**virtual text**	**4.0**
college policies, practices or procedures	**3.9**	**paragraph length text in charts, tables and graphs**	**3.9**
paragraph length text in charts, tables and graphs	**3.8**	***lecture notes***	**3.9**

Judging from the responses, it appears that lecture notes may not be the primary method of delivering in-school content to apprentices.

Postsecondary Comments

1. text books
    - strong expectation that students use a text
    - students are exposed to a lot of material in first term; a lot of the program 'groundwork' is established
    - open book exams/tests are standard and require a very strategic approach to reading text

2. lecture notes
    - lectures notes are an important element of the learning environment
    - students need good note taking skills
    - Students are very literal and need to develop ability to integrate information from lecture material. Faculty present examples but students don't generalize or make inferences from the material. As already noted, students need to take a more nuanced understanding of lecture material.
    - This requires a lot of thinking skills as notes are presented in PowerPoint outlines. Students need to synthesize information. Outlines present text, charts, and numerical information.

3. reference materials
    - Students are usually directed to information in paragraphs (charts, tables and graphs) and reference materials. It's not as important to know how to read these types of text because they're shown how.
    - not as relevant for vocational materials but has a strong focus in first term English (students research a vocationally-related project)

4. virtual text accessed through learning technologies
    - more important for full time program (i.e. navigating college web pages) – mature students often don't have access to computers so their entry levels skills are weak
    - will increase with more use of WebCT which was just implemented this year in this program

5. college policies, practices or procedures
    - same as industry standards and ties in with safety

6. paragraph-length text in charts, tables and graphs
    - found in technical manuals (i.e. building codes/specifications)

Types of text were further analyzed by program cluster for postsecondary programming as shown in **Figure 5** below:

FIGURE 5: Importance of Types of Text by Program Cluster

	Health Sciences						***Business***				***Technology***			
Types of Text	*1*	*2*	*3*	*4*	*5*	***Ave.***	*6*	*7*	*8*	***Ave.***	*9*	*10*	*11*	***Ave.***
Text books	4	5	5	5	5	**4.8**	5	5	4	**4.6**	4	4	5	**4.3**
Virtual text	3	5	5	5	2	**4**	4	5	3	**4**	3	5	4	**4**
College policies and procedures	3	5	5	5	3	**4.2**	2	4	2	**2.7**	5	4	5	**4.7**
Lecture notes	4	5	5	5	5	**4.8**	4	3	3	**3.3**	3	5	4	**4**
Text in charts, tables	3	4	3	5	3	**3.3**	4	4	3	**3.7**	3	5	5	**4.3**
Reference	4	4	5	5	4	**4.4**	4	4	3	**3.7**	3	4	5	**4**

Again, differences in the average scores were generally minor. Examples of texts used by the three clusters included navigating college/program home pages, managing patient charts, text books and handouts, written instructions, information on technical drawings and newspapers to read specific articles related to students' program.

One anomaly was the score assigned to college policies and procedures by the Business cluster. The average score, 2.7, was considerably lower than other scores. While no explanation was provided, it would be interesting to examine this score more closely, e.g., perhaps using the more generic term, policies and procedures, might have produced different results.

Other types of reading tasks performed by postsecondary students

Health Sciences

- using MSDS files
- using Merck Index
- following instruction manuals
- navigating the college/program home pages to find/enter information
- conducting literature reviews
- learning and applying terminology and medical abbreviations
- journaling (professional and personal)
- management of patient charts (finding selected information)
- evaluating peer assignments
- reading of assignments with WebCT

Business

- following written instructions
- reading text books and handouts
- learning terminology required in the field of study and in the workplace

Technology

- using newspapers to find articles on issues relevant to programs
- using trades magazine and periodicals relevant to the profession
- reading information on technical drawings

Apprenticeship Comments

There were few comments directly related to the different types of text-based reading that apprentices are required to do. One important comment with respect to accessing virtual text is that manufacturers' manuals are increasingly being published and accessed online in the workplace, so apprentices benefit from exposure to this during their in-school training.

Other types of reading tasks performed by apprenticeship students

Construction Sector

- Electrical Code book is a legal document written at university level; they must be able to extract, understand, and apply information from it
- manual reading (equipment, repair, etc.)
- manufacturers' guidelines/publications
- blueprint reading
- schematic diagrams
- employment contracts
- government regulations
- hand-outs pertaining to the text book(s)

Industrial Sector

- charts and tables
- reference texts

Motive Power Sector

- trade magazines
- reference materials geared toward continuous learning in the trade
- visual interpretation of wiring and fluid flow diagrams
- work orders that someone else has written
- virtual (online) repair manuals
- virtual (online) information for upgrading in the profession

Service Sector

- newspapers
- periodicals/journals
- instructions on assignments
- evaluation tools for child development or the childcare environment

Section B: Skills for Reading Text

Postsecondary Responses

Postsecondary interviewees were asked to speculate why some students do not succeed when it comes to reading.

Their overall responses are reported below:

- can't handle lengthy text
- don't read or lack interest in reading
- have problems with comprehension
- have difficulty distinguishing relevant from irrelevant information
- can't cope with analytical, high level reading materials
- have trouble learning the jargon in technical journals and the profession

Other observations for why students are not successful readers include the following: they lack concentration; they have problems integrating information from text; they have insufficient reading ability for the task at hand; they have trouble reading questions; they have difficulty recalling information from text.

Interviewees provided a number of solutions or strategies to improve poor reading performance:

- teach reading strategies such as SQ3R
- provide "visual" books
- help students "filter" unnecessary information
- translate difficult text into plain language
- provide study skills sessions
- use services of the college's Writing Centre

Apprenticeship Responses

Apprenticeship interviewees were asked to speculate why some students do not succeed when it comes to reading.

Their overall responses are reported below:

- lack of reading comprehension skills
- they don't spend enough time reading
- they have no desire to read; they view it as a waste of time
- they are easily distracted
- generally low reading skills
- ESL issues

Other observations for why students are not successful readers include the following: they don't appreciate the value of the information they will gain by reading; often lack of reading skills has been an issue since elementary school; they skim but don't want to or can't read for detail.

Interviewees provided a number of solutions or strategies to improve poor reading performance:

- Use pictures or diagrams to illustrate the problem or concept.
- Slow down the reading pace.
- Make uninterrupted time for themselves to work at home.
- Try to prepare them in advance for reading assignments so that they can be closely linked to in-class activities, i.e. provide as much context as possible.
- Present alternate terminology to that in the text or reading.
- Use supplemental handouts to support text book readings.
- Have the students do different activities related to the reading, i.e. make up multiple choice questions to use in class with others.
- Break long passages into smaller segments and let them readily refer to this when they are doing hands-on tasks that relate to the readings.
- Give them handouts already highlighted.
- Use more than one approach to addressing the content, i.e. reading, using overheads, making notes, PowerPoint, discussions, etc.
- Use clear language in handouts and notes.
- Provide trade-related leisure reading for students.
- Be a role model for both workplace and recreational reading.

Section C: Types of Document Use

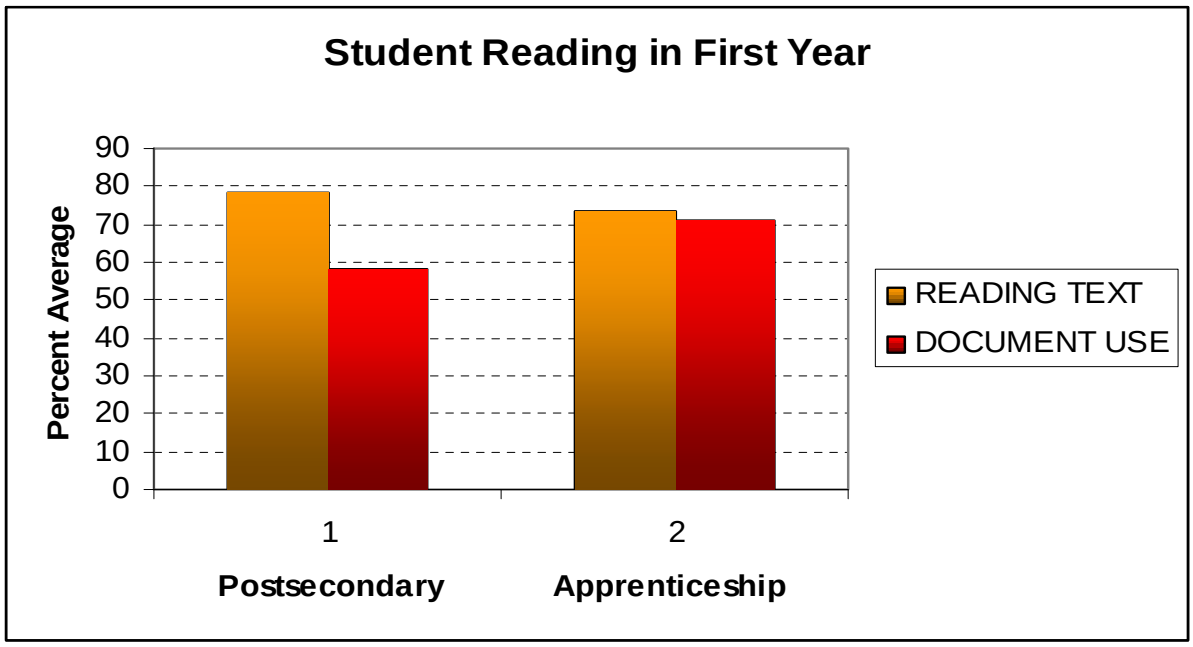
Postsecondary and Apprenticeship teaching staff were asked to rank types of document use using the five point scale. See **Figure 6** below for results:

FIGURE 6: Types of Document Use by Degree of Importance			
Postsecondary	***Ave.***	**Apprenticeship**	***Ave.***
locate/enter information in tables, schedules and other table-like text	**4.3**	***interpret and extract information from scale drawings (e.g., blue prints, maps)***	**5.0 (2 n/a)**
read, interpret and get information from graphs and charts	**4.1**	**obtain information from sketches, pictures, signs or symbols**	**4.9**
obtain information from sketches, pictures, signs or symbols	**3.9**	**locate/enter information in tables, schedules and other table-like text**	**4.4**
identify the purpose for 'entering' the document	**3.8 (1 n/a)**	**use specialized knowledge and reasoning**	**4.4**
use specialized knowledge and reasoning	**3.7 (1 n/a)**	***read, interpret and get information from graphs and charts***	**4.1**
identify the structure/type of document	**3.6 (1 n/a)**	**identify the structure/type of document**	**3.9**
read and complete complex forms	**3.6 (1 n/a)**	***identify the purpose for 'entering' the document***	**3.8**
interpret and extract information from scale drawings (e.g., blue prints, maps)	**3.4 (6 n/a)**	**read and complete complex forms**	**3.8**

In this example, there is more variation in the ranking of documents. What is even more compelling is that Document Use, with the exception of two examples where scores are the same, is consistently ranked higher by Apprenticeship faculty. This greater focus on Document Use in Apprenticeship is further confirmed by interviewee's responses to a question designed to get a rough comparison of how much text-based reading and how document use students do in the first year of their program.

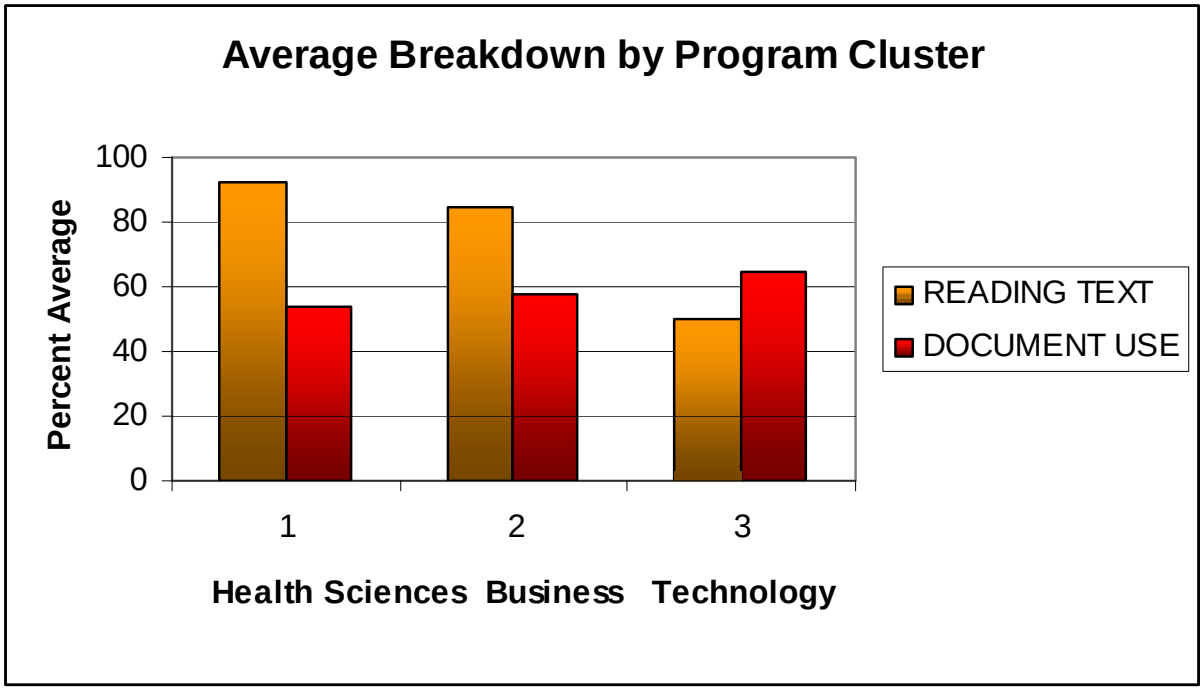
Figure 7 below shows the volume of Reading Text and Document Use students manage in their first year. The time devoted to Reading Text is quite similar – 75% on average. Apprenticeship students, however, spend considerably more time using documents than do their counterparts in postsecondary – 71% compared to 58%.

FIGURE 7



First year student reading and use of documents were also analyzed by program cluster. See **Figure 8** on the following page. While the use of documents is relatively consistent across all three clusters, Reading Text was much lower in Technology than it was for Health Sciences and Business. It must be noted, however, that this was a very subjective question and therefore a challenging one for some interviewees to answer.

FIGURE 8



Typical Document Use tasks performed by postsecondary students

Postsecondary Comments

Health Sciences

- institutional forms
- testing forms – following instructions, multiple choice navigating the test
- forms used in health settings such as the cardex which holds specific patient care information.
- on-line sources of information such as finding guidelines for standards of practice and standards of care).
- field placement manuals

Business

- balance sheets
- TDQ form for income tax
- accounting specific documents such as purchase journals

Technology

- blueprints
- machine specs
- Electrical Code book
- maps and map reading
- citations and referencing
- labs materials (instructions, charts, graphs) to both carry out the lab and write the lab report

> Document Use is even more important than reading.
>
> *Technology Interviewee*

Typical Document Use tasks performed by apprenticeship students

Apprenticeship Comments

There is some overlap among the types of Document Use in each sector, though the responses for the Industrial Sector are limited since only one Industrial Apprenticeship program was surveyed. Types of Document Use by sector include the following:

Construction Sector

- Electrical Code Book
- blueprints
- wring diagrams
- schematic diagrams
- drawings with trade-specific symbols and abbreviations
- instrumentation and electronics specifications
- manufacturers' documentation
- work permits
- bids on

Industrial Sector

- safety documentation
- medical/health forms

Motive Power Sector

- data from meters and scopes, i.e. charts/tables displayed on-screen
- work orders and estimates
- government documentation for Drive Clean tests, safety inspections, and vehicle transfer forms
- wiring diagrams
- power diagrams
- flow charts
- invoices
- warranty reports
- circle-check form for road-testing a vehicle

Service Sector

- observation forms and checklists re: child development and interaction
- assessment inventories re: child development and environment
- forms for documenting and reporting child abuse
- accident reporting forms
- evaluation tools for children in the childcare environment (checklist, anecdotal)

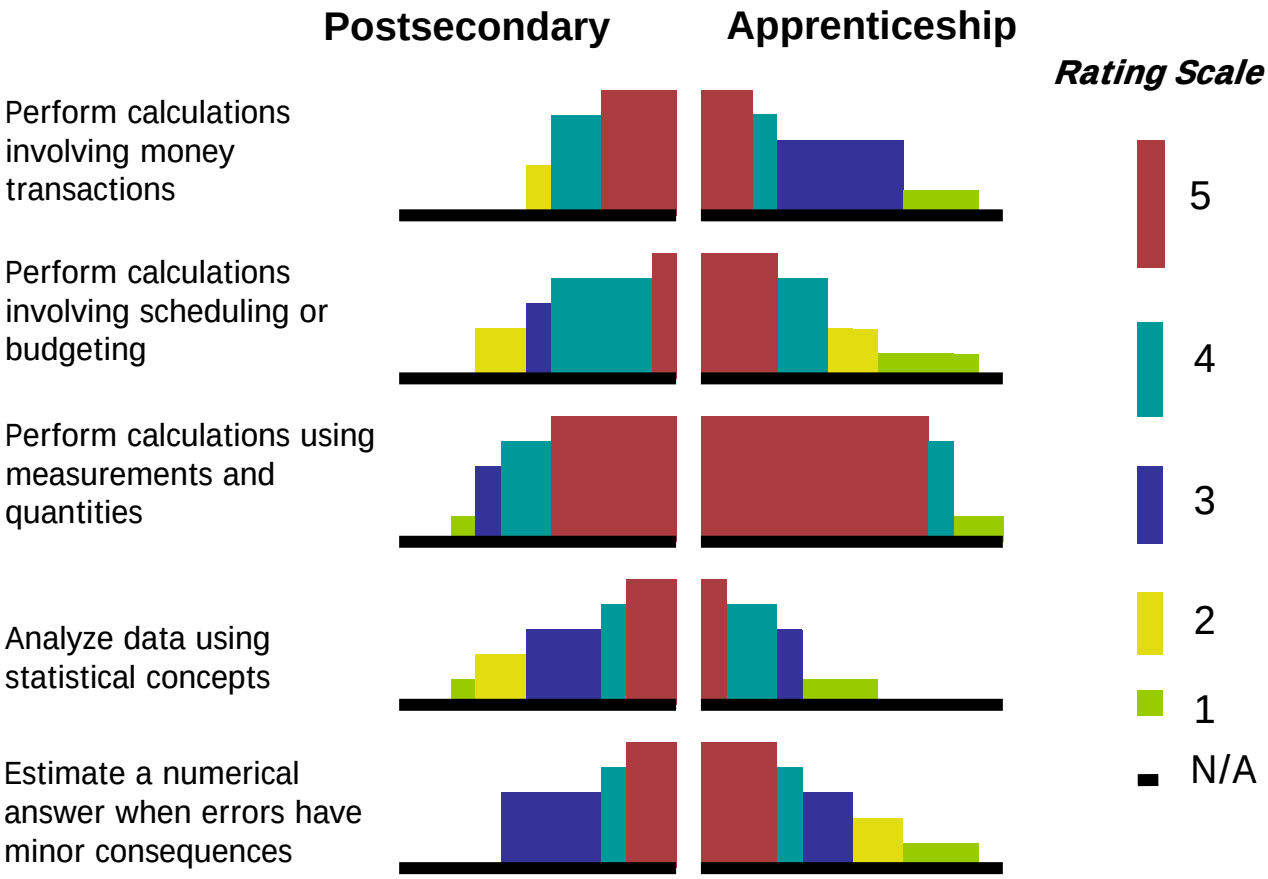
Section D: Types of Numerical Calculations

In contrast to Reading Text and Document Use, the Numeracy results showed little in the way of a common pattern when comparing postsecondary and Apprenticeship responses. For this reason, the results were displayed using a different visual to highlight areas of similarity and differences between them. See **Figure 9** below.

A few general observations can be made, however. The skill, "perform calculations using measurements and quantities," was given the highest rating by both postsecondary and Apprenticeship interviewees, while the skill, "analyze data using statistical concepts," was given the lowest rating by Apprenticeship". There were a greater number of "not applicable" responses by postsecondary (16 n/a responses) compared to Apprenticeship (7 n/a responses). In examining the n/a responses by program cluster for postsecondary programming, most of them (75%) were found in the Health Sciences cluster.

FIGURE 9

TYPES OF NUMERICAL CALCULATIONS by IMPORTANCE



Typical numeracy/mathematical concepts used by postsecondary students

There was a high degree of consistency related to the numeracy/mathematical concepts identified by both postsecondary and Apprenticeship interviewees. This is not surprising since those concepts are fundamental to any math-based content. However, it should be noted that all three postsecondary program clusters represented in the postsecondary results (Health Sciences, Business, and Technology) are ones in which math skills are widely used. Program clusters such as Human Services, Law and Justice, or Hospitality would have shown a different and likely much narrower use of numeracy and mathematical concepts.

Concepts identified as typical by both postsecondary and Apprenticeship interviewees include the following:

- operations with whole numbers
- operations with decimal numbers
- concepts and operations with fractions
- percentages
- ratio and proportion
- statistics
- metric and Imperial measurement (with and without conversions)
- basic algebra (solving equations)

In the Technology area and in Apprenticeship programs, typical concepts also included geometry and formula manipulation. Trigonometry was identified for a very small number of programs (three).

Concepts related to “money math” and statistics were not considered typical concepts for apprentices to use. Interviewees made several comments which indicated that high-level math skills are not necessarily required but strong basic math skills are essential in order to learn and assimilate the applied math concepts within the trade.

Responses from the ECE Apprenticeship faculty were exceptions in terms of the math concepts used since there is very little math-based content in that program. Whole number and decimal operations as well as ratio and basic measurement were identified for the ECE Apprenticeship.

Types of general math applications/tasks carried out by students in postsecondary programs and Apprenticeship

The concepts listed above are used by students in a wide variety of applications. Those applications are listed below by postsecondary cluster and by Apprenticeship sector.

Many applications require integration of several mathematical concepts and also require sound reading comprehension skills as many applications are embedded in a text-based format, i.e. “word problems”.

Postsecondary Responses

Health Sciences

- moles, dilutions, etc. in chemistry class
- taking body weight, measuring fluids
- basic math skills as they relate to the field of study, e.g. basic math skills to balance a budget, increase and prepare recipes for large numbers, balance accounts
- work around a formula for IV, flow rates, intake/output measures
- estimating the size of wounds (surface area of burns)
- converting 15 sec pulse rates to rate per minute

Business

- adding columns, balancing across columns
- journal entries (accounting), balancing accounts, totalling, budgeting
- finding present value, future value (compound interest calculations)
- tax calculations
- calculating the value of annuities and perpetuities
- calculating minimum and maximum values, i.e. profit/ loss/break even
- read and interpret stats (but not actually generating the stats) and understanding sample sizes and their impact on the stats

Technology

- Ohm's law (current, voltage, resistance) applied to series and parallel circuits
- input/output on DC motors
- power loss (watts): need to convert from horsepower to Watts in the calculation and state overall loss as a percentage
- speed regulator calculations: rotor speeds, slip speeds
- line drop in voltage (expressed as a percent) and find allowable loss for the system
- volumetric calculation – quantity of concrete or soil in a construction site
- drawing specifications to scale
- many chemistry applications (molarity, stoichiometry, pH, gas laws)
- physics applications (statistics, dynamics, motion, forces)

Apprenticeship Responses

Construction Sector

- circuit analysis (current, voltage, resistance) for series and parallel circuits
- calculating power, capacitance, conductance
- calculating power factor in AC circuits (using vectors and trigonometry)
- size of electrical services
- installation of electrical equipment
- measurement (linear and angular)
- unit conversions within and between metric and Imperial, especially on wiring diagrams
- process control devices (Level 2)
- determine values for input into electrical simulation software

Industrial Sector

- mechanical fitment
- creating retainers or gaskets
- correction of angles
- set-up of machinery

Motive Power Sector

- drive line math (gear ratio, torque, horsepower)
- engine components (compression ratio)
- basic electronics (current, voltage, resistance)
- Pascal's law (volume, area, force)
- piston displacement
- markup/markdown/discounts
- hydraulics
- non-invasive diagnostics of equipment
- measuring and converting units

Service Sector

- budgets for daycare centres
- ratio of children to caregiver
- read and interpret graphs
- estimate food portions, body temperature, height, weight (metric and Imperial)

Typical learning technologies used by students in postsecondary programs and Apprenticeship

Below are examples of the ways in which learning technologies are used by students. The responses are listed by program cluster for postsecondary and by sector for Apprenticeship.

Postsecondary Responses

Health Sciences

- PowerPoint for presentations (3)
- e-mailing which requires not only written communication but the ethical/confidential use of e-text
- full time program students use the computer to recording client/patient information of flow charts
- computers (MS Office applications) for producing professional reports and presentations
- electronic searches using databases
- CD Rom to supplements texts
- practice manipulation using medical technology in labs
- specific software for using the IV pump.
- Wordprocessing, PowerPoint, WebCT, Internet

Business

- TLM (in-house platform)
- Excel for calculations
- accounting software: ACCPAC, Simply Accounting
- web sites that come with the texts
- Internet for research
- MS Office: Word
- PowerPoint
- Access
- e-learning resources accompanying text books, i.e. CDs or web sites

Technology

- TLM (in-house platform)
- Excel
- WebCT
- VISEO drawings program (like AutoCad)
- program has been an early adopter and supporter of Laptop use and Blackboard
- email
- AutoCad
- program supports a really strong technical network
- publishers' web sites related to texts
- videos/DVDs

Apprenticeship Responses

The Apprenticeship interviewees mentioned a number of trade-related software and simulations that students use regularly. This was especially true in the Construction and Motive Power sectors. Using the Internet to access and retrieve information was also a typical task identified. There is limited use of traditional "office" software such as word processing, spreadsheets, and presentation software. This may explain the somewhat lower value attributed to Computer Use in the overall ranking for that Essential Skill among Apprenticeship faculty.

Below are examples of the ways in which technologies are used in each sector:

Construction Sector

- use commercial simulation software for various electrical applications
- hands-on technology such as circuit boards
- use computers to program the "Programmable Logic Controller" device
- trade-related technology from manufacturers
- some Internet research, e.g. updates to Electrical Code Book
- some word processing

Industrial Sector

- software for drawings/blueprints (MasterCAD)
- access to Internet is available for research

Motive Power Sector

- trade-specific software
- Internet for information retrieval and to access online service manuals
- circuit boards
- exposed to other technologies such as PowerPoint and the document camera
- CD ROMs for research on parts
- use electronic service tools, e.g. laptop for diagnostics
- GPS technology

Service Sector

- online learning platform and discussion groups
- word processing
- videos
- Internet research

> Students must be able to both accurately operate the computer and accurately interpret the figures and values on the screen.
>
> *Motive Power Interviewee*

Conclusion

The survey proved very successful in collecting data that (a) identified core skills for successful transition to postsecondary and Apprenticeship destinations, (b) provided examples of key tasks related to Reading Text, Document Use and Numeracy that will assist in the development of assessments based on Essential Skills, and (c) highlighted similarities and differences between the two college transition paths. Above all, it clearly linked student success in postsecondary and Apprenticeship programming to Essential Skills.

Strong communication skills are critical to the future success of Academic Upgrading students. Reading Text and Document Use top the list for both postsecondary programs and Apprenticeship. Communication skills were also prominent in preparing students for future employment, second only to team work. The survey elicited reasons for students' poor performance as readers. In postsecondary programming, for example, the sheer volume of text is a major factor. Nearly half of the postsecondary interviewees reported that students can't handle the workload. According to interviewees from both destination paths about 75% of the students' time is committed (or should be) to Reading Text in first year. Apprenticeship interviewees pointed to weak reading strategies and general lack of motivation as reasons why students are not successful readers.

Information was also gathered about what types of texts students interact with in their studies. Interviewees were asked to rank different kinds of texts. Text books are used extensively in both postsecondary and Apprenticeship programming as are reference materials and virtual text. Lecture notes have high currency in postsecondary, but were assigned the lowest ranking by interviewees from Apprenticeship programming. Interviewees from both programs provided long lists of reading tasks performed by students. These examples should prove helpful in designing learning and assessment activities for Academic Upgrading students who are preparing for transition.

Document Use also figures prominently in both destination paths. It is somewhat more prominent in Apprenticeship programming, where interviewees placed it nearly on par with Reading Text and a full 13% higher than Document Use in postsecondary programs. Within postsecondary programs, interestingly, Document Use was ranked higher than Reading Text by the Technology program cluster.

The results for Numerical Calculation were both consistent and inconsistent. A high degree of consistency was evident when interviewees were asked to identify math concepts students are required to use in postsecondary and Apprenticeship – math concepts that are common to most math content. The inconsistencies appeared when interviewees were asked to rank the five Numeracy Essential Skills. No common patterns emerged, except that both postsecondary and Apprenticeship identified "perform calculations using measurements and quantities" as the most important skill. The list of Numeracy tasks that interviewees proffered showed an interesting mix of math applications.

The questionnaire also collected information on the kind of technologies used by students. Postsecondary results were fairly consistent. In Apprenticeship there was limited use of

traditional “office” software which might account for the lower value attributed to Computer Use in the overall ranking for that Essential Skill.

Finally, interviewees were given the last word; they were invited to ask questions or make comments about Essentials Skills. They didn’t disappoint! Below are representative responses.

Postsecondary Comments

- Why is this project looking at just these three scales? These have well established links to literacy (IALS, IALSS, TOWES) and they are the Essential Skills that cross virtually all occupations
- We are missing these things in our students. I believe that we need to develop curriculum or modules within courses that highlight these Essential Skills. Such curricula need to be informative, applicable and fun. After all, teaching is part entertainment for the new group of students. I think that another “Essential Skill” that is not noted in the survey, but that is necessary is something related to more of a developmental process. I do not know what to term it, but students seem to be lacking overall social skills.
- We need to more specifically address Document Use skills; we have assumed that students know how to do this so we don’t teach them how to use documents, but we should.
- Essential Skills are the same as college’s essential employability skills. Key concern is a real disconnect between Essential Skills as core components of program curriculum and our assessment of them. In other words, we have them in the program(s) but we don’t do a good job of assessing how well students are developing them.

Apprenticeship Comments

- Essential Skills should be used as a tool to evaluate the preparedness for apprentices to enter in-school training once they are signed on (should not be used as a screening tool but as an advising tool). If they don’t have the Essential Skills levels required, they must remediate on their own time before taking the first level in-school training.
- Numeracy (math), reading comprehension, notetaking and good study habits are the essential skills needed, and I’m not getting students with these skills anymore.
- Industry or colleges should put together a questionnaire to help assess aptitude and background of prospective apprentices.
- It’s so important that we raise communication and problem solving skills, but there’s so much content to deliver now.
- Their (students) learning never ends in this trade.

Recommendations

1. Familiarize Academic Upgrading students with Essential Skills and their critical role in postsecondary and Apprenticeship program success. Essential Skills could, for example, be introduced in LBS/AU orientation, or as part of the Self-Management/Self-Direction course.

2. Identify and document Essential Skills that are currently addressed in Academic Upgrading (ACE) curriculum.

3. Provide adequate, timely professional development for faculty with respect to Essential Skills and their role in LBS/AU and employment.

4. Ensure a strong focus on reading strategies, including strategic reading, to prepare students for the variety, volume, and complexity of text they will encounter in postsecondary and Apprenticeship programs.

5. Teach Document Use explicitly as a separate unit, especially to prepare students for the in-school component of Apprenticeship training and for such postsecondary programs as Technology where Document Use appears to play a similarly important role as Reading Text.

6. Use examples of Reading Text, Document Use and Numeracy tasks provided by faculty to develop relevant assessment activities.

7. Consider instructional and curriculum suggestions from postsecondary and Apprenticeship faculty for Academic Upgrading, e.g. translate difficult text into plain language, use texts that are more visual and have students do different activities related to reading.

8. Utilize learning technologies where feasible.

9. Encourage Academic Upgrading faculty to use the *"Essential Skills for Success"* questionnaire to carry out interviews with postsecondary and Apprentice faculty in their own colleges to understand more clearly the role of Essential Skills in successful transitions.

10. Promote linkages between Academic Upgrading programs and postsecondary and Apprenticeship programs to facilitate smooth transitions for students.

APPENDIX A – Employment Ontario

The Ministry of Training, Colleges and Universities (TCU) is committed to developing a strong workforce in Ontario to ensure a competitive advantage in the knowledge economy. It will accomplish this through Employment Ontario, its new integrated "gateway" to training and employment services in Ontario. Employment Ontario will bring together approximately 470 service providers in nearly 900 locations funded by the Ontario government to provide effective and relevant skills training and other employment and career planning services.

Launched in November 2006, Employment Ontario was made possible by the signing of two important labour market agreements between the Ontario government and the federal government in November 2005. They are the Canada-Ontario Labour Market Development Agreement (LMDA), and the Canada-Ontario Labour Market Partnership Agreement (LMPA). These agreements have resulted in more resources for skills training for the people of Ontario. The LMDA has included the transfer of federal government projects, programs and staff to the provincial government. The LMPA will strengthen efforts to maintain a skilled workforce and target the rapid re-employment of unemployed Canadians and new Canadians who want to continue their careers in Ontario.

By 2009-10, both agreements will result in an investment of nearly $900 million per year in skills training in Ontario including apprenticeship, literacy and basic skills, bridge training for new Canadians, and initiatives to involve more Aboriginal people and people with disabilities in skills development programs.

Specifically, Employment Ontario will:

- provide comprehensive employment and skills-related services to improve labour market outcomes for people in Ontario
- provide fair and convenient access to customer services in communities across Ontario including access by telephone and Internet
- provide no wrong door – all individuals are provided with information on the full array of services and receive supported access to services they need to achieve labour market goals
- provide flexible and innovative approaches to labour market and community needs through a broad range of services, including labour market information, job matching and employment counselling
- provide specialized assistance for individuals such as Aboriginal peoples, new immigrants, long term unemployed, and older workers with particular barriers to training, employment and re-employment
- expand services to employers to help them find the people and skills they need and to encourage them to increase invest in skills development
- use a single, effective system for managing performance of the third party agencies delivering training and employment programs across Ontario

Employment Ontario includes the following programs:

Training and skills development

- Apprenticeship Training
- Co-op Diploma
- Ontario Youth Apprenticeship Program'
- Apprenticeship Scholarships
- Pre-Apprenticeship Training
- Literacy and Basic Skills
- Loans for Tools

Labour market attachment

- Job Connect
- Summer Job Service
- Apprenticeship Training Tax Credit

Meeting community needs

- Adjustment Advisory Program
- Local Training Boards
- Labour Market Planning
- LM information (Ontario)

Part II employment benefits *(EI Part I clients only)*

- Skills Development
- Targeted Wage Subsidies
- Self-Employment Benefit
- Job Creation Partnerships

Part II support measures

- Employment Assistance Services
- Labour Market Partnerships
- Research and Innovation

Other

- Labour Market Planning
- Labour Exchange - Job Bank
- LM information (Canada)

Clearly the new role of LBS/AU within the broader education and training system provides many exciting opportunities for developing and expanding literacy and Academic Upgrading provision in Ontario.

Provincial Educational Initiatives

A number of recent and current provincial educational initiatives related to Employment Ontario have particular implications for LBS/AU:

Student Success Strategy/Learning to Eighteen: This provincial government strategy targets youth (those under 18) to stay in school and has resulted in a number of joint school/college initiatives particularly aimed at those bound for an Apprenticeship as well as youth-at-risk. Some of these initiatives include expansion of co-operative education programs, recognizing dual credits between high schools and postsecondary destinations, and creating a Specialist High-Skills major within the high school diploma.

Pathway to Prosperity: Ontario's twenty-four colleges through Colleges Ontario (formerly the Association of Colleges of Applied Arts and Technology of Ontario) took the lead on a province-wide consultation on the workforce challenges of the 21st century. The consultations included students, employers, businesses, industries, labour groups, educators, political and community leaders. The consultations confirmed concerns about an impending skills shortage in Canada and the lack of a national plan to address it.

Two priorities that have implications for LBS/AU are:

1. Relevant skills – both a higher level of skills (hard and soft skills) and a greater number of people with skills are needed.
2. A flexible system – a more versatile postsecondary education and training system that can accommodate diverse needs of learners and employers is needed.

ROYL Report: In the fall of 2006, Colleges Ontario presented a report to the Committee of Presidents on the future of enrollment in postsecondary. It was identified that enrollment of direct entry students to colleges had stabilized, but that participation of mature students would continue to grow. This focused interest on the recruitment of adults as well as on the programs that prepare them for success in postsecondary.

Reaching Higher: This provincial government initiative encourages the movement of those traditionally under represented into postsecondary education. Specific target groups are:

- First Generation Learners
- Aboriginals
- Disabled
- Francophones

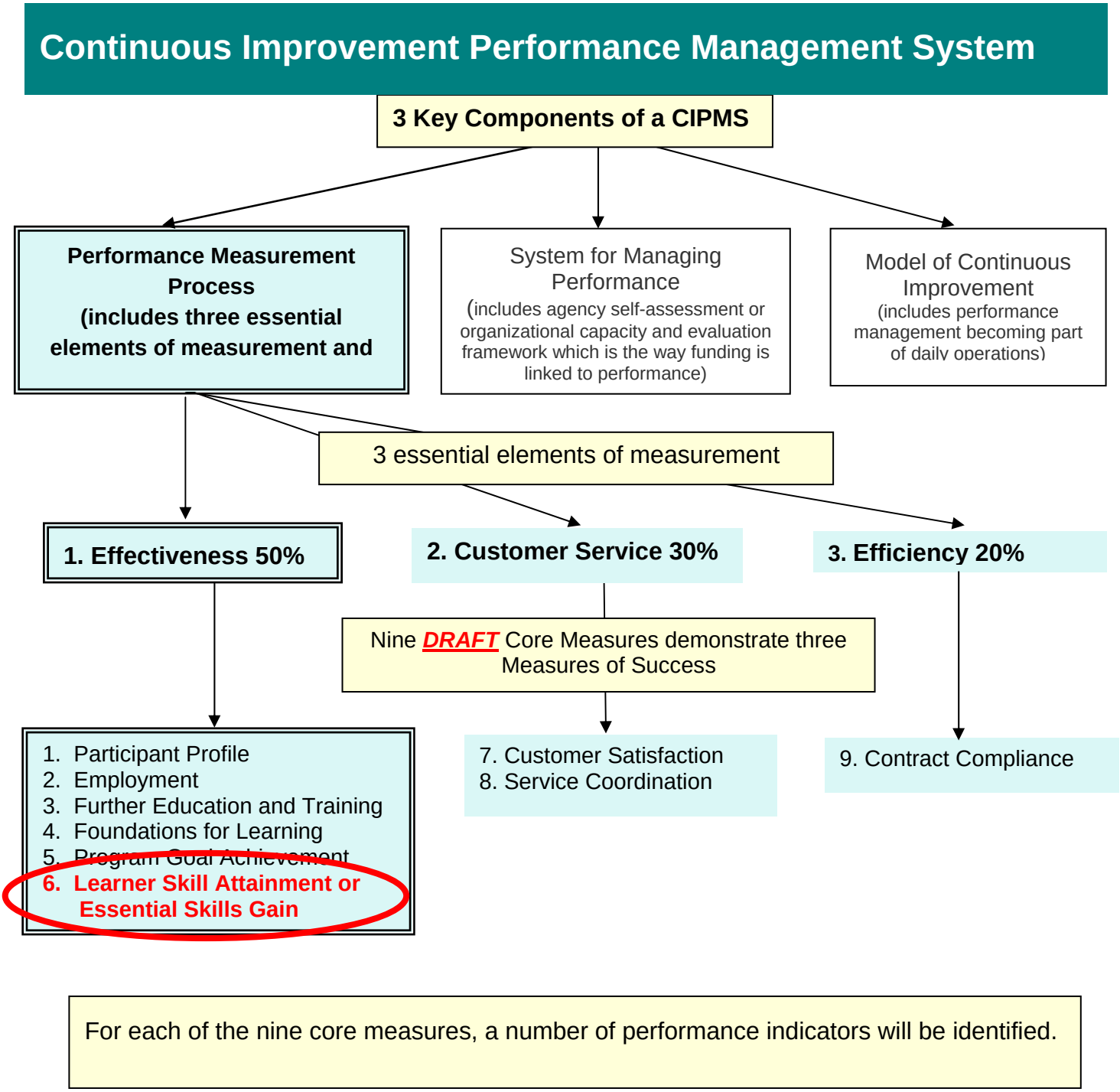
APPENDIX B – CIPMS

The Ontario government is accountable to its stakeholders through Continuous Improvement Performance Management System. CIPMS is a priority area for the LBS Program in 2006-07. For LBS/AU, accountability includes the identification of measures for LBS agencies, especially as they relate to their core service. One of the core measures is learner skill attainment. See **Figure A** on the following page which shows where learner skill attainment is situated in the overall CIPMS structure. The indicator for learner skill attainment is the percentage gain using the Essential Skills scales in Reading Text, Document Use and Numeracy.

The current five level LBS system does not capture skill attainment in a way that is consistent, meaningful and transparent to learners, practitioners and agencies. The language in the LBS Learning Outcomes document (matrix) is based on the Ontario school curriculum and therefore does not directly relate to adults, their learning needs or goals. The success and transition markers are too numerous and don't represent significant points of learning for learners. The field currently uses a variety of informal assessment tools to measure learners' progress. Agencies have created simple skills checklists, standardized tests and performance based assessments that they found were more appropriate for adults, goal setting and training plan development. The transition and success markers were synthesized as level descriptions to provide a more holistic alternative for teaching and assessing. This was especially helpful for instruction at the higher levels, but meant that instructors had to become familiar with another language.

The Ministry therefore requires a more effective, transparent approach to assessment that would result in accurate measures of skill attainment for the purposes of accountability.

FIGURE A



For each of the nine core measures, a number of performance indicators will be identified.

Jane Barber
L.E.T.S.
(revised from original)

APPENDIX C – Literature Review

Essential Employability Skills

In November 2003, the Association of Community Colleges of Canada (ACCC) reported on its Essential Employability Skills Project – Phase I at a National Symposium in Charlottetown. The proceedings included discussion of the place of Essential Skills in colleges' post secondary and adult learning curriculum, the relevance of the Test of Workplace Essential Skills (TOWES), and an announcement of an Essential Skills and Workplace Literacy Initiative to fund 15 projects to strengthen the adult learning system in Canada (http://www.hrsdc.gc.ca/en/cs/comm/news/2003/031117.shtml).

The ACCC adopted the following definition of essential employability skills: The *generic set of skills, attitudes, and behaviors that are necessary in any career area and which are essential to any person aiming to be successful in obtaining and progressing in his or her job. The essential employability skills are the foundation skills to a fulfilling personal and work life. These include literacy, numeracy, and document use, inter-personal and intrapersonal skills.*

The ACCC initiative is significant because it set in motion a national momentum towards more closely aligning college curriculum with Essential Skills. Following the 2003 conference, for example, when Ontario introduced a new TCU Framework for Programs of Instruction (http://www.sheridanc.on.ca/vpa/frameworkforprogramsapr2005.pdf), colleges rewrote the original CSAC Generic Skills program outcomes using the ACCC essential employability skills definition and the HRSDC Essential Skills profile.

Learner Skill Attainment Framework Initiative

The current College Sector Committee (CSC) project, the Learner Skill Attainment Framework Initiative, explores the role of Essential Skills in students' transitioning from college academic upgrading to postsecondary and Apprenticeship programming. Academic Upgrading programs are reviewing their curriculum to align it more closely with Essential Skills, thus helping students develop the strategies and skills to prepare for the variety, volume, and complexity of text and numerical calculations they encounter in postsecondary and Apprenticeship programming.

Earlier CSC studies identified (1) strategies to improve participation rates of underrepresented learners in further education and training (College Sector Committee for Adult Upgrading, 2006) and (2) literacy outcomes to ensure that OBS/AU and LBS learners would have the skills to transition to college (Goforth Consulting, 2005). This current CSC project uses an Essential Skills context to examine the adult learners' upgrading-to-college transition.

In 2004, the U.S. National Research Center for Career and Technical Education (NRCCTE) completed a similar, but more comprehensive study linking essential skill standards with curriculum development. It provides a very good overview of how and why skill standards are important to future workforce development, and how and why colleges have a role in developing them. Unlike the HRSDC Essential Skills definition that focuses on the complexity of the task, the NRCCTE definition of skill standards is more oriented to what workers need to do**:**

> Skill standards identify what people need to know and be able to do to successfully perform work-related functions within an industry sector. Specifically, standards define the work to be performed, how well the work must be done, and the level of knowledge and skill required…skill standards consist of two components: (1) a description of the responsibilities needed for competent performance, and (2) a description of knowledge and skills necessary to carry out these responsibilities.
>
> (NRCCTE, 2004, p. 1)

The NRCCTE study was grounded in two premises: (1) standards provide evidence of accountability and promote program quality and (2) standards are increasingly being used in postsecondary program curriculum. It used a descriptive survey design to sample community college career and technical deans about their awareness and implementation of industry-based skill standards. Data were collected across 10 Career and Technical Education (CTE) program areas including agriculture; construction/trade; automotive, commercial mechanic, and commercial driver's license; family and consumer sciences; graphic arts; health occupations; hospitality and hotel management; manufacturing; industrial; and business, administrative, and information technology. Its methodology provides a good research framework should the Ontario colleges pursue further research into curriculum-based Essential Skills.

Key findings that inform the CSC Essential Skills project include:

- Three quarters (75.7%) of the reporting institutions use skill standards within postsecondary CTE curricula;
- The program areas in which respondents reported the highest level of awareness of national industry-based skill standards included manufacturing, construction, automotive, and health occupations;
- The program areas in which the highest numbers of community colleges were implementing skill standards included construction (77%), automotive/mechanical (95%), and health occupations (99%);
- The majority of the community colleges are implementing standards for the purpose of developing curriculum;

- For those community colleges that assess students' achievement of skill standards, the split is fairly equal between the use of traditional knowledge-based assessments, such as paper-and-pencil or computer-based tools, and performance-based/authentic assessments

(NRCCTE, 2004, p. v)

The HRSDC occupational profiles describe skills found in common across all occupations. Other databases are available, but they often lack a level of descriptor detail well-enough linked to assessment measures to make them useful for educational and training purposes. Examples include the American-based O*Net database (http://www.onetcenter.org/) that contains information on hundreds of standardized and occupation-specific descriptors, and the Conference Board of Canada's Employability Skills 2000+ profile (http://www.conferenceboard.ca/education/learning-tools/employability-skills.htm).

Essential Skills in the New Economy

Cotton (1993) provides an early American perspective outlining the case for essential skills in the new economy. Her findings focus on the school-to-college-to work transition and its poor record of preparing people for work. She notes Bhaerman and Spill's (1988) caution to "remember that employment and employability are not the same thing. Being employed means having a job. For a youth or adult who is not adequately prepared, having a job is likely to be a temporary condition. Being employable means possessing qualities needed to maintain employment and progress in the workplace" (section: Research Findings I: Employers and the Workplace, 6th finding). Her study presents a summary of the employability skills cited most frequently in the research (to 1993), but she is careful to qualify how the table should be read:

> While a number of employers identified the "3 R's" and various higher-cognitive abilities as critical employability skills, virtually *all* of them named affective characteristics-particularly 'dependability,' 'responsibility' and 'positive attitude toward work' as vital. It should also be noted that, within each of the three categories, the skills and traits are arranged in descending order according to the frequency with which each was cited in the research. Finally, when respondents cited mathematics and/or oral and written communication skills as key employability skills, they often used qualifiers, e.g., *simple* arithmetic, *basic* reading, *brief* memo writing-and frequently noted that applicants need not be highly educated, but possess a solid foundation of these skills.
>
> (section: Research Findings I: Employers and the Workplace, 1st finding)

Summary of Employability Skills

How employability skills are taught takes priority over any debate about the merits of workplace- or classroom-based learning, or whether the skills should be taught at all. Citing Bhaerman and Spill and Stasz, et al., Cotton (1993) notes that “recent employability skills research is no longer even concerned with comparing the effectiveness of school-based instruction and learning with that of workplace-based learning, since previous research has shown that both can be effective or ineffective, depending upon how they are structured and managed” (section: Research Findings II: Effective Practices, para. 2).

Overtoom (2003-2004) discusses the Secretary's Commission on Achieving Necessary Skills (SCANS) 1991 report established by the U.S. Department of Labor to “define the necessary functional and enabling skills that society must provide to every child by the age of 16” (para. 7). Its “findings highlight 36 skills, including the ability to use 5 competencies efficiently (resources, interpersonal skills, information, systems, and technology) based on a 3-part foundation of basic skills, thinking skills, and personal qualities” (para. 8). The SCANS report suggests the competencies are required at all levels of career and education and go beyond the ‘soft skills’ (para. 11). It also points out that the term "employability skills" may misrepresent the competencies, suggesting instead that a term such as "career success skills" would be more apt (para 11).

Transition-to-College Research in the U.S.

Overtoom (2001-2002) notes that good learning practice is supported by cognitive science research showing that workplace employability skills are best taught as part of the school curriculum. Sticht (2007) describes this as Functional Context Education…”basic literacy, numeracy, and English language skills education is integrated into, or embedded in, or contextualized within, vocational education or job skills training…the integrated approach makes it possible to both raise basic skills and learn vocational knowledge and skills at the same time (p. 1).

The League for Innovation in the Community College’s (League) is exploring the school-to-college transition. The College and Career Transitions Initiative (CTI) is designed to “identify, develop, and refine practices that help students move effectively from high school to college and to careers by better aligning and improving the quality of secondary and postsecondary programs in high-demand career areas” (http://www.league.org/league/projects/ccti/index.html). The League is collaborating with the U.S. Office of Vocational and Adult Education (OVAE), but the initiative does not specifically look at adult learners’ transition to college.

Nevertheless, adults’ transition to college is receiving a lot of attention (Alamprese, 2005; Council for Advancement of Adult Education, 2005; Gittleman, 2005; Zaft, Kallenbach & Spohn, 2006). The U.S. workforce is experiencing a skill decline. Fewer young people are

moving into or graduating from high school; at the same time, minority groups and immigrants who represent the fastest growing and least educated sector of the population are not filling the skills gap. Developing a well-prepared workforce will involve training more adult learners across all sectors of the population. Because American colleges have a long history with Adult Basic Education (ABE) programs, "it is time for community colleges to make service to underprepared adults a much higher priority" (Council for Advancement of Adult Education, 2005, p. iii).

American colleges admit mature students on the basis of a high school diploma (Academic Secondary Education – ASE) or its equivalent (General Educational Development - GED), yet these standards fail to prepare non-traditional students academically or socially for the transition to college (Alamprese, 2005; Council for Advancement of Adult Education, 2005; Gittleman, 2005: Zaft et al., 2006). Lack of academic preparation is the biggest difficulty: "Most ASE [and GED] programs do not teach students strategies for reading dense college textbooks or how to research and write a term paper. The level of math covered in many ASE programs ends at pre-algebra while colleges require mastery of algebra for placement into college-level math courses. From our experience, adults who enter college without these skills, are at the highest risk of dropping out in their first year" (Zaft et al., 2005, p. 33).

The National College Transition Network (NCTN) study (Zaft et al., 2006) describes models of adult learners' transition to college. Of particular interest is the college preparatory model. It addresses the academic gap between the GED preparation and college-level work, attempts to mirror the college learning environment and expectations, builds learning communities, and provides counselling (p. 28).

The New England ABE-to-College Transition Project Project (Gittleman, 2005) is an example of the NCTN models. It seeks to "bridge the gap [through direct instruction and counseling that addresses the social barriers] between the level of academic work required to receive a certificate of General Educational Development (GED) or an External Diploma Program (EDP), and the skills required for college-level academic work" (p. 7). The Project worked with 40 post secondary institutions. The 'typical' non-traditional learner was a 32 year old, white female. Most learners worked. Participation in the Transition Project improved learners' academic and social readiness for college (p. 22).

The Council for Advancement of Adult Literacy (CAAL) (2005) asserts that colleges are the natural partners for ABE. It notes that too many "academically unqualified high school graduates and college applicants commonly have deficient skills in reading, writing, and math" (p. 14). Curriculum articulation between postsecondary and ABE programs that might address the gap is not well established. Bridging programs that go beyond GED preparation must "provide students who aspire to postsecondary education with the skills they need to succeed in credit programs" (CAAL p. 45). Finally, most American colleges have post secondary developmental programs that do serve the underprepared adult learner. The CAAL report simply raises the question of how American colleges organize their formidable

learning resources to best serve adult learners in transition. The same question may be directed to Ontario's colleges where learning centres, preparatory programs, or general arts and science programs often provide academic support to adult learners.

Essential Skills in Canada

Predicting just what skills will be needed for Canada's future workforce will be very difficult because specific vocational skills taught now may not be the skills needed later in life. Like the U.S., Canada is experiencing similar demographic shifts and skill shortages. The population is aging and becoming more diverse, and fewer young people are participating in higher education. Building capacity for a skilled workforce is a problem.

There is a strong perception that relevant job skills are changing:

- 50% of the Canadian labour force believe their job skills will be obsolete in 5-10 years
- 59% believe their current education and skills limit their ability to get another job
- 88% of the labour force see upgrading knowledge and skills as key to economic security

(1995 Ekos research study cited in Western Canada Workplace Essential Skills Training Network, (WWestnet), 2003, p. 7)

With strong Essential Skills, workers have:

- increased "promotability" and transferability
- increased ability to use technology
- greater ability to work more independently
- better health and safety records
- better morale and higher job satisfaction
- better teamwork, problem-solving, and communication
- greater sensitivity around diversity
- increased productivity and reduced error rates
- better quality of work and greater work effort
- reduced absenteeism and stronger labour relations

(WWestnet, 2003, p. 11)

Essential Skills go to the core dimensions of what it means to actually do workplace tasks. Literacy, for example, is "much more complex than just being able to read and write at one universally basic level – literacy is the ability to read, write, work with numbers, problem solve, communicate and/or think critically at whatever level is basic to the task a hand" (WWestnet, 2003, p. 3).

The Essential Skills Research Project (HRSDC, 1994) sought to identify how Essential Skills are used in various occupations. It drew on scales adapted from the IALS, Canadian Language Benchmarks (CLB), and other international literacy resources and conducted more

than 3,000 interviews across 180 occupations requiring grade 12 or less and on-the-job training. The research looked specifically at the complexity of specific Essential Skills across various jobs.

The nine HRSDC Essential Skills include three skills that the 1994 International Adult Literacy Survey (IALS) groups under the broader term, literacy, defined as *"using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential"* (HRSDC, p. 198, 2003). Like the IALS, the more recent more International Adult Literacy and Skills Survey (IALSS) "measures literacy and numeracy along a continuum of proficiency that indicates how well adults use information in today's society". The surveys do not measure whether a person is "literate or illiterate" (HRSDC, 2003, p. 12) or whether the person has knowledge of how to do a specific occupational task. They do assess the level of complexity associated with reading text, using documents, and doing numerical calculations across a range of occupations.

The IALSS used the IALS definitions of prose and document literacy but expanded the IALS definition of quantitative literacy (numeracy and problem-solving).

Prose literacy
The knowledge and skills needed to understand and use information from texts including editorials, news stories, brochures and instruction manuals.

Document literacy
The knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables and charts.

Numeracy
The knowledge and skills required to effectively manage the mathematical demands of diverse situations.

Problem solving
Problem solving involves goal-directed thinking and action in situations for which no routine solutions exist. The problem solver has a more or less well defined goal, but it is not immediately obvious how to reach it. The incongruence of goals and admissible operators constitutes a problem. The understanding of the problem situation and its step-by-step transformation based on planning and reasoning, constitute the process of problem solving.

As the HRSDC Essential Skills occupational profiles developed, interest also arose in developing an assessment tool to describe Essential Skills in terms of the IALS classification. Initially, this meant looking at the literacy skills of reading text, document use, and numeracy. Alberta's Bow Valley College and British Columbia's SkillPlan did the original work in 1998 to develop the Test of Workplace Essential Skills (TOWES). By 2001, a TOWES – IALS linking study was completed showing that TOWES was indeed a reliable and valid tool for

measuring essential workplace skills using item characteristics e.g. difficulty, discrimination similar to those used in the IALS (http://www.towes.com/pdfs/scalingtowes_execsum.pdf). Quantifiable measures linking occupational tasks to literacy levels make it possible to articulate academic preparation, i.e. adult upgrading, with college and apprenticeship curriculum.

Bow Valley College is currently the sole owner of TOWES (http://www.towes.com/home.aspx). In Ontario, TOWES is distributed exclusively through a provincial community college consortium agreement.

A strong case can be made for delivering Essential Skills in the college curriculum (WWestnet, 2003). Colleges have an important role developing the Essential Skills that employers say are "necessary to implement change and to operate our businesses effectively into the next century…college and employment preparation programs address Essential Skills and strive to ensure all prospective workers have the foundation they need to succeed in jobs that are constantly changing" (p. 7).

However, teaching basic skills in the context of college training programs aimed at workplace demands are a "bit of a moving target" (WWestnet, 2003, p. 3). Moreover, introducing them into the existing college curriculum may meet with resistance. Typical reactions reflect a lack of understanding/importance about Essential Skills: faculty say they will lose 'real' vocational teaching hours; need resources to make curriculum changes; need training to actually teach Essential Skills; that students should come to college with the skills already assured from prior schooling; that students will see Essential Skills as irrelevant; and that college administrators will not support Essential Skills implementation (p. 38). The discussion sounds eerily familiar to other change initiatives that initially met with resistance in the Ontario colleges (i.e., Outcomes-based education, General Education, Essential employability Skills, e-learning technologies).

Bow Valley College conducted an interesting study that finds a strong relationship between TOWES scores and student performance in five college programs (Accounting and Financial Management, Dental Business Assistant, Medical Office Assistant, Unit Clerk, Health Care Aide, Practical Nurse) (Kline, 2007). The study concludes there is a strong intercorrelation between TOWES subscores; students who score low or high on one scale score low or high on the other scales. An interesting theme emerged showing overall higher Reading Text and Numeracy scores and lower Document Use scores (p. 17; p. 20). The study suggests that pre-college students' three literacy scores should be at least TOWES level 2 (higher is recommended). It also identifies that graduates will function at TOWES level 3 or higher when they enter the profession. Students' TOWES scores vary considerably, but a clear relationship is established showing that TOWES is a strong predictive indicator of academic performance (p.10; p. 18).

Douglas College (2006) used TOWES in a national study to identify workers' skill gaps in the security field (commercial, institutional and special events security guards). Like the Bow Valley findings, Douglas College found the majority of the participants had the requisite Numeracy skills, less than half had the requisite Document Use skills and only the Special Event group demonstrated solid levels of Reading Text skills.

Identifying academic skill gaps only goes so far, and education level is not always an indicator of academic readiness for college. "What is often interpreted as a literacy problem - "he or she can't read" - is, in fact, a document navigation problem" (WWestnet, 2003, p. 42). Document use is a core dimension of almost all occupations, yet it is not taught as a specific skill (p. 12). Nevertheless, to be effective, Essential Skills must be taught and used (p. 37). Readers need to effectively locate and use specific information. Document reading strategies that teach readers to engage information in a 'smart' way include identifying the purpose for entering the document and understanding the way information is structured in it. A very useful outline of how to teach navigation skills is provided in the report, *Destination Integration, Workplace Essential Skills across the Technical Curriculum* (pp. 45-53).

The Applications of Working and Learning (AWAL) guide (HRSDC, n.d.) outlines a very practical professional development process for understanding Essential Skills in the workplace. It takes educators through a learning exercise that includes guided interviews of employers and employees. The collected information is then used to inform curriculum material. The methodology and the documentation (i.e., interview guides) are easily transferable to the college setting; in fact, some of it was used to develop the interview guide for this project.

Essential Skills for Success in Apprenticeship

The seminal report was prepared by SkillPlan (B.C. Construction Industry Skills Improvement Council) as a background and discussion paper for the Canadian Council of Directors of Apprenticeship. The purpose of that research was to highlight the links between Essential Skills and success in Apprenticeship training. The authors point out that, "Crucial to this discussion is defining just what Essential Skills are required for apprentices to do well in training and on the job. The more accurate and detailed the list, the better the chance that appropriate tools can be developed to assess individuals and determine their readiness." The report highlights that Essential Skills such as Reading Text, Document Use, and Numeracy are critical skills for apprentices both in school and at the workplace. Employers in many fields, including skilled trades, are asking increasingly for employees who not only have technical knowledge but who also possess the Essential Skills necessary to cope with an increasingly complex workplace. The report also discusses entry standards for Apprenticeship training, as well as supporting apprentices during their in-school training and in completing their qualifying Journeyperson examination.

Two key findings emerge from this report: it is difficult to equate traditional academic grade level completion to adequate preparation for success in Apprenticeship training; and, the average apprentice in Canada completed formal schooling ten years prior to entering Apprenticeship, which further decreases the link between academic achievement and readiness for Apprenticeship. Fownes and Evetts state that, "Coupled with this reality is the limitation of the academic system to reflect the applications of Essential Skills needed for trades."

In summary, the report suggests that it may be most effective to begin by remediating and supporting apprentices in the system who are currently struggling. A second recommendation is to create and provide leadership in the area of Essential Skills and Apprenticeship so that consistent resources and support are available for apprentices in Canada.

Literacy, Numeracy and Key Skills in Apprenticeship

This comprehensive report evaluates a recent project undertaken in the United Kingdom which "...explored different models of delivering literacy, numeracy and other key skills within apprenticeships". The need for such a project resulted from concern about the success of apprentices in their in-school training coupled with the observation that many training organizations were not integrating literacy, numeracy and other key skills but tended to teach those skills late in their Apprenticeship programs. The research project investigated eight Apprenticeship delivery sites which represented a variety of trades and regions in the U.K. As stated by the authors, "This evaluation report describes and analyzes the key findings, looking at pedagogy, and its effect on retention and engagement, assessment approaches, the background and training of teachers, and last but not least the responses from learners. The report paints a picture of the issues involved in achieving a practical whole organisation commitment to literacy, numeracy, and other key skills being delivered as a significant and integral part of Modern Apprenticeship programmes."

There are eleven key findings in the report, many of which are relevant to the Learner Skill Attainment initiative. Two findings are particularly relevant. The first is the premise that learners improve their literacy, numeracy and key skills most effectively when "...the whole organization believes key skills are an essential underpinning for learning vocational skills and technical knowledge." A second key finding is that learners who had secondary school background ("GCSE's") "benefited from the literacy and numeracy support in completing their apprenticeships". Findings, related to learner engagement and the role of the teacher, were also relevant to both the delivery of Academic Upgrading and in-school Apprenticeship training.

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APPENDIX E – Essential Skills for Success in Postsecondary

Summary of Data Collected

Part 1: General Information

During March 2007, a total of 11 interviews were conducted with postsecondary faculty at six colleges representing all regions of the province. The introductory page of the survey contained background information related to Essential Skills both nationally and provincially. It also provided a context for this questionnaire as it pertains to postsecondary education in Ontario.

General information in the categories listed below was gathered from each interviewee:

- College name, region, and size
- Interviewee's role/title and length of time in that role
- Postsecondary program in which the interviewee teaches*
- First semester program curriculum
- Academic admission requirements for that postsecondary program*
- Profile of typical students in that program*
- First semester enrolment
- % male/female
- % directly (or within two years) from high school/ % older than 25 years*
- Skills developed through the program that prepare them for future employment*
- Reasons why students are unsuccessful in their first semester*

*The findings from these categories are summarized on the following pages.

POSTSECONDARY PROGRAMS SURVEYED

Health Sciences

- Biotechnology
- Personal Support Worker Program
- Human Services Worker; and Child and Youth Worker
- Practical Nurse
- Human Services Foundation (certificate)

Business

- Human Resources Management
- Business – Accounting
- Business – Administration

Technology

- Electrical Apprenticeship Co-op Diploma Program
- Construction Engineering Technology
- Environmental Protection and Compliance

FIRST SEMESTER PROGRAM CURRICULUM

A wide variety of reportable subjects exist within postsecondary programs. The lists below may not be entirely complete but are a representative selection of subject areas.

Health Sciences

Biotechnology: Math, Biology, Chemistry, Communications, Computers and Analytical techniques

Personal Support Worker Program: Basic Writing Skills, Human Body Structure and Function, Professional Issues for the Personal Support Worker, Human Relations, Introduction to Supportive Care, Supportive Care Procedures (Lab), and Supportive Care Practicum

Human Services Worker; and Child and Youth Worker: Interpersonal Communication, Interviewing and Skills 1, Introduction to Psychology. Issues and Ethics, Record Keeping and Report Writing, Research and Design, Pharmacology and Behaviour, Field Placement Preparation, Introduction to Child and Youth Worker, and Employability Skills for Child Youth Worker

Practical Nurse: PHYS 1000 Human Anatomy & Physiology1, NURS 1501 Interpersonal Relationships, PSYC 12 Developmental Psychology, NURS 1500 Nursing Science 1 and NURS 1505 Nursing Practice 1

Human Services Foundation (certificate): Basic Writing, Psychology 1, Effective Helping 1, Social Issues and Community Services, and Orientation to a Helping Career and Field Work 1

Business

Human Resources Management: Introductory Accounting, Communication Strategies, Human Resources 1, Introduction to International Business, Marketing Essentials and General Education

Business – Accounting: Principles of Accounting, Communications, Marketing, Business Skills, Business Math and Introduction to Business and Microsoft Office

Business – Administration: Financial Accounting, Introduction to Business, Communications, Student Success and Math of Finance

Technology

Electrical Apprenticeship Co-op Diploma Program: This program combines the Apprenticeship in-school curriculum with the Electrical Technician curriculum

Construction Engineering Technology: Quantity Surveying, Architectural Drafting and AudoCad: Architectural Applications, Computer Applications, Mathematics 1 for Construction, College English and The Effective Learner

Environmental Protection and Compliance: Curriculum similar to high school science (Grade 12 college and university stream in Chemistry, Biology and Math, Foundational skills but little application, Ecology Lab, Introduction to the Environmental Industry and Communications

ACADEMIC ADMISSION REQUIREMENTS

Note: The admission requirements for the programs listed below may vary from college to college and are subject to change.

Health Sciences

Biotechnology:
- 12 MAP4C Math
- 12C English
- 11 C Biology recommended
- 12 C Chemistry recommended

Personal Support Worker Program:
- Grade 12 compulsory English, college or university or equivalent OR Conestoga College Preparatory Communications (COMM 1270)
- strong desire to work with older adults and /or clients with disabilities and/or long term health problems.
- good oral and written communication skills
- able to receive instruction and respond and research in the English language

Human Services Worker; and Child and Youth Worker:
- OSSD, GED, ACE or Mature Student Status plus Senior level (Grade 11 or higher subject credits: General, Advanced, OAC, College Preparation, University/College Preparation, University Preparation or postsecondary [college or university])
- Grade 12 English
- three additional senior level credits

Practical Nurse:
- Grade 12 English at the College or University level
- Grade 12 math at the College or University level
- Grade 11 or 12 Biology at the College or University level
- Grade 11 or 12 Chemistry at the College or University level

Human Services Foundation (certificate):
- 70% high school English or other College preparatory level programs

Business

Human Resources Management:
- OSSD or equivalent with courses from the college, University, University/College or Open preparations levels
- successful completion of Mature Student Test or appropriate credits from ACE
- courses required: Grade 12 College or University preparation English, Grade 12 college preparation mathematics

Business – Accounting:
- OSSD with Grade 12 math and English

Business – Administration:
- OSSD with Grade 12 math and English

Technology

Electrical Apprenticeship Co-op Diploma Program:
- Grade 12 diploma (admission is competitive and needs 80-90% grades, but that doesn't necessarily translate into success)

Construction Engineering Technology:
- the usual secondary school courses

Environmental Protection and Compliance:
- OSSD with Grade 12 math, English and two sciences (one science can be the Grade 12 Environmental Resources course)
- (admission requirements are under review)

PROFILE OF THE TYPICAL INDIVIDUAL ATTRACTED TO PROGRAM

Health Sciences

Biotechnology:
- *students who like science*
- *the first year class is very diverse, with 12C and 12U level students.*
- *enrolment is 36*
- *60% are female*
- *75% are directly from high school*
- *25% are older than 25*

Personal Support Worker Program:
- *part time program: usually working – looking for a career change, older (attendance can sometimes be a problem)*
- *full time program: younger, want to work with seniors (their expectations of the program often don't reflect the reality)*
- *the program is often used to ladder into other Health programs*
- *enrolment is 35*
- *99% are female*
- *full time mostly direct from high school*

Human Services Worker; and Child and Youth Worker:
- *prior to entering the HSC Program, 74% of the students have completed high school, 11% have some previous college, 11% have completed a College Diploma, and 5% have a university degree*
- *the program is predominantly female*
- *most students work a minimum of 24 hours a week as well as attend school full time*
- *10% of the students are single parents*
- *enrolment is 110*
- *92% are female*
- *55% are directly from high school*
- *14% are older than 25*

Practical Nurse:

- *communication skills (verbal and written)*
- *critical thinking is a very strong element, as is ethical reasoning*
- *numeracy has a strong role in the curriculum*
- *Enrolment is 70*
- *90% are female*
- *33% are directly from high school*
- *33% are older than 25*

Human Services Foundation (certificate):

- *students who did NOT get into community services diploma programs (Social Services, Recreation & Leisure, Pre-Service Firefighting, Police/Law & Security, etc.), injured Workers sponsored by WSIB – graduates from College Preparatory programs*
- *young high school graduates who need career advice*
- *students with an interest in personal development*
- *enrolment is 40 to 75*
- *90% are female*
- *75% are directly from high school*
- *10 to 30% are older than 25*

Business

Human Resources Management:

- *very attractive to mature students who have working experience*
- *may have been in unions*
- *others are facing career change (i.e. injuries and WSIB).*
- *HR is becoming female dominated*
- *high school students have no idea about the HR dimensions of work (benefits, payroll, etc.)*
- *they simply do not choose the vocation because they have no experience with what it does*
- *enrolment is 55*
- *60% are female*
- *25% are directly from high school*
- *50% are older than 25*

Business – Accounting:

- *students who have already taken accounting in high school; usually have strong math skills or students have relatives who are chartered accountants and so they think it's a good career but may not have had exposure to the field*
- *students are often recruited directly from high schools when the college does presentations for recruiting*
- *enrolment is 50*
- *50% are female*
- *90% are directly from high school*
- *10% are older than 25*

Business – Administration:

Marketing

- *at ease with other people*
- *like the sales industry*
- *innovative thinkers*
- *not number crunchers*

Administration

- *entrepreneurial*
- *have people skills*
- *enrolment is 75*
- *50% are female*
- *80% are directly from high school*
- *20% are older than 25*

Technology

Electrical Apprenticeship Co-op Diploma Program:

- *both recent grade 12 grads and workers from industry*
- *some have grade 12 equivalency instead*
- *enrolment is 32*
- *9% are female*
- *50% are directly from high school*
- *50% are older than 25*

Construction Engineering Technology:

- *students don't easily accept the importance/relevance of so many English requirements throughout the program (they do appreciate it more as graduates)*
- *students are attracted to the idea of construction*
- *they have a wide variety of previous experience with construction (work, secondary school shop, personal construction projects) but their expectations often conflict with the reality of the program*
- *enrolment is 60*
- *60% are directly from high school*
- *30% are older than 25*

Environmental Protection and Compliance:

- *have affinity for the outdoors*
- *enjoy practical, hands-on work*
- *have curiosity for science environmental systems*
- *like to travel*
- *enrolment is 30*
- *50% are female*
- *90% are directly from high school*
- *10% are older than 25*

SKILLS THAT PREPARE STUDENTS FOR FUTURE EMPLOYMENT

Health Sciences

Biotechnology:
- *laboratory skills*

Personal Support Worker Program:
- *mostly vocational skills*
- *communication (writing, verbal)*
- *observation skills are important (i.e. how to report information, how to interact)*
- *full time – used to offer a student success course that developed transitional skills*

Human Services Worker; and Child and Youth Worker:

A demonstrated ability to:
- *maintain professional helping relationships which adhere to legal and ethical standards*
- *assess the needs and resources of individuals, families, groups, and communities and to assist them to achieve their goals and meet their needs*
- *collaborate with diverse populations using culturally appropriate methods*
- *collaborate with communities and community leaders to advocate for systematic change*
- *analyze current social policy, relevant legislation; and political, cultural and/or economic systems in order to develop and implement effective plans of action*
- *provide appropriate access to resources in order to assist individuals, families, groups, and the community*
- *maintain effective working relationships with colleagues, peers and supervisors*
- *implements ongoing personal and professional development strategies and plans to improve job performance, work relationships and stress management*
- *apply knowledge of developmental influences when counselling the client and/or family*
- *implement the Life Skills methodology*
- *create a group and facilitate group process*
- *utilize intentional counselling techniques to facilitate the interview and counselling process in a variety of settings*
- *apply knowledge of family dynamics*
- *demonstrate the principles of crisis intervention in the workplace*
- *apply the understanding of pharmacotherapy*
- *foster and utilize therapeutic environments of a residential and non residential nature which respect culture and which promote well-being and facilitate positive change for children, youths and their families*
- *employ effective intervention strategies in the areas of therapeutic programming, individual counselling, and the group work which comply with the treatment aims for the client*
- *communicates effectively in oral, written, non verbal and electronic forms to enhance the quality of service*

Practical Nurse:
- *communication skills (verbal and written)*
- *critical thinking is a very strong element, as is ethical reasoning*
- *numeracy has a strong role in the curriculum*

Human Services Foundation (certificate):

The program is not intended to help students gain skills for employment. Rather, it is directed at preparing them for future study.

However, students do acquire skills in:
- *academic writing*
- *professional writing*
- *team building and maintenance skills*

- *conflict management*
- *analytical skills*
- *skills in empathy, interviewing, counselling and crisis intervention*
- *self awareness and personal development*

Business

Human Resources Management (based on HR program renewal):
- *well developed interpersonal skills*
- *teamwork*
- *working with other people*
- *strong reinforcement of the messages "you don't have to like the people with whom you work, but you have to work with them"*
- *speaking and presentation skills (from simple 5 minutes presentations to full training sessions)*
- *read and research and apply practices and legislation, e.g. a graduate was asked by a municipality to establish a new cemetery which meant integrating all the learned skills into researching issues, developing a plan and implementing it*

Business – Accounting:
- *logical approach to problem solving*
- *analytical skills*
- *computer skills*
- *teamwork*
- *interpersonal skills*

Business – Administration:
- *time management*
- *lifelong learning*
- *stress management*
- *critical thinking*
- *customer service*
- *research and report writing*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- *team work skills*
- *strong work ethic is very important, i.e. "You wouldn't buy a car if it wouldn't start on a Monday."*

Construction Engineering Technology:
- *they're learning the importance of developing these essential skills*
- *they develop strong technical communications*
- *they develop estimating*
- *math*
- *AutoCad*
- *time management*
- *this is a long-time laptop program – students develop a strong facility with learning technology*

Environmental Protection and Compliance:
- *maturity*
- *teamwork with multidisciplinary groups*
- *social skills*
- *technical skills that prepare them for employment*

TYPICAL REASONS WHY STUDENTS ARE NOT SUCCESSFUL IN POSTSECONDARY

Health Sciences

Biotechnology:

- *they do not submit their written laboratory reports*
- *they have difficulty completing their weekly lab reports on time*

Personal Support Worker Program:

- *students lack preparation (academic preparation, e.g. writing and critical thinking)*
- *they have difficulty drawing on prior knowledge and applying and integrating it – they don't connect what they know to the program material*
- *mature students can multi-task and cope better but they also have difficulty integrating what they know from experience and prior learning with the curriculum*
- *their expectations coming into the program don't match reality – the issues are workload and time management*

Human Services Worker; and Child and Youth Worker:

- *poor attendance*
- *poor time management skills*
- *poor organizational skills*
- *lack of study skills, i.e. note taking, taking tests*
- *poor reading/ writing skills*
- *lack of understanding about their program of choice*

Practical Nurse:

- *work and maturity are problems; many students stay in residence 1st year which complicates their ability to be disciplined*
- *non mandatory attendance at some classes creates attendance problems*
- *reality of 1st term (work load, time management) is different than expectations*
- *second language issues – students will struggle using a second language and using a very specialized language such as medical vocabulary, abbreviations)*
- *the program requires 67% to advance, yet most students are used to a 60% standard in high school*

Human Services Foundation (certificate):

- *Usually, a lack of interest is the primary reason students fail in the first semester. Additionally, some students do not take the program seriously and this causes some failures. Students are often overwhelmed by the first-time-in-college phenomenon and as they attempt to make new friends, let go of old ones and try to fit in, their attention to schoolwork falters.*
- *Another reason that students are not successful is due to the heavy emphasis on self. Some students are not adequately prepared to delve into their personal issues as the program demands.*
- *Some students fail because they do not receive the support necessary from their families as well as the college.*

Business

Human Resources Management:
- *lack of motivation*
- *unrealistic expectations*
- *not used to a heavy workload*
- *not used to failing*
- *poor reading skills*

Business – Accounting:
- *attendance issues due to distractions, i.e. those right out of high school*
- *they think it's too easy, i.e. brighter students disengage because they see that other students need too much "hand-holding"*
- *they are too busy partying*
- *some are just not suited to the profession or to college in general*

Business – Administration:
- *not necessarily academic reasons (rarely in fact)*
- *non-copers almost always have financial problems that inhibit their success*
- *some are too social – too much partying and get left behind due to lack of attendance and lack of work*
- *mature students often come back to school at the wrong time, i.e. right after a major life change like a divorce, job loss, injury, etc., when they are not in a stable position to handle college*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- *high marks from high school don't always mean they are successful*
- *often students "off the line", i.e. from industry are more successful*
- *some are not academically prepared*
- *mostly lack of success is due to an insufficient work ethic, i.e. can't work an 8-10 hour day; but those from industry can*
- *some mature students haven't succeeded due to heavy debt load and weren't prepared for it*
- *we need a better filter than grade 12 to help determine potential for success*

Construction Engineering Technology:
- *English is **not** the stumbling block.*
- *being unsuccessful usually has to with not handling the 1st term workload (there's a lot of material to go through)*
- *expectations are also an issue, particularly with secondary school students*
- *the reality of program doesn't match the expectations coming in*

Environmental Protection and Compliance:
- *program is too challenging academically for some (particularly chemistry and physics)*
- *program wasn't what they thought it would be; this impacts attendance, participation, effort*

Section A: Knowledge of Essential Skills

For the remainder of the questionnaire, a number of rating scales are used along with anecdotal questions. The instructions for interviewees are shown in each section. Values indicated on the rating scale are averages of the 11 interviewees' responses. Anecdotal comments are also included where applicable.

Essential Skills are the skills needed for work, learning and life. Regardless of a student's program or discipline, they are critical for success in college, the workplace, day-to-day living, and for lifelong learning.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to each of the nine Essential Skills. If the example is not applicable, circle **n/a**.

Reading Text **4.6**

Writing **4.6**
- *this task becomes difficult if they can't use the computer's spell check*

Working with Others **4.6**
- *working with others is one of the success factors – students do a lot of formal/informal collaborative work in first year.*

Thinking Skills **4.6**
- *students are expected to make sense of lecture notes (PP outlines)*

Continuous Learning **4.6**
- *the field is constantly changing*

Document Use **4.5**
- *students do a lot of manual drafting in first and second semester*

Oral Communications **4.3**

Numeracy **4.2**
- *numeracy is not a strong element in the program*
- *this is a vital skill, yet it is problematic as students don't often have a sense of what calculated information means (i.e. no sense that 5000 ml of medicine is like giving a patient a bag of IV drip)*

Computer Use **3.6**
- *A lot of technology is used in health settings to store/retrieve information. Again, there are confidentiality issues.*
- *Levels are quite varied. This is a laptop program. Students need to know common operating systems but faculty teach specific technical knowledge/applications. Adult learners tend to have weak general knowledge but they catch on with extra effort.*

Part 2: Reading Text, Document Use, and Numeracy

Section A: Types of Text

Reading Text refers to reading material that is in the form of sentences or paragraphs. It generally involves reading books, manuals, reports, journals, specifications, regulations, memos, notes or letters. It also includes forms and labels if they contain *at least one paragraph*, print and non-print media (for example, texts on computer screens and microfiche), and paragraph-length text in charts, tables and graphs.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the kinds of text or prose that students are required to read in the first year of your program. If the example is not applicable, circle **n/a**.

1. text books **4.6**
    - *strong expectation that students use a text*
    - *students are exposed to a lot of material in first term; a lot of the program 'groundwork' is established*
    - *open book exams/tests are standard and require a very strategic approach to reading text*
2. lecture notes **4.2**
    - *lectures notes are an important element of the learning environment*
    - *Students are very literal. They need to develop ability to integrate information from lecture material. Faculty present examples but students don't generalize or make inferences from the material. As already noted, students need to take a more nuanced understanding of lecture material.*
    - *need good note taking skills*
    - *This requires a lot of thinking skills as notes are presented in PP outlines. Students need to synthesize information. Outlines present text, charts, and numerical information.*
    - *students don't know how to take notes*
3. reference materials **4.1**
    - *Students are usually directed to information in paragraphs (charts, tables and graphs) and reference materials. It's not as important to know how to read these types of text because they're shown how.*
    - *not as relevant for vocational materials but has a strong focus in first term English (students research a vocationally-related project)*
4. virtual text accessed through learning technologies **4.0**
    - *more important for full time program (i.e. navigating college web pages) – mature students often don't have access to computers so their entry levels skills are weak*
    - *will increase with more use of WebCT which was just implemented this year in this program*
5. shop policies, practices or procedures **3.9**
    - *same as industry standards and ties in with safety*
6. paragraph-length text in charts, tables and graphs **3.8**
    - *found in technical manuals (i.e. building codes/specifications)*

What other types of general reading tasks/activities are carried out by first year students in your program?

Health Sciences

Biotechnology:
- *MSDS files*
- *Merck Index*
- *instruction manuals*

Personal Support Worker Program:
- *for full time students, it's navigating the college/program home pages to find/enter information (i.e. accessing student accounts). Students are not always accustomed to using computers to do this.*

Human Services Worker; and Child and Youth Worker:
- *literature reviews*

Practical Nurse:
- *there's often difficulty with new language and with medical abbreviations*
- *professional and personal journaling, and management of patient charts (finding selected information)*

Human Services Foundation (certificate):
- *reading one another's paper, group work where students read one another's contributions, a lot of WebCT reading of assignments, semester plans – students have to read, understand and submit many forms for the field placement component of the program*

Business

Human Resources Management:
- *nothing to add*

Business – Accounting:
- *following written instructions*

Business – Administration:
- *mostly reading text books and handouts*
- *much reading is related to learning terminology and being able to define the terms required in the field of study and in the workplace*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- *presentations*

Construction Engineering Technology:
- *reading information on technical drawings as a way of understanding systems, components, etc.*

***Environmental Protection and Compliance**:*
- *use newspapers to find articles on environmental issues, i.e. current events*
- *use trades magazine and periodicals relevant to the profession*

Section B: Skills for Reading Text

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the following reading skills required by students in the first year of your program. If the example is not applicable, circle **n/a**.

1. choose and integrate information from various sources or from several parts of a single text **4.5**

2. identify the purpose for reading (e.g. scan for/locate information, skim for meaning, read the whole text to critique or evaluate) **4.4**

3. identify relevant and irrelevant information **4.1**

4. make low-level inferences from various sources **3.6**

5. compare ideas, values and perspectives in texts **3.6**

6. make complex inferences utilizing general background knowledge **3.3**

Many students struggle with the demands of college reading. Why do you think students don't succeed when it comes to reading? From your experience, what kinds of reading tasks often give your students difficulty? What kinds of strategies help students read better?

Health Sciences:

Biotechnology:
- *they won't buy the text books, and if they do, they won't read them*
- *they will do problems*

Personal Support Worker Program:
- *they read for words, not understanding*
- *reading strategies are usually taught by Student Services*
- *getting information and integration – it poses problems*

Human Services Worker; and Child and Youth Worker:
- *poor comprehension skills or reading level is lower than the text they are reading*
- *they have difficulty reading for relevant information or remembering what they've read*
- *strategies: SQ3R (Survey, Question, Read, Recite, Review)*

Practical Nurse:
- *concerns about students who pass TOEFL but still can't function*
- *Students need visual books. It's what they're used to. They have short attention spans (computer users?). Heavy sustained reading demands are difficult. They won't or can't handle text-heavy books. It's an on-going problem. Students have difficulty locating information and therefore faculty assign directed reading and reading strategies (table of contents, index, etc.)*
- *Faculty is developing strategies to overcome this. Counselling provides study skills sessions. Writing Centre helps with reading strategies. Program has recently hired a Student Success Facilitator.*

Human Services Foundation (certificate):

- *Part of the problem has been that students have not been oriented to analytical reading material. As well, they do not appear to have the patience, concentration and dedication required to read lengthy material. High level reading (academic articles) sees to be difficult for my students. All I can do is force them to continue reading and practicing.*

Business

Human Resources Management:

- *They don't read. Lengthy reading tasks are too demanding. Faculty need to teach reading and help translate difficult language into plain English.*
- *A student with very strong writing and grammar skill had no obvious educational background. She reads 3- 5 novels a week. Another student with poor reading skills was encouraged to read "anything" and immediately improved performance.*
- *We understand these skills and use them; what we take for granted is simply not present in the students.*

Business – Accounting:

- *Why? – students don't read well and they don't like to read – I don't know why they bother buying the text*
- *they want me to give them the notes and put that material on the tests*
- *they want to oversimplify text passages*
- *What tasks? – filtering information from texts and documents*
- *reading questions, i.e. if there if one word that they don't understand, they have trouble getting past that, even if the word is not necessarily key to the problem*
- *paraphrasing and extracting "content out of clutter", i.e. weed out extraneous information*
- *Strategies? – try to help them filter unnecessary information, e.g. when studying the Income Tax Act*

Business – Administration:

- *mostly reading text books and handouts*
- *much reading is related to technology and being able to define the terms required in the field of study and the workplace*

Technology

Electrical Apprenticeship Co-op Diploma Program:

- *Why? – they don't to spend the time reading; also a lack of reading comprehension skills*
- *What? – long text readings are difficult*
- *Strategies? – Give them the following guidelines: read the chapter summary first; then read the index; then read the 1st and last sentence of each paragraph; then read the chapter; answer questions at the end of the chapter; then check answers by looking back at the reading*
- *they understand material much better when it's in point-form*

Construction Engineering Technology:

they just lack a general interest in reading anything at all

Environmental Protection and Compliance:

- *Why? – The students don't follow up on lectures/classes with relevant text readings nor do most read before the classes.*
- *What is difficult? – Technical journals are difficult reading because of all the 'jargon' related to the profession.*

Section C: Types of Document Use

Document Use refers to tasks that involve a variety of information displays in which words, numbers, icons and other visual characteristics (e.g. line, colour, shape) are given meaning by their spatial arrangement. It includes lists, tables, graphs, blueprints, schematics, drawings, signs and labels.

Reading problems are often navigation problems. Document navigation involves clearly understanding the document structure and the information being sought. If the purpose for "entering" the document is not understood, the document user will have difficulty locating specific and relevant information.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the skills that your students need to navigate typical program documents. If the example is not applicable, circle **n/a**.

1. locate/enter information in tables, schedules and other table-like text **4.3**
2. read, interpret, and get information from graphs and charts **4.1**
3. obtain information from sketches, pictures, signs, or symbols **3.9**
4. identify the purpose for 'entering' the document **3.8 (one n/a)**
5. use specialized knowledge and reasoning **3.7 (one n/a)**
6. identify the structure/type of document **3.6 (one n/a)**
7. read and complete complex forms **3.6 (one n/a)**
8. interpret and extract information from scale drawings (e.g. blueprints, maps) **3.4 (six n/a)**

Reading text in the form of sentences and paragraphs generally involves reading books, manuals, reports, journals, specifications, regulations, memos, notes or letters. It also includes forms and labels if they contain *at least one paragraph.* Please draw a line through the bar to indicate how much text-based reading your students do in the first year.

◄-- read very little text **read a great deal of text --►**

0% 25% 50% 75% 100%

Average 78.6%

Reading text and locating/information often involves navigating documents such as tables, graphs, maps, etc. Please draw a line through the bar to indicate how often your first year students read or use information contained in documents.

◄-- rarely look for information in documents **frequently look for information in documents --►**

0% 25% 50% 75% 100%

Average 58.1%

AVERAGE BREAKDOWN BY PROGRAM CLUSTER

Reading Text	Document Use
HEALTH SCIENCES	
92%	54%
BUSINESS	
85%	58%
TECHNOLOGY	
50%	65%

What other forms of document use are your students required to do in first year?

Health Sciences

Personal Support Worker Program:
- *institutional forms – students get help with these*
- *testing forms – following instructions, multiple choice navigating the test*
- *this is particularly challenging for international students (testing is a foreign concept, different learning styles, test anxiety may be cultural) and students often have poor comprehension*

Practical Nurse:
- *forms used in health settings. There are a lot of places to locate information in the workplace. A vital reference is the nursing/medication information cardex that holds specific patient care information.*
- *Students need to navigate on-line sources of information (i.e. finding guidelines for standards of practice and standards of care).*
- *Students also have to manage the reading of journals and articles*

Human Services Foundation (certificate):
- *journal articles, field placement manuals, textbooks*

Business

Human Resources Management:
- *accounting information, balance sheets*

Business – Accounting:
- *the TDQ form for income tax*

Business – Administration:
- *accounting specific documents such as purchase journals – not too many in first year that are specific to document use*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- *document use is even more important than reading, e.g. using blueprints, machine specs, Electrical Code book*
- *this is what they need to be able to do every day on the job – all of the skills in the list about # 1 to 8*

Section D: Types of Numerical Calculations

Numeracy refers to the use of numbers and the requirement to think in quantitative terms. It involves using mathematical concepts (e.g. fractions, percent, ratio/proportion, algebraic equations, geometry, statistics, etc.) to turn a problem into a set of operations to obtain an answer. It also involves numerical estimation that results in a number, performing calculations in various ways and using measurement instruments to calculate units of measure.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the numerical skills first year students would need in your program. If the example is not applicable, circle **n/a**.

1. perform calculations involving monetary transactions (e.g. handling cash, making payments) **4.2 (five n/a)**

2. perform calculations using measurements and quantities (e.g. conversions, area, volume, indirect measurements using geometry or trigonometry) **4.1 (two n/a)**

3. estimate a numerical answer when errors have minor consequences **3.7 (four n/a)**
   - particularly, assessing the credibility of instrumental calculations (calculator, software applications)

4. perform calculations involving scheduling or budgeting (e.g. planning, monitoring, assessing value, etc.) **3.5 (three n/a)**
   - very basic calculations
   - they must produce a personal daily schedule for the program to include class time, study them, job, sleep, etc.

5. analyze data using statistical concepts (e.g. mean, median, mode, probability) **3.1 (two n/a)**
   - questions 3 and 4 are essential for this program

Describe the typical mathematical concepts your students are required to use (e.g. fractions, decimal operations, percent, ratio/proportion, solving equations, geometry, trigonometry, statistics, etc.)

<u>Health Sciences</u>

Biotechnology:
- *ratios, percent, algebra, moles, dilutions, unit conversions*

Personal Support Worker Program:
- *arithmetic, units of measure, metric system (but not conversions)*

Human Services Worker; and Child and Youth Worker:
- *basic math skills for balancing budgets and accounts, fractions, percent, volume and area, calculations*

Practical Nurse:
- *fractions, percents, ratio/[proportion, marginal use of statistics*

Human Services Foundation (certificate):
- *as part of a beginner's applied research, the limit of learning for the students is some descriptive statistics frequencies, percentages and averages*

Business

Human Resources Management:
- *fractions, percent, ratio/proportion, some algebra, statistics in 3rd year*

Business – Accounting:
- *operations with whole numbers, decimal numbers, fractions, percents, ratios, statistics, solving equations*

Business – Administration:
- *students need the true numeracy skills – fractions, percents, ratios, as well as algebra (equations). They need to recognize when answers are not reasonable, i.e. don't make sense based on the question or situation.*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- *fractions, decimals, percent, ratio/proportion, algebra equations, using formulas*

Construction Engineering Technology:
- *fractions, ratio/proportion, algebra equations, geometry, trigonometry*

***Environmental Protection and Compliance**:*
- *fractions, percents, ratio, proportion, geometry, trigonometry, statistics, algebra*

How do students perform calculations (e.g. mental calculation, pen & paper, calculator, computer)?

Health Sciences

Biotechnology:
- *calculator*

Personal Support Worker Program:
- *pen & paper, calculator*

Human Services Worker; and Child and Youth Worker:
- *mental calculations, pen & paper, calculator*

Practical Nurse:
- *pen, paper, calculators, computers (not a lot)*
- *programmable calculators are not allowed in first year (not allowed for College of Nursing examination).*
- *math assessments are done at entry*
- *math tutors are available*
- *students have difficulty 'seeing' the results/implications of their calculations*

Human Services Foundation (certificate):
- *pen & paper, calculator, Excel*

Business

Human Resources Management:
- *all of these (e.g. mental calculation, pen & paper, calculator, computer)*

Business – Accounting:
- *calculators and computers (Excel); we try to get them to do mental calculations but they won't*

Business – Administration:
- *on their fingers! using a calculator; they don't like mental math at all, always want to use a calculator; they use Excel a little bit, but don't like it*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- calculator and computer, i.e. use Excel for estimating material take-off

Construction Engineering Technology:
- *pen and paper, calculator, computer*

***Environmental Protection and Compliance**:*
- *calculator and computer*

What types of general math applications/tasks are carried out by students in your program?

Health Sciences

Biotechnology:
- *in chemistry class – moles, dilutions, etc.*

Personal Support Worker Program:
- *taking body weight, measuring fluids*

Human Services Worker; and Child and Youth Worker:
- *basic math skills as they relates to the field of study, e.g. basic math skills to balance a budget, increase and prepare recipes for large numbers, balance accounts*

Practical Nurse:
- *ability to work around a formula for IV, flow rates, intake/output measures*
- *estimating the size of wounds (surface area of burns)*
- *converting 15 sec pulse rates to rate/minute*

Human Services Foundation (certificate):
- *none provided*

Business

Human Resources Management:
- *adding columns, balancing across columns*
- *arithmetic/fractions – very simple use of equations*

Business – Accounting:
- *journal entries (accounting), balancing accounts, totalling, budgeting*
- *finding present value, future value (compound interest calculations)*
- *tax calculations*

Business – Administration:

- *calculating simple and compound interest*
- *calculating the value of annuities and perpetuities*
- *calculating minimum and maximum values, i.e. profit/ loss/break even*
- *read and interpret stats (but not actually generating the stats) and understanding sample sizes and their impact on the stats*
- *introducing accounting principles*

Technology

Electrical Apprenticeship Co-op Diploma Program:

- *Ohm's law (current, voltage, resistance) applied to series and parallel circuits*
- *input/output on DC motors*
- *power loss (watts): need to convert from horsepower to Watts in the calculation and state overall loss as a percentage*
- *speed regulator calculations: rotor speeds, slip speeds*
- *line drop in voltage (expressed as a percent) and find allowable loss for the system*

Construction Engineering Technology:

- *algebra – volumetric calculation – quantity of concrete or soil in a construction site*
- *scale – drawing specifications to scale – students have difficulty conceptualizing the idea of scale*

***Environmental Protection and Compliance**:*

- *many chemistry applications (molarity, stoichiometry, pH, gas laws) physics applications (statistics, dynamics, motion, forces)*

Section E: Other Information

Describe the learning technologies used by students in first year (e.g. computers, in-house learning platforms, media, vocationally specific technology).

Health Sciences

Biotechnology:
- *computers, lab, practical things*

Personal Support Worker Program:
- *emailing requires not only written communication but the ethical/confidential use of e-text*
- *The use of technology to use information will increase over time. Currently there's not a lot of technology used in part time PSW. Full time program students go the computer more often.*
- *recording client/patient information of flow charts*

Human Services Worker; and Child and Youth Worker:
- *computers (MS Office applications) for producing professional reports and presentations*
- *documentation related to the field of study*
- *electronic searches using databases*

Practical Nurse:
- *Students sometimes present with PowerPoint. Students are fairly computer literate. They can use it to access search engines and on-line databases. They use CD-Rom supplements for their texts.*
- *Students do practice manipulation the medical technology in their labs.*
- *Specific software could include process for using the IV pump.*

Human Services Foundation (certificate):
- *Wordprocessing, PowerPoint, WebCT, Internet*

Business

Human *Resources Management*:
- *computers, in house (blackboard), locating web based references*

Business – Accounting:
- *TLM (in-house platform)*
- *Excel for calculations*
- *accounting software: ACCPAC, Simply Accounting*
- *publishers' learning materials or sites that come with the texts*
- *Internet for research*

Business – Administration:
- *TLM (in-house Internet platform used mostly for grammar and math)*
- *Internet*
- *MS Office: Word, Excel, PowerPoint, Access*
- *e-learning resources that come with text books, i.e. CDs or web sites*
- *publishers' learning materials or sites that come with the texts*

Technology

Electrical Apprenticeship Co-op Diploma Program:
- *WebCT*
- *Excel*
- *VISEO drawings program (like AutoCad)*
- *they take an MS Office course and are instructed in using VISEO*

Construction Engineering Technology:
- *program has been an early adopter and supporter of Laptop use and Blackboard*
- *student use of email is expected*
- *AutoCad is a core application*
- *program supports a really strong technical network*

***Environmental Protection and Compliance**:*
- *TLM (in-house platform)*
- *publishers' web sites related to texts*
- *videos/DVDs*

Do you have any questions or comments about Essential Skills?

Health Sciences

Biotechnology:
- *no questions*

Personal Support Worker Program:
- *Why is this project looking at just these three scales? These have well established links to literacy (IALS, IALSS, TOWES) and they are the Essential Skills that cross virtually all occupations*

Human Services Worker; and Child and Youth Worker:
- *no questions*

Practical Nurse:
- *Essential Skills are Essential.*

Human Services Foundation (certificate):
- *We are missing these things in our students. I believe that we need to develop curriculum or modules within courses that highlight these essential skills. Such curricula need to be informative, applicable and fun. After all, teaching is part entertainment for the new group of students. I think that another "Essential Skill" that is not noted in the survey, but that is necessary is something related to more of a developmental process. I do not know what to term it, but students seem to be lacking overall social skills.*

Business

Human *Resources Management:*
- *Interviewee aware of the importance of Essential Skills in the workplace citing examples from practice, believing in scenario-based assessment in which students apply learned skills in real settings. Interviewee also believed in teaching students how to learn as a means to teaching them what to learn.*

Business – Accounting:

- *We need to more specifically address document use skills; we have assumed that students know how to do this so we don't teach them how to use documents, but we should, e.g. (interviewee recounts this simple example of an error that students made on a form)*
  Last Name: Smith First Name: Mary Initial: MS
  i.e. it didn't say "middle initial"…

Business – Administration:

- *The college should use the term Essential Skills instead of Generic Skills*

Technology

Electrical Apprenticeship Co-op Diploma Program:

- *Many people want Apprenticeships, and more want to do it, but employers don't necessarily want the Apprentices with high marks in high school and no experience.*
- *They'd rather hire the farm kids with good work ethics and some practical experience.*
- *The Co-op diploma (like this program) is the way of the future because we are weeding the students out for the employers before they are signed on as Apprentices.*
- *The trades require more theory and training now, so this program gives employers a leg-up since the students (potential apprentices) already have a lot of the Apprenticeship in-school training (and some practical experience vis-à-vis the shop experience) when they start the long Co-op placement.*

Construction Engineering Technology:

- *Essential Skills are the same as college's essential employability skills. Key concern is a real disconnect between Essential Skills as core components of program curriculum and our assessment of them. In other words, we have them in the program(s) but we don't do a good job of assessing how well students are developing them.*

***Environmental Protection and Compliance**:*

- *Essential Skills are important academic skills.*

Are there additional examples of learning materials that you use which require them to apply their skills in one or more of the three Essential Skill areas that we have discussed (Reading Text, Document Use, and Numeracy)?

Health Sciences

Biotechnology:

- *read directions, perform the lab task, record the results, interpret the results and write a final report*

Personal Support Worker Program:

- *learning materials were submitted*

Human Services Worker; and Child and Youth Worker:

- *no response*

Practical Nurse:

- *Cardex form (sent)*

Human Services Foundation (certificate):

- *Reading – Students have a self directed Lifespan Development course that is purely text book driven with no classroom teaching. There is also a research based term paper which requires students to collect and synthesize information that is from legitimate peer reviewed academic sources.*
- *Numeracy – none yet as part of an applied research project, students must formulate a survey, distribute it and collate data. This is NOT a core function of this program*
- *Document Use – Students are doing research and utilizing materials to either put in a paper or to present to a class or the college at large. As well, they are using documents to work through their field placements.*

Business

Human Resources Management:

- *no response*

Business – Accounting:

- *Income Tax Act (usually access it electronically)*
- *accounting software*

Business – Accounting:

- *using text books, class handouts and case studies*

Technology

Electrical Apprenticeship Co-op Diploma Program:

- *no response*

Construction Engineering Technology:

- *no response*

Environmental Protection and Compliance*:*

- maps and map reading
- geological, hydrologic and topographical symbols on maps
- citations and referencing
- labs materials (instructions, charts, graphs) to both carry out the lab and write the lab report

APPENDIX F – Essential Skills for Success in Apprenticeship

Summary of Data Collected

Part 1: General Information

During March 2007, a total of 12 interviews were conducted with Apprenticeship faculty at seven colleges representing all regions of the province. The introductory page of the survey contained background information related to Essential Skills both nationally and provincially. It also provided a context for this questionnaire as it pertains to Apprenticeship training in Ontario.

General information in the categories listed below was gathered from each interviewee:

- College name, region, and size
- Interviewee's role/title and length of time in that role
- Apprenticeship program in which the interviewee teaches*
- Basic Level Curriculum ("Basic" is the term for the first level of any in-school Apprenticeship training. The second and third levels are known as "Intermediate" and "Advanced".)*
- Academic admission requirements for that Apprenticeship program*
- Profile of typical apprentices attracted to that trade*
- Basic level enrolment
- % male/female
- % directly (or within two years) from high school/ % older than 25 years*
- Skills developed through the program outside of the technical skills related to the trade*
- Reasons why apprentices are unsuccessful in their in-school training*

*The findings from these categories are summarized on the following pages.

APPRENTICESHIP PROGRAMS SURVEYED

Construction Sector
- Electrician

Industrial Sector
- Industrial Electrician
- Precision Metal Fabricator

Motive Power Sector
- Automotive Service Technician
- Small Engine Technician
- Truck and Coach Technician

Service Sector
- Early Childhood Educator

LEVEL I (BASIC LEVEL) CURRICULUM

A wide variety of reportable subjects exist within Apprenticeship programs. The lists below may not be entirely complete but are a representative selection.

Construction Sector

Electrician: Electrical Theory, Electrical Code, Prints and Installations, Electronics, Instrumentation, Installation Methods, Wiring

Industrial Sector

Industrial Electrician: Same as Construction Electrician (curriculum for Industrial Electrician differentiates at Level 3 in only one course)

Precision Metal Fabricator: Metallurgy, Metrology, Bench working Techniques, Safety, Applied Trade Calculations, Engineering Drawings

Motive Power Sector

Automotive Service Technician: Applied Work Practices, Electronic Systems, Fuel Systems, Suspension and Brakes, Drive Train, Engine Systems

Small Engine Technician: Safe Work Practices, Work Practices and Procedures, Equipment Inspection and Pre-Delivery, Electrical and Electronic Systems, Fuel Systems, Engine Systems, Braking Systems, Transmission and Auxiliary Power Systems

Truck and Coach Technician: Trade Practices, Electrical Systems, Fluid Power Systems, Fuel Systems, Engine Systems, Drive Train, Brakes

Service Sector

Early Childhood Educator: Child Development I, Creative Arts, Communications, Advocacy and Bias Free Curriculum, Pre-school Learning Environment, Work Placement Course

ACADEMIC ADMISSION REQUIREMENTS

Apprenticeships in the Construction Sector and a small number in other sectors require minimum of grade 10. Many interviewees indicated that employers normally prefer grade 12 or equivalent, even though the Ministry requirement might be grade 10 only.

PROFILE OF THE TYPICAL INDIVIDUAL ATTRACTED TO THE TRADE

Please note that responses for Construction Electrician and Industrial Electrician are combined as they both receive the same in-school apprenticeship training in Levels 1 and 2; there is a differentiation in Level 3.

Construction Sector

Electrician:
- *not "typical" profile any more*
- *now we see some people with university/college who are realizing the potential for trades careers*
- *male with mechanical aptitude; early to mid-20's*
- *like working with their hands*
- *in high school, Apprenticeship is in the "college" stream but should be more publicized to university stream students as well*
- *many are in a second career, i.e. have been working in another field prior to the Electrical trade*
- *more than ever, some have postsecondary education (college or university) though it may not always be an entire degree or diploma*
- *different (more positive) attitude than most other groups of apprentices, according to Job Connect who refers a number to the program*
- *mid to low-level high school student; low motivation to do school work*
- *were in low-paying jobs after high school*
- *poor math and English skills*
- *few interpersonal skills*

Industrial Sector

Precision Metal Fabricator:
- *dexterous and like to work with their hands*
- *may not have strong reading comprehension skills but very good with hands-on requirements*
- *able to do manual work*

Motive Power Sector

Automotive Service Technician:
- *hands-on oriented and technically able*
- *interested in the auto industry in general*
- *think outside the box to come up with solutions, i.e. when troubleshooting problems/malfunctions*
- *enjoy repairing components*
- *good hand/eye coordination*

Small Engine Technician:
- *from the age of 11 or so to 18, these were the students at the back of the room in school trying to get through as quickly as possible*
- *hands-on learners*

Truck and Coach Technician:
- *interested in motors and motor sports*
- *would like shows like "Orange County Choppers"*

Service Sector

Early Childhood Educator:
- *mature students*
- *enjoy working with children*
- *many immigrants who get a job in a school or daycare but aren't qualified*
- *majority in GTA are women from other countries who have degrees and were professionals (teachers, engineers, biologists, etc.) in their home country*
- *about 25% are younger and have been working in the field but are not qualified*

AGE BY PERCENT

Interviewees were asked to estimate the percent of apprentices who came directly from, or within two years of, high school, as well as the percentage of those apprentices over 25 years of age. The percent for those who came directly from or within two years of high school averaged 32%. Some interviewees attributed those coming directly from high school to OYAP graduates. The value for those over 25 years, i.e. not recently from high school, was 68%.

NON-TRADE RELATED SKILLS THAT PREPARE APPRENTICES FOR EMPLOYMENT

Construction Sector

Electrician:
- *good work ethics; it's a competitive trade and they need to know how to do things properly*
- *pride in self and work*
- *responsibility*
- *teamwork (group work)*
- *communication skills (verbal); need to speak the same language regarding the trade and the workplace*
- *exposure to areas that not all employers may be able to provide*
- *interact with other apprentices from other workplaces*
- *safety practices (these can be lacking in the workplace especially among smaller contractors)*
- *prepare for qualifying exam*
- *indirectly they are learning time management because shop sessions (practical) are time-limited*
- *homework helps to develop core skills (reading, numeracy)*

Industrial Sector

Precision Metal Fabricator:
- *communication with others*

Motive Power Sector

Automotive Service Technician:
- *communication skills*
- *problem solving*
- *critical thinking*
- *interpersonal (customer relations) skills*
- *professionalism*
- *time management*
- *research skills above the curriculum requirement*
- *critical thinking through problem solving*

Small Engine Technician:
- *all the Essential Skills are what employers want and they are learning some of these*

Truck and Coach Technician:
- *reading skills*
- *general math/physics background*
- *legalities of the profession, i.e. Mechanics Lien Act, Motor Vehicle Repair Act*

Service Sector

Early Childhood Educator:
- *computer literacy skills (Blackboard, Internet)*
- *planning and time management skills*
- *negotiation skills for their own advocacy, e.g. when assignments are due they may need to negotiate with the professor (or with their family re: time)*
- *professionalism*
- *critical thinking,*
- *analytical thinking*
- *research skills*
- *improving oral and written English skills*
- *professionalism, multiculturalism, collaboration, creativity, self-worth, self-direction [independence] as a learner*
- *those from countries where memorizing facts and quoting others is valued (Iran, China, Russia) have difficulty expressing themselves and their own ideas, so we help them to do this*

TYPICAL REASONS WHY APPRENTICES ARE NOT SUCCESSFUL IN THE IN-SCHOOL TRAINING

Construction Sector

Electrician:

- *10-15% who struggle*
- *poor work and study habits*
- *poor note taking skills*
- *weak math skills so they rely on the calculator*
- *reading comprehension and math skills are weak*
- *lack of good math and reading skills*
- *lack of communication skills*
- *lack of attendance*
- *lack of time for studies*
- *attitude (by Level 2 they think they know enough)*
- *personal/family commitments*
- *increasing problem with employers being willing to release students for the in-school training at the colleges because the pool of licensed trades people is declining; firms can't afford to give up the apprentices*
- *e.g. they can more easily comprehend a circuit diagram where they need to calculate voltage, current, and resistance rather than having those calculations asked for in the form of a word problem*
- *sometimes overwhelmed at the beginning but if they make it to week 5 or 6, they are usually okay*
- *they don't develop the ethics, responsibility, pride in workmanship, etc.*
- *not usually because of academic deficits*
- *if they have a base level of academics, it will allow them to get through but they also need the above skills and attitudes*

Industrial Sector

Precision Metal Fabricator:

- *no desire to learn*
- *need to be spoon-fed, i.e. not good independent workers*
- *don't want to do homework*

Motive Power Sector

Automotive Service Technician:

- *underlying problem is the time that they dedicate to their schooling*
- *supports are available within the college*
- *financial hardship sometimes requires them to work and they can't commit to school*
- *language skills can be lacking (reading and writing); this may or may not be associated with a learning disability*
- *lack of reading comprehension skills*
- *lack of attendance due to personal issues*
- *"Once they get behind, it's hard to keep them motivated."*

Small Engine Technician:
- *lack of motivation due to age, drugs, finances*
- *not really academic issues*

Truck and Coach Technician:
- *the attitude that often prevails in this trade is that, "If you can't do anything else, be a mechanic", but because of the increasing technical requirements, it can be hard for some people to be successful*
- *students who lack sound, basic math and reading comprehension skills have difficulty*

Service Sector

Early Childhood Educator:
- *ESL issues; we try to encourage them to take the Communications course first to help their English skills*
- *Sometimes they take courses out of order since there are few prerequisites, i.e. they can take a Level 3 course while in Level 1 if it's offered (need to work on fixing this)*
- *Child Development Part One is a key foundational course, and they are encouraged to take it first to promote success in other courses; it's also a more academic course*
- *family and time constraints contribute to lack of success as well*
- *low literacy skills or low English skills (foreign students)*
- *learning disabilities or intellectual difficulties [low IQ]*
- *lack of communication/interpersonal skills with colleagues, host teachers, parents, children*
- *unable to meet deadlines*
- *"in this field by default" – a means to an end for some professional immigrants to get into the workforce, or because of the impression that it is not academically difficult (high school dropouts)*

Section A: Knowledge of Essential Skills

For the remainder of the questionnaire, a number of rating scales are used along with anecdotal questions. The instructions for interviewees are shown in each section. Values indicated on the rating scale are averages of the 13 interviewees' responses. Anecdotal comments are included also where applicable

Essential Skills are the skills needed for work, learning and life. Regardless of a student's program or discipline, they are critical for success in college, the workplace, day-to-day living, and for lifelong learning.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to each of the nine Essential Skills. If the example is not applicable, circle **n/a**.

Reading Text **4.8**

- *less important once they are on the job, but important for the in-school training*

Document Use **4.7**

Continuous Learning **4.6**

- *very important in this trade; goes hand in hand with Reading Text and Document Use*

- *There are 3 ways that continuous learning is important:*

1. *The Electrical Code book is revised every 3 or 4 years, so electricians need to always keep up-to-date.*
2. *The field is getting very broad, especially in the Industrial Electrician area because many employers are providing training and P.D. opportunities to help keep their electricians up-to-date and flexible within the organization*
3. *Increasingly, there is cross-training among trades, i.e. millwrights or welders who then decide to become electricians (the "second career" issue mentioned earlier)*

Thinking Skills **4.4**

Working with Others **4.3**

Oral Communications **4.3**

Numeracy **4.2**

- *even just basic math skills are adequate to start*

Writing **3.9**

- *we don't do as much writing as we used to and we also have Spell-check to help with grammar/spelling*
- *very little writing during in-school or on-the-job*

Computer Use **3.8**

Part 2: Reading Text, Document Use, and Numeracy

Section A: Types of Text

Reading Text refers to reading material that is in the form of sentences or paragraphs. It generally involves reading books, manuals, reports, journals, specifications, regulations, memos, notes or letters. It also includes forms and labels if they contain *at least one paragraph*, print and non-print media (for example, texts on computer screens and microfiche), and paragraph-length text in charts, tables and graphs.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the kinds of text or prose that students are required to read , especially in Level 1 (Basic) of your program. If the example is not applicable, circle **n/a**.

1. reference materials **4.7**

2. text books **4.5**

3. shop policies, practices or procedures **4.5**

4. virtual text accessed through learning technologies **4.0**
   - *manufacturers' manuals are online in the workplace*

5. paragraph-length text in charts, tables and graphs **3.9**
   - *tables and graphs (most important)*

6. lecture notes **3.9**
   - *make notes along with PowerPoint presentation*

What other types of general reading tasks/activities are carried out by your apprentices?

Construction Sector

Electrician:
- *Electrical Code Book is written at university grad level – it's a legal document; they must be able to extract, understand and apply information from it*
- *the Electrical Code book (which is a legal document) was assessed by university studies to determine its reading comprehension level; it was determined that it requires 17 years of formal schooling to read and understand it*
- *it includes long explanations which are often followed by either "and/or/may/shall" at the end or the passage, so it is very easy to miss these key words which have great implications on the interpretation of the Code*
- *Canadian Electrical Code (difficult because it's legal language)*
- *manual reading: can be difficult to apply written instructions in manual to hands-on tasks*
- *handouts pertaining to the text*
- *also information based on manufacturers guidelines and publications/manuals, especially for safety practices*
- *blueprint reading*
- *schematic diagrams (especially for wiring)*
- *instructions for equipment operation*
- *equipment repair manuals*
- *employment contracts and government information regarding self-employment*

Industrial Sector

Precision Metal Fabricator:
- *charts, tables, reference texts*
- *leisure reading, i.e. for relaxation and to separate themselves from reading for school and continuous learning only; (in other words, this teacher encourages his apprentices to read as a hobby to cultivate an interest in reading.)*

Motive Power Sector

Automotive Service Technician:
- *trade magazines*
- *reference materials geared toward continuous learning in the trade*
- *visual interpretation of wiring and fluid flow diagrams*

Small Engine Technician:
- *reading and comprehending work orders that someone else has written (in the work place)*

Truck and Coach Technician:
- *virtual (online) repair manuals are becoming more common in this industry*
- *online reading and learning for professional development and upgrading in the profession*
- *this can be problematic for hands-on learners*

Service Sector

Early Childhood Educator:
- *newspapers or periodicals/journals*
- *reading fluently aloud*
- *reading and interpreting instructions on assignments*
- *using evaluation tools for child development and the childcare environment*

Section B: Skills for Reading Text

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the following reading skills required by students, especially in Level 1 (Basic) of your program. If the example is not applicable, circle **n/a**.

1. identify the purpose for reading (e.g. scan for/locate information, skim for meaning, read the whole text to critique or evaluate) **4.5**
    a. *Must read for detail, not skim only*

2. choose and integrate information from various sources or from several parts of a single text **4.4**

3. identify relevant and irrelevant information **4.3**
    a. *especially important in preparing for the C of Q exam which is multiple choice and contains irrelevant info on the test question*
    b. *e.g. a service manual for one model of engine may contain options for 5 different kinds of transmissions for that model, so they must discern the irrelevant info and focus on the info for the model in question*

4. make complex inferences utilizing general background knowledge **4.2**

5. make low-level inferences from various sources **3.8**

6. compare ideas, values and perspectives in texts **3.3**
    a. *not much room for this since electrical code is the law*
    b. *must integrate info from three different texts (Electrical Theory, Motor Control, Electronics) because all have info on motors*
    c. *also, they have to infer/integrate info from lab work with "text book" information, i.e. "Theoretically the equipment should do this, but practically, what is the reading on the lab equipment?"*
    d. *they need to associate what's right and what's wrong in a situation and make their own decisions, i.e. think critically about the best course of action*

Many students struggle with the demands of reading that they encounter in Apprenticeship training. Why do you think students don't succeed when it comes to reading? From your experience, what kinds of reading tasks often give your students difficulty? What kinds of strategies help students read better?

Construction Sector

Electrician:
- *What? – Electrical Code book and technical manuals*
- *Why? – because they are written at such a high level*
- *Strategies? – try to encourage them to get into the Student Learning Centre to get support, as well as support from the Apprenticeship teachers*

- *Why? – reading comprehension skills are lacking*
- *What? – Electrical Code Book*
- *Strategies? – use pictures or diagrams to illustrate the problem or concept in order to focus on the problem or issues instead of the "words"*

- *Why? – lack of reading comprehension skills*
- *What? – Electrical Code book*
- *Strategies? – slow down the reading, don't skim, read for technical detail*

- *Why? – they don't spend enough time reading and they are easily distracted*
- *Strategies? – I encourage them to set priorities and make uninterrupted time for themselves to work; be prepared to study and apply themselves*
- *try to prepare them in advance for readings to link them with in-class activities and provide more context and purpose for the required readings*

- *Why? – generally low reading skills*
- *What? – have a difficult time with long text-book readings, i.e. a full chapter*
- *Strategies? – reading material needs to be introduced, i.e. prefaced in class to give context and purpose*

Industrial Sector

Precision Metal Fabricator:
- *Why? –They have no desire to read and they close the book when the class is done.*
- *What? – No particular reading tasks present significant difficulty*
- *Strategies? – Try to present alternate terminology to what the text or reference books use in order to promote understanding, e.g. surface area is the same thing as lateral area; identify the purpose for the reading*

Motive Power Sector

Automotive Service Technician:
- *Why? – lack of time; low literacy skills; they view reading as a waste of time, i.e. they don't appreciate the value of the information they'll gain by reading; some are slowly beginning to value reading more but in general they are not comfortable with it; they don't know how to read to learn*
- *What? – text-based readings are problematic*
- *Strategies? – use supplemental handouts to support text books; do different activities to give context to the readings, e.g. write a summary, or create multiple choice questions; just try to use the information in a different way than just reading it*

- *Why – lack of reading comprehension skills which have often been a problem since elementary school.*
- *What? – they struggle with long passages of technical information*
- *Strategies?*
  1. *break the long passages into segments and let them have it in front of them when they are doing the related hands-on work so that they can refer to it readily (instead of having it 500 ft away in the classroom)*
  2. *Link the readings to immediate hands-on tasks to provide context.*

Small Engine Technician:
- *Why? – they hate to read; they skim but don't want to or can't read for detail*
- *What? – long text passages, but it has to be done*
- *Strategies? – provide fiction books for the class to read as well; i.e. require a book report or summary on a book that is trade-related to encourage reading*
- *be a role model for reading both workplace and recreational materials*

Truck and Coach Technician:

- *Why? – low literacy skills*
- *What? – long text passages and sometimes passages in online service manuals*
- *Strategies? – keep the class interactive; put notes on the board so that they can see, hear, copy the information (multi-sensory); encourage them to make their own notes on some material; if using handouts, give it to them already highlighted as they don't often know what to highlight; (he makes 25% of tests based on text readings to encourage them to read it and ask if they don't understand.)*

Service Sector

Early Childhood Educator:

- *Why? – ESL issues*
- *What? – reading large chunks of text; they will want the shortest article if they have a choice of readings*
- *Strategies? – summarize the readings verbally first to give them context and purpose for reading; encourage them to read the headings first; read articles in class to share info with classmates*
- *Why? – many are in the field because of misperception of the required reading skills*
- *some are not yet fluent in English but can't get a job in their field (foreign trained professionals)*
- *What? – reading instructions can be difficult; also reading long text passages for understanding*
- *Strategies? – use more than one approach: overhead, board, etc.*
- *use clear language in notes and handouts, no extra info or words, write at a lower grade level, use pictures and illustrations, give concrete examples to illustrate concepts, give one-on-one help at the end of class (usually evenings)*

Section C: Types of Document Use

Document Use refers to tasks that involve a variety of information displays in which words, numbers, icons and other visual characteristics (e.g. line, colour, shape) are given meaning by their spatial arrangement. It includes lists, tables, graphs, blueprints, schematics, drawings, signs and labels.

Reading problems are often navigation problems. Document navigation involves clearly understanding the document structure and the information being sought. If the purpose for "entering" the document is not understood, the document user will have difficulty locating specific and relevant information.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the skills that your students need (especially in Basic level) to navigate typical documents that they are required to use. If the example is not applicable, circle **n/a**.

1. interpret and extract information from scale drawings (e.g., blueprints, maps) **5.0 (two n/a)**

2. obtain information from sketches, pictures, signs, or symbols **4.9**

3. locate/enter information in tables, schedules and other table-like text **4.4**
   - *locating very important in Electrical Code book*

4. use specialized knowledge and reasoning **4.4**
   - *e.g. notes on troubleshooting*

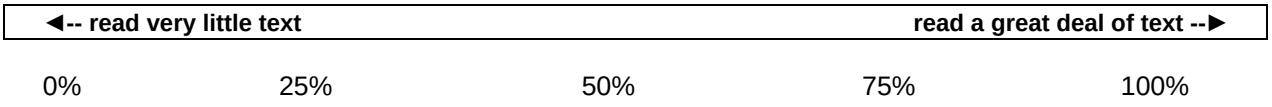
5. read, interpret, and get information from graphs and charts **4.1**

6. identify the structure/type of document **3.9**
   - *e.g. in the lab manual, they must differentiate between schematics and wiring diagrams*

7. identify the purpose for 'entering' the document **3.8**

8. read and complete complex forms **3.8**
   - *especially reading the Code book*
   - *mostly simple forms*

Reading text in the form of sentences and paragraphs generally involves reading books, manuals, reports, journals, specifications, regulations, memos, notes or letters. It also includes forms and labels if they contain at least one paragraph. Please draw a line through the bar to indicate how much text-based reading your students do in the first year.



Average: 73.3%

Reading text and locating/information often involves navigating documents such as tables, graphs, maps, etc. Please draw a line through the bar to indicate how often your first year students read or use information contained in documents.

◄-- rarely look for information in documents				frequently look for information in documents --►
0%	25%	50%	75%	100%

Average: 71.3

What other forms of document use are your students required to do, especially in Level 1?

Construction Sector

Electrician:

- *documents with various symbols*
- *material take-off sheets (similar to accounting documents) involving estimates for pricing*
- *documentation for bids on jobs*
- *not really complex forms*
- *Electrical Code Book*
- *Blueprints*
- *wiring and schematic diagrams*
- *instrumentation and electronics specifications (sometimes in Excel charts)*
- *interpreting drawings with symbols and abbreviations specific to the trade*
- *surprise quizzes (20 minutes long)*
- *manufacturers' documentation on equipment*
- *work permits that involve the specific details of the installation that is being done, the materials, etc.; such documentation must always be in order because electrical inspectors visits sites regularly*

Industrial Sector

Precision Metal Fabricator:

- *MTCU documentation for registering as an Apprentice (from MTCU consultant)*
- *medical/health forms*
- *safety documentation*
- *program policies*
- *grading schemes*

Motive Power Sector

Automotive Service Technician:

- *interpreting and using data from meters and scopes, i.e. documents (charts/tables) displayed on-screen when using computer equipment connected to the engines (often for diagnostics)*
- *work orders, estimates*
- *documentation from government for Drive Clean Tests and Safety Inspections*
- *wiring diagrams*
- *power diagrams*
- *flow charts*
- *work orders*
- *estimates, invoices*
- *interpreting and gathering data from live, on-screen information when using scopes and meters, especially in terms of percentages*

Small Engine Technician:
- *work orders, estimates, invoices, warranty reports*

Truck and Coach Technician:
- *government Safety Certificates: 2 for school buses, 1 for dump trucks*
- *government Vehicle Transfer Form(buying and selling)*
- *"Circle Check" form to use when road testing a vehicle*

Service Sector

Early Childhood Educator:
- *observation forms and checklists re: child development and interaction*
- *assessment inventories re: environment and child development*
- *document (and report) child abuse*
- *accident reports*
- *evaluation tools for children in the childcare environment, i.e. checklist, anecdotal*

Section D: Types of Numerical Calculations

Numeracy refers to the use of numbers and the requirement to think in quantitative terms. It involves using mathematical concepts (e.g., fractions, percent, ratio/proportion, algebraic equations, geometry, statistics, etc.) to turn a problem into a set of operations to obtain an answer. It also involves numerical estimation that results in a number, performing calculations in various ways and using measurement instruments to calculate units of measure.

Using a scale of **1** (low importance) to **5** (high importance), indicate the degree of importance you would assign to the numerical skills students need, particularly in Basic level. If the example is not applicable, circle **n/a**.

1. perform calculations using measurements and quantities (e.g., conversions, area, volume, indirect measurements using geometry or trigonometry) **4.3**

2. estimate a numerical answer when errors have minor consequences **3.0 (one n/a)**
- *should be able to approximate values when doing calculations to determine a reasonable answer*
- *e.g. what values should you get if troubleshooting a circuit*
- *must use precise measures not estimates*
- *accuracy is important for doing estimates for customers' work, especially around labour costs*

3. perform calculations involving monetary transactions **2.9 (one n/a)**
- *never used during in-school*
- *e.g. collect $ for field trips*
- *not everyone deals with money*

4. analyze data using statistical concepts (e.g., mean, median, mode, probability) **2.8 (four n/a)**
- *a little in Level 2 and 3*
- *used somewhat in terms of the likelihood of components being in certain places e.g. wires, pipes, studs, etc.*

5. perform calculations involving scheduling or budgeting (e.g., planning, monitoring, assessing value, etc.
- *becomes more important on the job after they are qualified* **2.7 (one n/a)**
- *used somewhat in terms of the likelihood of components being in certain places e.g. wires, pipes, studs, etc.*

Describe the typical mathematical concepts your students are required to use (e.g., fractions, decimal operations, percent, ratio/proportion, solving equations, geometry, trigonometry, statistics, etc.).

Construction Sector

Electrician:
- *fractions, decimals, percents, ratio, proportion, equations, formula manipulation, geometry, trigonometry*
- *fractions, decimals, percents, ratio/proportion, equations and formulas (algebra), some geometry; trigonometry is used in Level 3*
- *fractions, decimals, percents, ratio, proportion, basic algebra, solving equations, geometry, trigonometry and vectors are at the end of Level 2 and in Level 3*
- *fractions, decimals, percents, ratio, proportion, equations/formulas (algebra), geometry, trig in upper level only; metric and Imperial measurement*

- *skills are used at all times*
- *fractions, decimals, percent, ratio, algebraic equations and formulas, geometry*
- *trigonometry is a specialized skill and only used in the higher level training*

Industrial Sector

Precision Metal Fabricator:
- *fractions, decimals, percents, ratio/proportion, algebraic equations (formulas), geometry (in Level 1), trigonometry (Level 2)*

Motive Power Sector

Automotive Service Technician:
- *fractions, decimals, percent, ratio, proportion, basic algebra and formulas (equations), geometry*
- *estimation skills when using meters, i.e. they must have an idea of what the reading should be in the given situation*
- *measurement skills using both rudimentary measuring tools as well as electronic devices with digital or electronic readings*
- *basic operations with whole numbers, fractions, decimals percents, metric and Imperial measure and conversions*
- *overall good numeracy skills but not too high-level*

Small Engine Technician:
- *fractions, decimals, percents, ratio, simple equations (algebra), basic geometry,*
- *metric and Imperial measurement and converting within and between those systems (very important)*

Truck and Coach Technician:
- *operations with whole numbers, fractions, decimals, percents, square roots, area, volume, simple equations and formulas (algebra)*
- *Imperial and metric measurement and conversions within and between those, e.g. temperature, pressure*

Service Sector

Early Childhood Educator:
- *whole number and decimal operations; very minimal fraction work*
- *ratio and basic measurement*

How do students perform calculations (e.g., mental calculation, pen & paper, calculator, computer)?

Construction Sector

Electrician:
- *some mental math but they try to avoid it*
- *some pen and paper*
- *calculator*
- *use calculator; don't want to do mental math*
- *they have an aversion to mental math and lack of basic math skills*
- *they do all three above: mental, pen and paper, and calculator*
- *they first must be able to do basic calculations without a calculator, and then they are allowed to use a calculator after they've shown they can do it without*

Industrial Sector

Precision Metal Fabricator:
- *pen and paper to learn the procedure but use calculator to do the calculations as they would in the industry*

Motive Power Sector

Automotive Service Technician:
- *pen and paper as well as calculator*
- *some computer use(based on trade-related software usually)*

Small Engine Technician:
- *pen and paper and calculator*
- *don't like mental math*

Truck and Coach Technician:
- *calculator*

Service Sector

Early Childhood Educator:
- *mental calculations, pen and paper, and calculator*

What types of general math applications/tasks are carried out by students in your program?

Construction Sector

Electrician:
- *sizing for wires*
- *circuit analysis (voltage, current, resistance, power, etc.)*
- *size of electrical services*
- *installation of electrical equipment*
- *in Level 2 and 3, they are adding and subtracting vectors when studying AC circuits i.e. voltage and current are not in-phase in AC*
- *measurement (linear and angular)*
- *unit conversions between and within metric and imperial systems (especially on wiring diagrams*
- *electrical theory (calculating voltage, current, resistance, power, capacitance, conductance)*
- *vector diagrams and trigonometry for working with AC circuits, i.e. "power factor"*
- *calculating demand loads on circuits*
- *process control devices (Level 2)*
- *use the FACET system in the lab (it's an electronic simulation) where they have to input figures to determine necessary calculations*
- *some estimating of materials (wire, piping, etc.)*
- *algebra and formula manipulation applied to electrical theory, e.g. calculating voltage, current, resistance, etc.*

Industrial Sector

Precision Metal Fabricator:
- *mechanical fitment*
- *creating retainers or gaskets*
- *correction of angles*
- *set up of machinery*

Motive Power Sector

Automotive Service Technician:
- *measuring (Imperial and metric) and conversions*
- *drive line math (gear ratio, torque, horsepower)*
- *engine components (compression ratio)*
- *basic electronics (current, voltage)*
- *ratios, voltage and amperage (current), engine math, driveline math, Pascal's law (volume, area, force)*
- *use fractions/decimals/percents throughout, as well as simple formula work, i.e. basic algebra*

Small Engine Technician:
- *compression ratios*
- *piston displacement*
- *markup/markdown/discounts*

Truck and Coach Technician:

- *area of piston in a cylinder*
- *hydraulics: non-invasive diagnostics of equipment, e.g. Customer says, "The bucket on the loader isn't moving fast enough." Mechanic can use dimensions of bucket and hydraulics to calculate the maximum lift speed without actually taking apart the equipment, hence, "non-invasive". May then be able to tell the customer that the bucket is lifting as fast as the components will allow for that model, and you've saved him some money too.*
- *use hydrometer to check fuel condition (good or spoiled)*

Service Sector

Early Childhood Educator:

- *budgets for daycare*
- *graphing*
- *following instructions for linking values from graphs to assessment criteria on the assessment forms mentioned earlier*
- *ratio of children to caregiver*
- *estimate food portions, body temp, height, weight (metric and Imperial)*

Section E: Other Information

Describe the learning technologies used by students in your program, especially in Basic level (e.g., computers, in-house learning platforms, media, vocationally specific technology).

Construction Sector

Electrician:
- *use online learning a little for accessing their marks and grades*
- *Levels 2 and 3 have computers in the electrical labs but they are supervised there; use them to access online building and fire codes*
- *use computers to program and run the "Programmable Logic Controller" (PLC) device*
- *electronics application programs, e.g. MultiSim (for constructing circuits)*
- *signing up for EI benefits on the Internet*
- *Internet research*
- *Computer-based simulations involving a) circuit performance, b) programming circuits, and c) motor control*
- *Hands-on technology/equipment (circuit boards and constructing circuits)*
- *Internet to access updates and changes to the Electrical Code book; also for safety practices*
- *Use commercial platforms/applications that are trade-related*
- *trade-related technology from manufacturers*
- *word processing*
- *"LabVolt" software/hardware to investigate electrical concepts; may also used as a testing tool*

Industrial Sector

Precision Metal Fabricator:
- *CAD program for drawings/blueprints, "Master CAD"*
- *access to Internet for research is available*

Motive Power Sector

Automotive Service Technician:
- *trade specific software (parts and labour estimates)*
- *Internet for information retrieval (look up vehicle and the procedures for diagnostics and repair)*
- *Circuit boards to build and test electrical circuits*
- *online access to the texts, service manuals*

Small Engine Technician:
- *teacher uses PowerPoint for most classes*
- *also uses a document camera for demonstrations, i.e. projects the engine components onto a screen for viewing by the class*
- *students are exposed to those above technologies*
- *use Internet and CD ROMs for research re: parts*

Truck and Coach Technician:
- *use electronic service tools, e.g. laptop for diagnostics and checking status of engine components*
- *must be able to both accurately operate the computer and accurately interpret the figures and values on the screen*
- *GPS technology (ON STAR system for vehicles)*

Service Sector

Early Childhood Educator:
- *Blackboard platform, online discussion groups*
- *Using videotape for observation of children*
- *"VIDEOTIVES" is a downloadable video series of short clips that link the theory to videotaped observations of children*
- *word processing*
- *Internet research*

Do you have any questions or comments about Essential Skills?

Construction Sector

Electrician:
- *costs a lot to send apprentices to school*
- *Essential Skills should be used to evaluate the preparedness for apprentices to enter in-school training once they are signed on (not used as a screening tool to keep people out but for use as an advising tool)*
- *if they don't have the Essential Skill levels required, they must remediate on their own time before taking the first level in-school training*
- *it's good to identify the Essential Skills*
- *the problem with success for apprentices lies with the need to find a trade or profession that you like doing i.e. students need more guidance in high school*
- *trades are still not given the respect that they deserve*
- *Increasingly, there is cross-training among trades, i.e. millwrights or welders who then decide to become electricians (the "second career" issue mentioned earlier)*
- *math and reading comprehension skills, and study habits and note taking skills are the essential skills needed and "I'm not getting students with these skills anymore.*
- *make sure students have the prerequisite, i.e. grade 12 diploma or equivalent*
- *industry or colleges should put together a questionnaire to help assess aptitude and background of apprentices*
- *should be comfortable doing basic math without a calculator*
- *it's a great idea to do this kind of research*

Industrial Sector

Precision Metal Fabricator:
- *the main objective of the student is to have the desire and will to learn in any atmosphere (school or workplace)*
- *Essential Skills will develop more through the employer*
- *the student is the driver and must be willing to drive, but we steer them the right way*

Motive Power Sector

Automotive Service Technician:
- *pleased that we are doing this study; ES need to be addressed*
- *it's so important to raise communication skills, problem solving skills but there's so much content to deliver now*
- *there used to be communication and interpersonal skills in the curriculum*
- *their learning never ends in this trade*
- *basic skills in elementary and secondary school are so important (reading comp and basic math)*
- *grade 12 doesn't mean anything*

- *everyone is in a box in elementary and secondary and may not succeed when they get an Apprenticeship, so they need more options sooner and more preparation focused on what they want to do and what they can do*

Small Engine Technician:
- *the nine Essential Skills on the list are all important ones*
- *need interpersonal skills too: "They [students] can be a little on the 'acidic' side."*

Truck and Coach Technician:
- *there should be a basic math/physics test for Apprentices to enter Basic Level*
- *then they could remediate if they didn't pass*
- *that would lead to better retention and less frustration*
- *aptitude testing would be helpful too – not to exclude Apprentices but to advise them*

Service Sector

Early Childhood Educator:
- *it is great to focus on these Essential Skills for Apprenticeship*
- *interpersonal communication is an important ES in this field*

Are there additional examples of learning materials that your apprentices use which require them to apply their skills in one or more of the three Essential Skill areas that we have discussed (Reading Text, Document Use, and Numeracy)?

Construction Sector

Electrician:
- *using the Electrical Code book integrates all three skills (Reading Text, Document Use, Numeracy)*
- *they can use the Code in the C of Q exam; it refers them to tables, charts, etc. where they have to extract info and apply it to do a calculation; they need to navigate it very well*
- *therefore all three skills are integrated: read text, look up values in the tables, perform a calculation*
- *need strength in all three skills to be able to integrate them*
- *In-house shop manuals are produced and used in the program*
- *must be able to follow instructions: draw diagram and perform installation*
- *blueprints and schematic diagrams*
- *Inspection Request Forms (but not in great detail – more of a supervisor's role on the job)*
- *bulletins from the Electrical Safety Authority; the latest information must be sought and available by both students and employers*

Industrial Sector

Precision Metal Fabricator:
- *n/a*

Motive Power Sector

Automotive Service Technician:
- *1. Scanner use: scanners interface with engine components; they have to interpret the data and have the foresight to know what the reading should show or how the tool should work in order to troubleshoot and identify problems*
- *2. Multimeter use: the multimeter has an LCD display and a rotary dial with 24 different scales; they must select the correct scale for the task at hand and interpret the display as per the choice of scale they have made; they have a hard time relating the scale chosen on the dial and the display readings e.g. they may not realize that the display value needs to be x 100 to get the required value (they want to take the display at face value but need some problem solving and critical thinking skills to use and interpret it correctly – need numeracy skills as well). Using the multimeter really requires all three skills: RT, DU and N*

Small Engine Technician:
- *newspaper reading is important too*

Truck and Coach Technician:
- *n/a*

Service Sector

Early Childhood Educator:
- *Evaluation tools, as mentioned earlier*