

Literature Review on Integrating Literacy and Essential Skills into Trades Training

Working Paper



May 2011



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Table of Contents

Acknowledgments	2
I. Introduction	3
II. Search Strategies	3
III. Findings from the Literature Review	
Integration Models.....	4
The Need for Integration.....	4
Results from Integration	5
Challenges of Integration.....	5
Effective Practice for Integration	5
IV. Annotations	6
Canadian Reports	6
International Resources.....	12
Works Cited	19

Acknowledgments

Many thanks to the project working group (see below) for reviewing this document. Thanks also to CSC consult Claire Hall.

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This project was funded by the Ontario Ministry of Colleges, Training and Universities.

I. Introduction

The purpose of this literature review is to annotate relevant literature related to the College Sector Committee (CSC) for Adult Upgrading project: *Integrating Academic Upgrading into Pre-Electrical Programming*. The project goal is to ensure that pre-apprenticeship students receive an Academic Upgrading component that is tailored to their trade and appears seamless with the trade component of their program. This will increase both their interest in the Academic Upgrading portion of their program and their retention and future success in the trade, and employment.¹

The literature review focuses mainly on integration as it applies to program delivery and curriculum development. This review includes:

- integration models
- the need for integrating literacy and essential skills into pre-apprenticeship and trades training
- the case for integration
- strategies/tips/effective practices for integration in the classroom
- benefits and outcomes of an integrated approach

A major limitation of the literature review is that there were a limited number of research reports and documents found concerning integration across the industrialized world.

II. Search strategies

There were several search strategies used for this literature review, as outlined below:

- searched data bases, listservs, and websites such as the National Adult Literacy Database (NALD), the National Institute for Literacy listserv, the New Zealand Literacy Portal, and the Centre for Literacy website
- received information from colleagues from Literacy and the Nunavut Literacy Council who also have projects embedding essential skills into the workplace
- used extensive networks in Canada, the United States, the United Kingdom, and New Zealand for resources and report suggestions

¹ See CSC project proposal to MTCU

III. Findings from the Literature Review

Integration Models

The common theme in terms of integration of literacy and basic or essential skills into trades or technical training is that literacy and basic skills are taught/learned in conjunction with the trades training. The most common ways to do this are to:

- teach the literacy and basic skills component before the trades training with the literacy component related to what participants will learn in the trades or pre-apprenticeship training
- teach literacy and basic skills at the same time as the trades training, but in different sessions. For example, basic skills could be offered in the morning and trades content in the afternoon with the two instructors collaborating to make sure the literacy component is tailored to the trade.
- use a fully integrated model where literacy and basic skills are mapped explicitly in the curriculum with one instructor teaching both or the trades instructor and literacy expert working together

The Need for Integration

The greatest need to integrate literacy and essential skills with pre-apprenticeship programs, vocational training, and trades training is to create more opportunities for students and apprentices to be successful in their trade or vocation. The skills shortage is identified as one of the main reasons why integration is an important strategy to ensure that apprentices need to be successful in their training. Although trades math is identified as a number one need, other essential skills such as note-taking, reading comprehension, and test- or exam-taking are also of critical importance.

Canadian reports indicate that there is a disconnect between what people learn in high school and what they need for apprenticeship—especially in subjects such as math. In addition, some groups may have a greater need for essential skills upgrading to be successful in their trades training. This includes Aboriginal people, speakers of English as another language, and those whose skills are rusty because they have been out of school for some time.

In the electrical field, essential skills are noted to be important because of technological and regulatory changes, along with higher national standards. The International Brotherhood of

Electrical Workers (IBEW) Canada's needs assessment on essential skills notes the importance of including essential skills, especially trades math in pre-apprenticeship and pre-trades training.

Reports from other countries such as Australia, the United Kingdom, and New Zealand suggest that there are both young people and older workers with low literacy skills in vocational training. Essential skills needed focus on workplace writing, numeracy, reading, document use, oral communication, and teamwork.

Results from Integration

The few research reports that focused on results of integrating literacy into trades or vocational training indicate better retention of students, increased success in the trades or vocational training, and a move to higher order training because of the inclusion of literacy and basic skills training. In Ontario, colleges also see increased revenues and profile and experience more non-traditional students coming into programs.

Other results are an increase in pay and employment for workers.

Challenges of Integration

One of the main challenges of integration is there is a lack of knowledge about the usefulness of integration as a strategy, how to do it, and where to find existing materials and templates. Another challenge is that there is not a lot of support for basic skills for apprentices in their training beyond what their trades trainer can offer.

Recommendations for addressing this situation include having more focus on basic and essential skills within trades and pre-trades training, more materials, and templates and training on essential skills for trades trainers. In addition, the relationship between literacy experts and trades trainers needs to be strengthened in order to address the literacy and essential skills needs of pre-apprentices and apprentices.

Effective Practice for Integration

Common themes from the literature in terms of effective practice for integrating literacy and essential skills into trades training include:

- a commitment for integration needs to be organizational
- starting with the needs of the learners and checking in with learners often to head off challenges

- using a team approach that includes a literacy instructor and a trades trainer to plan and integrate essential skills into trades and workplace training
- offering training to trades trainers on how they can integrate literacy and numeracy strategies into their trades training
- making sure that the basic skills component is contextualized specifically to the trades using trades-specific materials
- recognizing that note-taking and test-taking strategies are important components of integrating essential skills into trades training
- identifying a number of models of integration that can be used; the model chosen depends on needs, resources and scheduling of programs
- providing opportunities for trades trainers and literacy trainers to have joint professional development and work together to problem-solve around common issues

IV. Annotations

The annotations which follow have been organized into two categories: Canadian and international reports and resources. With each category, the annotations are listed in alphabetical order according to title.

Canadian Reports

1. *Essential Skills and Success in Apprenticeship*

Fownes & Evetts (2001, for Skillplan)

Available at: http://www.skillplan.ca/pdfs/Appr_Rpt_Complete.pdf

Fownes and Evetts found through their survey and their own experience that many apprentices need support with essential skills to be successful in their technical training. They noted that this is increasingly important because of skills shortages. Support is needed in terms of note-taking, memory aids, reading, and setting up problems in math. They argued that there is a large disconnect between the preparation people get in high school and the skills and knowledge needed for Apprenticeship. The authors indicated that there is not a lot of support for apprentices within their training for basic and essential skills beyond what the trades trainer can offer or some tutoring support. They also noted that without a skills intervention, apprentices are left in a deficit position. Fownes and Evetts recommended more joint work between trades trainers and workplace educators and the integration of essential skills into trades training.

2. *Essential Skills Needs Assessment of IBEW Members in Canada (Construction and Utility)*

IBEW Canada (2003)

Available at: http://www.ceca.org/documents/ESNA_Report.pdf

This needs assessment report identifies barriers to lifelong learning related to essential skills and provides recommendations for moving forward. Essential skills such as reading text, document use, and numeracy are defined as “enabling skills” that help in the learning of technical skills.

The importance and need for essential skills are seen as related to:

- technological and regulatory changes
- higher national standards
- need for greater labour mobility
- classroom training within apprenticeship and technology systems
- essential skills needs among Aboriginal people, speakers of English as another language, and those whose skills may have become rusty

In this report, the authors discussed the importance of pre-apprenticeship and pre-trades in the electrical field in terms of providing the opportunity to build essential skills so these students can be successful as apprentices. The IBEW also promoted the leadership of key electrical stakeholders in strengthening these programs to better identify and address essential skills needs with participants. Trades and technical trainers emphasized the importance of focusing on electrical trades math in these programs as it is not adequately covered in the Grade 12 curriculum. Mastery of the trades math is seen as a good predictor of success in the trade.

Recommendations from the report of interest to this project include the following:

- develop note-taking and test-taking strategies for journeypersons working towards their Red Seal
- integrate an essential skills strategy into the IBEW’s Instrumentation training
- offer training to trades and technical trainers on how to integrate essential skills into trades training
- integrate essential skills into training offered by colleges, employers, and the IBEW

3. *Filling the Gap: Building Communities to Support the Aspiring Apprentice*

Foran & Boutis Herrmann (2008, for PTP)

Available at: <http://www.ptp.ca/wp-content/uploads/2008/12/filling-the-gap-nov-08.pdf>

This research conducted by PTP had three objectives:

- to determine how community-based literacy organizations could support “would be” apprentices and apprentices through the apprenticeship delivery system
- to develop a working model these agencies could use to help link literacy students to successful apprenticeships and pre-apprenticeship training
- to develop a set of best practice principles

Best practices for LBS agencies working with students headed towards pre-apprenticeship training or an apprenticeship (those of interest to this project) include:

- using contextualized, trades-specific upgrading materials
- ensuring pre-apprenticeship training is part of an integrated delivery model
- focusing on Essential Skills that will help students learn to learn
- anticipating barriers and challenges before they happen
- holding regular advisory meetings with students

The authors recommended two different models that are of interest to the CSC project:

Integrated linear model: Within this model, students get literacy and Essential Skills training that is contextualized to the trades but may not be applied right away in a practical setting on the shop floor.

Integrated concurrent model: In this model, literacy and Essential Skills and trades-specific applications are woven together in a seamless fashion. For example, students might learn math in the morning and then apply it on the shop floor in the afternoon.

4. *Making the Business Case for Integration among Employment Ontario Programs and Services*

Folinsbee (2009, for College Sector Committee for Academic Upgrading)

Available at:

http://www.collegeupgradingon.ca/employmenton/making_business_case.pdf

The purpose of this College Sector Committee (CSC) research report was to document the business case for and effective practices in partnership work among Academic Upgrading, Apprenticeship, Job Connect, and Employment Assistance Services. Detailed cases were prepared on seven Ontario colleges.

The research findings indicated that:

- there is a strong business case for these kinds of partnerships in that there is increased student success and retention and greater efficiency, along with an increase in college profile, non-traditional students, and increased college revenue
- important success factors include management support, clear roles, good communication, and a team approach
- the partnership between Academic Upgrading (AU) and Apprenticeship faculty needs to be strengthened

Best practices identified that apply to faculty include:

- providing flexible AU support for pre-apprenticeships students and apprentices that meets their needs and schedules and is practical, applied, and trades-related
- AU and trades faculty working together as a team to ensure that AU and trades content are fully integrated in the curriculum
- faculty from AU getting to meet with faculty from other areas such as apprenticeship in professional development sessions in order to build relationships and problem solve together

One of the recommendations from the report was to “develop pilot projects and support resources that illustrate and promote ways that Apprenticeship and Academic Upgrading faculty can collaborate as a team; document results in terms of benefits for Apprenticeship.”

5. ***Report on the Integration of College Academic Upgrading Programs: Pre-Apprenticeship, Pre-Trades, and Apprenticeship Programming***

Folinsbee (2008, for College Sector Committee for Academic Upgrading)

Available at: <http://www.collegeupgradingon.ca/current/integration/integration.pdf>

The purpose of this research was to build on the previous work of the CSC to identify the joint work that is happening between Academic Upgrading and Pre-Apprenticeship, Pre-Trades, and Apprenticeship programming in Ontario's college system.

The focus of joint work was on:

- information sharing
- facilitated referral processes
- assessment and intake
- curriculum development and delivery

Twenty-one out of 24 colleges participated in the research through a survey and/or an interview. The large majority of respondents were from Academic Upgrading (AU), although apprenticeship in each college was also invited to participate in the research.

The research documented to what extent joint work was taking place in the college system, success factors for joint work, challenges, outcomes, and what would help colleges move forward on integration.

Findings show that the bulk of the joint work in curriculum development and delivery is taking place in pre-apprenticeship programs as opposed to working with apprentices. Fifty-five percent of respondents indicated that AU is offered as part of pre-apprenticeship programs either at the front end of the program or integrated throughout. One important factor for joint work to be successful is for both AU and Apprenticeship to have a better understanding of what each is about. Apprenticeship needs to have better awareness of the support AU can provide. AU needs to know more about Apprenticeship and how to offer AU tailored to the trades.

Colleges indicated that they would like to see guidelines, templates, and success stories for integration that they can adapt to their own work.

6. *Tips on Introducing Essential Skills into Construction Trades Training*

Construction Sector Council, Skillplan, and the Canadian Apprenticeship Forum (2010)

Available at: http://www.csc-ca.org/pdf/CSC_TipsEssentialSkillsTrades_en.pdf

This document uses a study of the role of Essential Skills in Apprenticeship to isolate tips from technical training instructors and teachers who provided skills upgrading to those apprentices who needed help with Essential Skills.

The audience for the document is trades instructors looking for practical ways to integrate Essential Skills such as reading, document use, and numeracy into trades training.

The document includes:

- a definition of Essential Skills and how they relate to trades training
- task examples that relate to Essential Skills
- information on informal and formal assessments
- tips on how to offer upgrading
- strategies for integrating Essential Skills into technical training

The research findings indicated that:

- integration works best when workers have access to benefits, good jobs, and opportunities for training and development
- job training integrated with postsecondary can also increase earning and job quality
- bridge programs that integrate basic skills can speed up the transition to training and higher education
- education and training need to be tied to career ladders where there is access to higher paying jobs and promotional opportunities

International Resources

1. *Building Literacy and Numeracy into Training: A Synthesis of Recent Research into the Effects of Integrating Literacy and Numeracy into Training Packages*
Adult Literacy and Numeracy Australian Research Consortium (2000)
Available at <http://www.staff.vu.edu.au/alnarc/reports/alnarcisy.pdf>

The purpose of the research was to investigate and synthesize the effects of including literacy and numeracy into national (vocational) training packages.

The report includes among other topics the issues with integrating literacy and numeracy into vocational training along with recommendations for the future. The research was conducted by six research centres looking at six projects representing a variety of sectors and industries. Sectors included the civil construction, food processing and health care.

The inclusion of literacy and numeracy into vocational training packages across Australia occurred in 1995.

The findings across the six projects and six reports of interest to the CSC project included:

- The introduction of National Training Packages with the inclusion of literacy and numeracy across the vocational system in Australia caused confusion and uncertainty because of different understandings and different interests on the part of stakeholders. Literacy and numeracy took a back seat to the overall transition.
- There was an unevenness in the quality and quantity of literacy and numeracy training across the six projects; in some instances there was no literacy or numeracy provision.
- A key recommendation was that training organizations need to be accountable to state authorities and have a plan for assessment practices and strategies for including literacy and numeracy into training. There is also the need for stronger links between literacy experts, training organizations, and industry partners.
- Workplace and workplace-based trainers need more professional development overall to work in the new system but particularly if they are to include literacy and numeracy effectively into training.
- More flexible funding is needed to support literacy and numeracy in training plans.

- More awareness of and access to existing literacy and numeracy materials along with the development on new materials illustrating best practices and assessment practices are needed.
- The danger of building literacy and numeracy into a training package means that it could take a back seat or be less visible within the content focus. There is a need to make the literacy and numeracy competencies more visible within the training package.
- Literacy and numeracy need to be built into all aspects of organizations, not just training packages.
- More in-depth research on the issues identified in this synthesis report would be advantageous.

2. ***Embedded Literacy: Strengthening the Connection between Work and Learning.***

D'Amico, D. (2003, for the Workplace Learning Conference).

Available at: [http://www.workandeconomy.org/images/Embedded_Literacy - Strengthening the Connection between Work and Learning - DAmico.pdf](http://www.workandeconomy.org/images/Embedded_Literacy_-_Strengthening_the_Connection_between_Work_and_Learning_-_DAmico.pdf)

In the paper, D'Amico offered delivery strategies that embed literacy in a work context and as part of job training to help workers do their jobs better or progressively move on to new jobs in their sector. She noted that education is connected to employment and that, in order to advance, workers need opportunities for training and education to move on to good jobs. She argued for contextualized and meaningful literacy within the context of work.

D'Amico discussed comparisons among five different short-term programs in a labour-management context for health care workers that embedded literacy. First she described these programs:

- Registrar-receptionist training:* Participants received two weeks of upfront literacy training which was closely focused on the 10-day classroom training and 2-day on-the-job component that followed the literacy component.
Results: 11 participants who took the literacy training passed the skills based training and got upgraded positions. All had scored below minimum competency needed on a healthcare workplace literacy tests.
- Sterile supply technicians:* These workers were now required to pass a national certifying exam to keep their jobs. An integrated team approach to training for the test was used. A

literacy instructor attended 26 morning sessions in which the content trainer went over the content material and then in the afternoons taught participants understanding of the text and test conventions.

Results: Participants were all at the Grade 4–7 level. All nine passed the progress tests, indicating a good prediction they would pass the exam.

- c) *Certified nursing assistant training:* In this 140-hour training program, literacy and job skills were integrated throughout. This training was on workers' own time.

Results: Fifty-eight of 61 participants (95%) passed both the clinical and written state certifying exam. On a standardized literacy assessment, these participants had scored between Grade 8 or below on math and reading.

- d) *Clinical associate training:* All workers eligible by their job title to take this training to get upgraded pay and skills were included. The program provided tutors to help participants who needed it pass the course. There was not literacy assessment before the course.

Results: All 205 participants passed the course and got upgraded to the position of clinical associates. They were given the standardized literacy test after the course. Over half had below a Grade 9 reading level, including some who had outstanding performances in the course.

- e) *Training for three job titles:* Participants who scored below competency required for the training were put in a remedial literacy class with 84 hours of training. The training was half on work time and half on people's own time.

Results: Fifty-four percent of those with remedial training passed the training in comparison to 66% of those who did not have the remedial training.

From her analysis of these different models, D'Amico concluded that there are common strategies that improve the employment opportunities for those in certain sectors who need basic skills support. The common strategies are integrating literacy, language, and math and that job training increases employment and pay.

3. *Embedding Literacy and Numeracy into Level 2 Plumbing and Gas Fitting Textbook Wraparound Guides.*

Industry Training Federation (ITF, New Zealand, un-dated)

Available at:

<http://www.itf.org.nz/assets/Publications/Literacy-Publications/Plumbing-ITO-embedding-into-resources-guidelines.pdf>

The practical guide provides an example of how to integrate literacy and numeracy strategies into trades-training through the development of a workbook or guide for a Level 2 Plumbing and Gas fitting textbook. The document includes the following:

- how to isolate key reading, writing and numeracy skills students will need for a particular chapter
- where to place these skills alongside content in the lesson planning process
- how to incorporate activities that build these skills within the trades content using the textbook

4. *Industry Training Organizations Literacy and Numeracy Good Practice Case Studies: Series One*

Industry Training Federation (New Zealand, 2009)

Available at:

<http://www.itf.org.nz/good-practice-publications.html> *Good practice -case studies 2009 online.pdf*

This research from the Industry Training Organization (ITO) of New Zealand includes a case study on embedding literacy and numeracy into workplace training in the health and disabilities sector. Many of the support workers are described as mature workers who are women, speaking English as another language.

The case outlines good practice for embedding literacy and numeracy used by Careerforce, the sector's industry training council. Some of the features of the integrated approach of interest to the CSC project are:

- this integrated workplace project used a team teaching approach with a literacy expert and a workplace trainer
- the literacy and numeracy work fit with the Careerforce development philosophy of building capacity of and infrastructure for these workplaces

The outcomes of an integrated approach were:

Employees:

- 75% of 400 employees from 27 workplaces got a National Certificate in Community Support Services (Foundation Skills) Level 2
- They showed gains in reading and writing and numeracy
- They improved in organization skill and had more confidence to work on a formal qualification

Workplace Trainers:

- Workplace trainers were more aware of the link between literacy and more independent learning

Employers:

- better service delivery and stronger organisational culture
- better communication around workplace practices—what works and what does not
- stronger in-house training capacity

5. *Embedding / integrating literacy, language, or numeracy in other subjects / programmes.*

NIACE (2005)

Available at: http://archive.niace.org.uk/information/Briefing_sheets/64-Embedding-LLN.pdf

NIACE indicates that embedding basic skills is a concept that is a “work in progress.” Suggested working definitions of embedding include: 1) supporting activities through basic skills that are integrated into, contextualized through, and developed within those activities. Activities include vocational training or courses.

NIACE outlines three main embedding models:

a) Fully integrated model:

Basic skills are clearly mapped on the curriculum and are present in all teaching and learning opportunities. The curriculum may be delivered by one instructor who has a knowledge of the vocational content and basic skills. Each learner has an individual training plan which covered both outcomes.

b) Sandwich model:

Basic skills are mapped on the curriculum but delivered in separate sessions. For example, the trades content might be delivered in the morning with the basic skills portion related to that content delivered in the afternoon. Different staff are involved in each area and learners have two individualized learning plans.

c) Overlapping Circles model:

Within this model, the vocational content and the basic skills content are both seen as separate circles that progressively become integrated during the program. For example, the two areas may start out separately in a program, move to a percentage of integration, and then to full integration. This model can contain elements of the first two previous models and may use one staff or two depending on resources. This model is seen as very flexible.

6. *Practical Guidelines for Embedding Skills for Life into Vocational Programs* (website)
Skills for Life Development Centre, Falmer, UK (undated)
Available at: <http://www.sfldc.org/guidelines/embedding/whatis.php>

On their website, the *Skills for Life Development Centre* has defined *embedding* as when basic skills are combined with vocational and other skills in a way that builds confidence, motivation, and competence for participants to succeed in their endeavours.

Embedding basic skills is articulated as an approach that benefits learners and makes the business case for providers. For learners, embedding basic skills into vocational training is deemed to contextualize the basic skills so learning has meaning and ensures success in the vocational program. For providers, the embedding approach increases retention, success in a vocational program and progression to other higher-level programs.

The guiding principles for embedding include the following:

- starting with the needs of the learner
- assuming that the inclusion or integration of basic skills underpins vocational success
- using a team approach to integrate basic and vocation skills
- developing basic skills to the level required by the vocational training
- using both a vocational and basic skills trainer for quality assurance of the program

7. *Skills for Life: Embedded Materials First Phase Research Report*

Training Advice and Consultancy (2003)

Available at http://rwp.qia.oxi.net/learning_material/reports/initial_report.pdf

This Phase 1 research report commissioned by the Adult Basic Skills Strategy Unit outlines the results of research on embedding literacy, language, and numeracy into vocational, occupational, and other settings as part of *Skills for Life* in the United Kingdom. The research consisted of both a document review and field research. The purpose of the research was to identify sectors that are priorities for embedding literacy, language, and numeracy.

Embedded materials are seen as materials that motivate learners to improve their literacy, language or numeracy skills within activities and the learning they undertake as part of vocational, training programs along with other work and non-work related settings.

A number of vocational and occupational sectors were identified as important for embedding materials including construction, health care, horticulture, hospitality, and retail. Research findings of importance to the CSC project are that:

- there are large numbers of young people in vocational training with low literacy and numeracy skills
- materials used for embedding literacy, language, and numeracy must be “real and everyday” and written in clear language
- there were a number of skill development areas identified as important such as (a) weighing, measuring, and volume; (b) completing workplace documents; (c) understanding safety manuals; (d) following instructions and passing on information; (e) customer care; (f) team work and communications; and (g) writing emails and short notes
- there was a lack of awareness about the usefulness of embedding literacy, language, and numeracy materials
- there was a lack of knowledge about good materials for embedding purposes; these materials should reflect the needs of stakeholders and not duplicate other material development

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