A "How to" Guide for AU Professors: Integrating Academic Upgrading (AU) into Pre-Apprenticeship Programs

College Sector Committee (CSC) for Adult Upgrading with Durham College of Applied Arts and Technology

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DURHAM COLLEGE
SUCCESS MATTERS

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Introduction

This handbook is part of a larger College Sector Committee (CSC) project called *Integrating Academic Upgrading into Pre-Apprenticeship Programming*. The overall goal of the project was to ensure that pre-apprenticeship students receive an Academic Upgrading (AU) component that is tailored to their trade and appears seamless with the trade component of their program. The CSC partnered on the project with Durham College of Applied Arts and Technology and its pre-trades Electrical Technical – Instrumentation & Control program. A project working group made up of CSC staff and consultants and Durham College faculty oversaw and provided guidance on different components of the project.

We use the term *pre-apprenticeship* to include Ministry of Training, Colleges and Universities (MTCU) funded pre-apprenticeship programs as well as the one to two year postsecondary pre-trades or technical programs that are offered through Ontario's community colleges. Academic Upgrading prepares people for entry into postsecondary programs and qualifies them to register as an apprentice. It is delivered exclusively by Ontario's 24 community colleges. The curriculum delivered is called the Academic and Career Entrance (ACE) program and is Grade 12 equivalent.

We also use the term *integration* to refer programming that integrates AU into pre-apprenticeship training. We use the terms *joint work*, *partnership*, and *collaboration* to refer to the larger partnership between AU and Apprenticeship departments. The joint or partnership work for the purposes of this handbook refers to how AU is planned and delivered as part of pre-apprenticeship programming.

Who this handbook is for

This handbook is for AU professors who are required to integrate AU into pre-apprenticeship or pre-trades programs in Ontario's community colleges. The information and practical advice will apply to those professors who work with both pre-apprentices and apprentices and need to embed AU into trades training. The principles and their applications will be helpful to AU professors who are working with students to get the Academic and Career Entrance (ACE) or General Educational Development (GED) credential as part of their pre-apprenticeship training.

How this handbook can help

This handbook contains useful guidelines for planning and developing AU support for pre-apprenticeship and pre-trades programs. We have also provided tips and strategies for developing trades-related AU and essential skills materials. This handbook also contains helpful examples from the Durham College pilot program with pre-electrical students and examples from other colleges' pre-apprenticeship programs. We also include an overview of apprenticeship and pre-apprenticeship programs and how they work in Ontario. This information is included in Appendix 1.

What this handbook includes

The handbook includes the following chapters offering useful information and practical advice to help you develop a trades-specific AU component of pre-apprenticeship training:

Chapter 1:

- Provides information on the current status of integrating AU into pre-apprenticeship training in Ontario's colleges
- Provides models of integrating AU or essential skills into trades training
- Outlines guidelines for effective practice

Chapter 2:

- Provides a rationale for using an integrated approach
- Identifies the results from using an integrated approach

Chapter 3:

- Explains how Apprenticeship and AU can work together for pre-apprenticeship programs

Chapter 4:

- Provides practical tips and examples for how to make AU materials trades-specific to different subjects
- Shows how to work with pre-apprenticeship students

Chapter 5:

- Identifies useful resources

Bibliography

- Includes a detailed list of resources used to develop this document

Appendix 1:

- Explains the cycle of apprenticeship and pre-apprenticeship training

Chapter 1: What it means to integrate AU into pre-apprenticeship and pre-trades programming

This chapter includes an overview of current community college integration activities in pre-apprenticeship programming. It illustrates common models of how AU and essential skills[1] have been integrated into trades, technical, or vocational training in Ontario's colleges and elsewhere. It also includes guidelines for effective practice that apply to any model of integration work or partnership work that is undertaken.

Overview of college integration activity for pre-apprenticeship[2]

A 2011 survey by the CSC of Ontario's colleges shows that over 80% of colleges offer pre-apprenticeship programming and integrate AU into that programming. The most common method of integration is to embed AU into the pre-apprenticeship curriculum, followed by delivering AU prior to the pre-apprenticeship program. Just over 40% of colleges offer more than 40 hours of AU in pre-apprenticeship programming. Half the colleges indicated they offer less than 20 hours of AU as part of the pre-apprenticeship program. The most common subjects included in AU are Math and Communications. To a lesser degree, Computers, Science subjects, English, Self-management, Self-direction, and Success strategies may be offered as part of the AU component.

The most common trades included in pre-apprenticeship programming with an AU component are:

- Cook*
- Construction Craft Worker*
- Carpenter*
- Automotive Service Technician*

[1] In this handbook, we use *essential skills* in the generic sense to include the foundation skills that students need to be successful in their trade and at work. This may include the nine Essential Skills in the HRSDC framework (see http://www.hrsdc.gc.ca/eng/workplaceskills/LES/definitions/definitions.shtml). However, we use the generic term to go beyond these nine to include other areas such as sciences and self-management, self direction, study skills, and exam-taking skills, etc.

[2] Folinsbee, S., & Hall, C. (2011). *The state of integrating academic upgrading into pre-apprenticeship programming in Ontario's colleges: Final report.* College Sector Committee and Durham College.

- Plumber
- Industrial Millwright
- Sheet Metal Worker
- Truck and Transport Technician

The trades listed below are included to a lesser extent:

- Baker
- Construction Electrician
- Electronic Technician
- Machinist
- Metal Fabricator
- Parts Person
- Heavy Duty Equipment Technician
- Industrial Electrician
- Instrumentation and Control Technician
- Refrigeration and Air Conditioning Service Technician

* Top trades identified for pre-apprenticeship programming

A. Common models of integration

In Ontario's college system, the most common way to integrate AU into pre-apprenticeship training is to offer the AU component upfront before the trades subjects are taught or offer it at the same times as the trades courses. In some cases, extra math upgrading programs are offered to support pre-apprenticeship/trades students and apprentices who need extra help. In other cases, AU achievement goes towards the ACE or GED. What is offered and how it is offered depends on each college and is dependent on many factors.

We did an international literature review for the project and found that the most common ways to integrate essential skills into vocational training include the following:

Essential skills component is taught before trades training

The AU or essential skills component (math, document use, writing, computers, etc.) is taught before the trades training with the essential skills component related to what participants will learn in the trades or pre-apprenticeship training.

Essential skills component is taught at the same time as the trades training

Essential skills are taught at the same time as the trades training but in different sessions. For example, essential skills could be offered in the morning and trades content in the afternoon with the two instructors collaborating to make sure the essential skills component is tailored to the trade. The AU component may be offered after class as well.

Essential Skills component is taught within the trades training

The trades program uses a fully integrated model where essential skills and literacy are mapped explicitly in the curriculum with one instructor teaching both or the trades instructor and essential skills expert working together.[3]

B. A model of integration that works for your pre-apprenticeship program

The choice of how to integrate AU into pre-apprenticeship programs is dependent on many factors such as:

- level of commitment to integration
- integration strategy chosen
- scheduling issues

[3] Folinsbee, S. (2010). *Literature review on integrating literacy and essential skills into trades training.* College Sector. Committee and Durham College.

- student needs
- available resources
- relationship with the apprenticeship area

Whether you decide to offer AU before the pre-apprenticeship program begins, during or both of these options will depend on these factors.

C. Guidelines for effective practice for integrating AU into pre-apprenticeship programs

To identify effective integration practices, we interviewed experienced AU faculty who work with pre-apprenticeship and pre-trades programs. The literature review also identified a number of effective practices. We have combined the effective practices and listed them below as a series of broad guidelines for integrated work.

We use the term *guidelines* to reflect the diversity of ways in which colleges work on integration. There is no one process that will work for everyone; rather, they are flexible guidelines that emphasize careful planning and collaboration and the need to make AU materials trades-specific.

These guidelines assume that there is at least a desire on the part of AU and Apprenticeship to work together and some shared understanding of how working together can support students' success.

The guidelines are:

1. Have commitment from senior management from your college to work towards integrated programming.

2. Use a model of integration that works for your pre-apprenticeship or pre-trades program.

3. Consult and work with trades management and faculty to plan how best to integrate AU with trades subjects.

4. Review the course outline and the content of the trades subjects under focus for integration.

5. Together with Apprenticeship, identify gaps in foundation skills students will need—both for the pre-apprenticeship program and for working in the trade.

6. Conduct an assessment with each student in the integrated program to identify his or her goals and areas for development.

7. Develop a training plan for each student. Revisit the plan often.

8. Make sure that the AU or the essential skills component is contextualized specifically to the trades using trades-specific materials.

9. Use the materials the trades faculty are working with to prepare and teach trades-related math foundations, communications, and other subjects.

10. Link AU learning to the real world of the trade and the workplace.

11. Demonstrate and have students put into practice how foundation skills like math are used in the trade.

12. Use many different ways to illustrate learning to accommodate diverse learning styles.[4]

[4] See *Making the business case for integration among Employment Ontario Services and Programs.* College Sector Committee (2010) and *The State of integrating Academic Upgrading into Pre-Apprenticeship Programming in Ontario's Colleges: Final report* (2011).

Effective Practice: Durham College Pilot with Pre-Electrical Students

In the pilot at Durham College with pre-electrical students, academic upgrading was offered concurrently with the program in which the students were enrolled. Academic Upgrading faculty worked with the Electrical Technical – Instrumentation & Control program to deliver a first semester mathematics course. The course addressed basic math skills including whole numbers, fractions, decimals, percentages, algebra, geometry and trigonometry. Academic Upgrading instruction occurred 2 hours per week. Students had the option to attend more hours, but there was a minimum requirement of 2 hours/week.

In order to identify a focus for the pilot, consultations were held with Apprenticeship and AU management and faculty as well as pre-trades electrical students and electrical apprentices.

In preparation and as a means of identifying student learning gaps, students completed the Test of Workplace Essential Skills (TOWES) and were debriefed on their results within the first month of their program. TOWES is an assessment tool to test whether someone has the appropriate levels of Essential Skills in the areas of reading text, document use, and numeracy.

A collaborative approach was also used with the students around their academic progress in order to encourage accountability for their academic success. They were expected to complete a monthly training plan that identified their academic progress for the month. This allowed for continuous effort, review, and increased learning throughout the course.

AU and Apprenticeship worked together and decided that more frequent tests on course material would occur. This was instead of one test for several units of content as used in the pre-electrical math program. More frequent tests allowed for constant review and growth of knowledge of course topic areas. Students also became more aware of their level of performance, and had opportunities to improve in areas that they were weak in. Students could also write the tests when they were ready.

Chapter 2: Why use an integrated approach?

The purpose of this chapter is to make the case for why an integrated approach to pre-apprenticeship training is important. The information in this chapter is taken from an international literature review which included the 2010 CSC study: *Making the Business Case for Integration among Employment Ontario Services and Programs.* This chapter identifies the kinds of AU and essential skills needs that students in pre-apprenticeship programs have.

A. The Need for an integrated approach

Literature review findings

The literature review for the project indicated that 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. Although trades math is identified as a number one need, other necessary skills such as note taking, document use, reading comprehension, and test- or exam-taking skills are also of critical importance. The specific needs for AU support will depend on the trade under consideration.

AU professors identify needs

Similarly, in interviews with AU professors, math was cited as the greatest need for pre-apprenticeship students followed by document use, reading, writing, oral communication, and study skills. Computers, customer service, and "working with others" were also mentioned, although less frequently.[5]

[5] See *The State of integrating Academic Upgrading into Pre-Apprenticeship Programming in Ontario's Colleges: Final report.* College Sector Committee and Durham College (2011).

Findings from the Durham College Consultation:

The consultation with pre-trades electrical students and faculty in the Durham pilot indicated that math, document use, physics, science, computer use, note-taking, study skills, and reading comprehension were challenging areas for pre-electrical students.
(CSC, 2010)

B. Making the business case for integration

Rationale for integration

Here are some of the reasons why integration work has been identified as important:

A way to improve student retention and success
Collaboration among Academic Upgrading, Apprenticeship, and Employment Services improves the success of and retention rate of non-traditional learners coming into colleges. In addition, the Ontario government's launch of Employment Ontario in 2007 also facilitated the need for internal college departments focusing on skills training to work together.[6]

More MTCU emphasis on student outcomes
A recent focus from MTCU on student outcomes has meant a greater emphasis on more referrals from Apprenticeship to AU and for Apprenticeship to increase its retention and success during in-school component as well as Certification of Qualification (C of Q) tests.

[6] See *Making the business case for integration among Employment Ontario Services and Programs.* College Sector Committee. (2010)

C. Results of Integrating AU into Pre-apprenticeship Training

Integration supports success

Research conducted by the CSC showed that there was a business case to be made for departments such as AU and Apprenticeship working together to serve the needs of pre-apprenticeship students. Cases across seven Ontario colleges using a partnership model showed that there were many benefits to colleges, including increased student retention and success in completion.[7]

Increased success completing trades courses

Faculty members from Ontario's community colleges indicated that students are more successful in passing their trades courses and they are more confident.[8]

Retention also a benefit

The results from the literature review are congruent with the faculty members' responses and the CSC research. 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
- a move to higher order training because of the inclusion of literacy and basic skills training.[9]

Students confirm results

Students from pre-apprenticeship programs in Ontario's colleges confirm the results. They indicate that they gained confidence from having an integrated program combining AU and trades subjects. They got better marks and were able to meet their career goals. For some, the

[7] Ibid.
[8] Folinsbee & Hall (2011).
[9] Folinsbee (2010).

integrated approach gave them a chance to refresh skills such as math and to transition into college. They also found the AU component supported their success in the pre-apprenticeship program and prepared them for future employment.[10]

Pre-electrical Students Pass Math

At Durham College, all 14 participants who took trades math through Academic Upgrading passed their Trades Math in the first year of their pre-electrical program.

In the Durham College pilot, students indicated in the first evaluation check that they understood math better, they got immediate support from the instructor, and they had become better at problem solving because they were working at their own pace. They indicated that the class allowed for different ways of learning and they felt they learned the material better. The class was seen as self-motivating, more interesting, and with less pressure.

[10] See *Making the business case for integration among Employment Ontario Services and Programs.* College Sector Committee (2011).

Chapter 3: AU and Apprenticeship: Common practice and lessons learned

In this chapter, we look broadly at ways AU and apprenticeship can work together to plan an integrated program. We examine the lessons learned in partnership work by some of Ontario's colleges.

A. Overview: How integration between AU and Apprenticeship has worked in Ontario's Colleges[11]

Information as sharing a first step

Collaboration between AU and Apprenticeship often began informally with informal meetings to share information and figure out how to work together. In some cases, collaboration came about naturally because AU and Apprenticeship worked together at the same location or in the same building. Frequently collaboration began when there were opportunities to apply for funding especially around pre-apprenticeship training programs.

Organizational commitment and regular meetings important

Organizational commitment to joint work or integrated programming between AU and Apprenticeship is a key ingredient to success. This includes having an identified champion for the joint work, having partnership goals built into the college's strategic plans, and ensuring that partnership work is included in the performance plans of the departments involved. In these partnerships, management from the two departments (sometimes along with other departments) meet regularly to share information and to solve problems, as well as to plan and monitor specific activities and projects. The partnerships are focused and task-oriented. The

[11] Ibid.

partnership activities included information sharing, referrals, and work on joint initiatives like pre-apprenticeship training.

Faculty collaboration important

At the faculty level, there are varying levels of collaboration among Apprenticeship and AU to tailor AU to the pre-apprenticeship trade under consideration. The more collaboration there is, the more benefits there are for the students.

B. Lessons Learned from successful integration projects

The results of case studies from seven colleges in *Making the Business Case for Integration Among Employment Ontario Services and Programs* show that there are a number of key factors in partnership work among AU and Apprenticeship and others. These factors are important to keep in mind when working with Apprenticeship to integrate AU into pre-apprenticeship training.

The lessons learned include:

Partners need to share a common goal of student success

It is important for AU and Apprenticeship faculty to share a common goal in working together for the success of the student.

Vision and support from management is necessary

Vision and support from management for partnership work is key. This support may be formal or informal. This support smoothes the way for successful partnerships at the faculty level.

Value of Academic Upgrading is demonstrated

It is important for AU to be able to demonstrate what they can bring to the partnership to help in areas such as math, reading, document use, oral communication, and the sciences, as well as other skills such as note-taking and exam-taking. Apprenticeship faculty may not know the kinds of support that AU can bring that will support their students' success. Furthermore, they are under pressure to cover a great deal of material in a short amount of time. They may not have the time or expertise to help students who are struggling in these areas.

Ability to share resources in critical

The ability to share resources is also key. In the case of AU and Apprenticeship faculty, this would include sharing curriculum, textbooks, and course materials.

Good relationships and shared values are a must

The desire to want to work together is a priority. Faculty need to share a common vision and goal for student success. Other shared values include openness, trust, creativity, and flexibility.

Clear expectations around roles and timelines need to be established

An understanding of who will do what and when is important at all levels of the partnership including at the management level and among faculty.

Length of pre-apprenticeship programs should be extended

Often the length of pre-apprenticeship programs is not long enough to accommodate program goals for AU—especially if students need to get a credential. It is important to build in enough time for these goals to be accomplished at the front end of the program, before the program actually starts, or during the program.

Working Together: Durham College Pilot

Durham identified early that communication was a key element in ensuring a successful pilot. An initial meeting was held with the Dean and Associate Dean of Academic Upgrading and the Dean of Skilled Trades, Apprenticeship and Renewable Technology. At this meeting, the project proposal was discussed and two faculty, one from each program, were identified as leads for the integrated course. Timelines were identified for the components of the project.

A working group was also developed. Members were the Associate Dean of Academic Upgrading and the Manager from the Apprenticeship programs. These contacts oversaw the operational aspects of the project and worked with the CSC project leads.

We developed a work plan which identified the necessary steps to be completed prior to the pilot program starting. We also developed a communication strategy amongst all parties involved in the project. Communication among the parties took place via email, by phone, and in face-to-face meetings. These meetings were ad hoc and primarily occurred as questions came up about the program or student progress. Management were not located at the same campus where the delivery of the project occurred and so two teleconference calls were set up with the faculty to discuss progress and provide feedback on different aspects of the project as well as troubleshoot any concerns related to delivery. If concerns came up between the scheduling of these calls, faculty would call or email management directly.

For the duration of the project, AU faculty became located at the campus where the trades programs were delivered. AU faculty were co-located in office space with trades faculty to allow for relationship building and for students to easily meet with AU faculty regarding course material.

This arrangement also established a cohesive environment for faculty members to interact on an informal basis and further provide for the close integration between the programs. This enhanced and supported our program teams and built a sense of community within the two programs. Faculty found this to be a positive experience where they were able to collaborate and share resources from their respective areas in order to enhance their curriculum.

Chapter 4: Development and delivery of AU: A guide to making AU materials trade-specific for pre-apprenticeship students

The purpose of this chapter is to provide AU professors with strategies, tips, and examples of how to make AU trade-specific for pre-apprenticeship students. There are many ways to develop, customize, or find additional supporting materials and tasks that are trades specific for different subjects. The information in this chapter is based on interviews with AU professors who are experienced in integrating AU and trades-related materials into their programs and the Durham college pilot. We use quotations, information, and examples from these interviews with AU professors throughout this chapter. We also provide examples from the Durham College pilot. You will probably be familiar with many of these strategies from your regular AU programming. This chapter will show you how to make AU trade-specific.

During pre-apprenticeship training and on a work site, pre-apprentices need more than just technical skills. They need strong essential skills to succeed in training and on the job. Materials in technical training often combine reading, document use, and numeracy at the same time. For this reason, we have focused the examples on reading, numeracy, document use, and communication.

By making AU trade-specific and related to the world of work, AU professors help apprentices to develop transferable skills and strategies that will serve them throughout their trades training and on-the-job. When the essential skills strategies are used in conjunction with technical training material, their application is direct and relevant.

A. What is trades-related AU?

Trades-related AU instruction and activities have a clear connection to trades training. The activities developed for instruction should be relevant to pre-apprentices' trades training and on-the-job work experience. This supports the transitions to on-the-job and provides background knowledge needed for preparing for tests and exams such as in-school tests and exams, the C of Q and the IP Red Seal examination

Therefore, trades-related AU is any activity linked to students' trade of choice and the trades-related training. Using authentic materials in an authentic trades-related way is the best way to make activities relevant.

B. Steps to making AU trade-specific

There are four main steps to making AU materials trade-specific:

1. Link AU learning to the world of the trade and the workplace:
   - Meet with trade instructors
   - Gather authentic trade-related materials from trades faculty and workplaces
2. Develop learning objectives based on what the students need to be able to do
3. Develop trade specific learning activities
4. Conduct initial Essential Skills Assessment

Step 1: Link AU learning to the real world of the trades and the workplace

Meet with trades instructors

Trades instructors are in a challenging position. They often meet apprentices on the first day of a six- to eight-week block of training with little or no background information about them. Contact time is short and the curriculum is dense. They do not have the time to teach the reading, document use, and numeracy skills—even if it is at the refresher level. They appreciate the support from AU.

It is important to meet with trades faculty. This is an opportunity to build a relationship with them and show the value of AU. You can also learn about the common areas where learners struggle. You will need more than just statements like, "Well, they struggle with math and formulae." Try to get specific examples of *where* pre-apprentice learners struggle and *what tasks* are the most difficult, for example, foundation math skills such as fractions, percentages, ratios; reading and interpreting blueprints, drawings, and schematics; taking class notes; basic science and physics.

A trade instructor commented that pre-apprentices did not have a strong grounding in using fractions to calculate measurements. They also needed a better understanding of electrical formulae, electrical principles and basic physics. He noted that trades professors can help AU professors get a sense of the skills pre-apprentices need to have to be successful in trades courses and the workplace.

From Durham College consultations

Gather authentic trades training and trades-related materials

It is important to use the materials and concepts the trades faculty are working with to prepare and teach trades-related math foundations, communications, and other subjects.

Why use authentic materials?

Using authentic trades-related materials and creating teaching objectives linked to the trade and world of work makes learning direct and relevant. You are providing learners with transferable skills that they can use throughout their pre-apprenticeship training, both in school and on the job.

What are authentic materials?

Authentic materials include drawings, tables, photos, videos, course tests, quizzes and assignments, diagrams, textbooks, and codebooks that learners will encounter during their trades training and on the job. Any material that has real-life work application or is trades training-related is authentic.

Many materials can be used to develop teaching materials for numeracy and communications (including reading, document use, and oral communication) and other subjects. Useful materials that you could incorporate include:

From trade instructors:

- course outlines
- textbooks
- tests

- quizzes
- teaching aids such as notes and slide presentations
- course projects and assignments

From the trades and apprenticeship community:

- authentic real-life and workplace materials (forms, drawings, schematics, schedules, letters, maps, codebooks, manuals, photos, product instructions, operator manuals, and online instruction videos, etc.)
- published Essential Skills trades training materials from sector councils, colleges, and apprenticeship and trades-related organizations (see Chapter 5)

Sector councils, colleges, and apprenticeship and trades-related organizations such as Skillplan have trades-specific teaching materials available. Many of these materials have been developed using construction industry applications but are usually not specific to any one trade. They can be used as presented or used as models to develop similar activities for a specific trade you are working with.

Things to consider when collecting materials:

- Do they meet and fit within your instructional goals?
- Is the content of the materials accurate?
- Is the material current with trade standards? You can verify this with trades instructors.
- Do you have written permissions to use materials?
- Have you followed copyright requirements when making copies?

Step 2: Develop learning objectives: what do the students need to be able to do[12]

Determine what you want students to be able to do

Develop trade-specific learning objectives in terms of what trade tasks pre-apprenticeship students need to be able to do. In order to plan for specific learning activities, you need to combine the objectives of the pre-apprenticeship program with the more immediate and concrete short-term AU objectives of students.

Meeting with the trade instructors, reviewing course outlines, and assessing students' needs will help you to determine your global learning objectives and target your teaching. If you are clear about what you want pre-apprentices to do, then you can create and use materials that will help meet the learning objectives you have set for the students.

Here are some trades-related learning objective examples:

- set up and solve numeracy problems that involve several steps and foundation math skills to complete tasks such as determining quantities for materials or goods
- locate and interpret codes
- locate measurement data in drawings

An AU professor said she initially started integrating pre-packaged trades-related material into pre-apprenticeship and apprenticeship programs and then, as she became more comfortable, she was able to adapt and create her own trades-specific materials based on the group and individual needs of learners.

From interviews with AU professors, 2010

[12] Adapted from *A Handbook for Construction Trade Instructors: Developing Trades Math Worksheets,* Construction Sector Council (2009).

Determine skills and sub-skills the students need to know in order to achieve the learning objective

Once you have developed your overall learning objectives, it is important to identify the essential skills required by the student to complete the task. This helps you determine what essential skills to teach and review as they relate to trade specific tasks. For example:

- ***Numeracy tasks:*** Pre-apprenticeship students may need to know formulae, conversion calculations, and how to perform calculations using decimals, fractions, rates and ratios.
- ***Reading tasks:*** Pre-apprenticeship students may read codebooks and operating manuals. They need to know how to navigate these documents to select relevant material and interpret dense and sometimes complex information.

Trades-training activities and workplace tasks often combine several essential skills at the same time. Keep this in mind when developing learning objectives. For example, industrial electricians scan tables in electrical codebooks for specifications of the size of wire needed in relation to the length of the wire's run and the size of motor. In this case, students combine reading, document use, and numeracy skills to determine the size of wire required. If all of these tasks are identified and authentic materials are used during a math class, the students see the immediate relevancy of the foundational math.

Determine the authentic materials that will relate the learning to trades training and the workplace.

For example:

- codebooks
- specifications
- charts
- graphs
- operating manuals
- diagrams
- recipes
- standard operating procedures
- manuals
- various regulations and legislation depending on the trade
- documents and forms from employers

Determine what information is required or helpful that the students will need to have as part of the learning activities

For example:

- Break down a process into steps and explain each step
- Provide trade-related formulae with workplace task examples related to the student's trade
- Provide examples of how to set up and solve numeracy problems
- Provide document use and reading strategies

Step 3: Integrate trade specific learning into AU

In this step, you will find strategies and examples of how to make AU materials trade-specific to various subjects.

Numeracy

Global Numeracy Strategies:

- Create cheat sheets for common trade formulae and foundation math skills such as ratios, rates, percentages, fractions, and decimals. Make sure to provide examples of calculations using trade and workplace tasks.
- Create examples of how to set up and solve numeracy problems. Include examples and answer keys which describe the steps using trade and workplace tasks.

The examples that follow show how to create trade specific AU for numeracy.

Numeracy Sample 1

The goal of this activity: To further develop foundation, finance, and business math skills in relation to cooking environments as part of a pre-apprenticeship program for cooks.

The AU instructor worked closely with the cooking instructor to link the ACE core numeracy curriculum to the assistant cook program. She used recipes to teach students how to multiply and divide fractions and decimals, to use ratios and percentages, and to convert between units of measure. In addition, she incorporated authentic materials such as catering inventory lists, order forms, and events requests to calculate ingredient amounts, wastage, costs, and profit margins as part of the business and retail finance math.

How did this numeracy activity incorporate trades-related learning?

By using authentic workplace materials, the students learned their foundation math, business math, and retail finance skills in a way that was directly applicable to how they were using them in the cooking classes and on-the-job. By linking trade materials to AU activities, students were more motivated and better able to grasp the AU math concepts required to achieve their ACE requirements. In addition, because the math activities were related to the trade, they were more confident in completing the activities and able to transfer their learning directly to their assistant cook training and job placements.

Numeracy Sample 2

The goal of this activity: To further develop an understanding of fractions, decimals, orders of operation, metric and imperial units of measure, integers, algebra, geometry, and trigonometry being studied and its relation to electrical environments.

In the Durham pilot, trades-related curriculum was used from the Apprenticeship Network's trades-based curriculum *Evaluating Academic Readiness for Apprenticeship Training* (EARAT) available at http://www.theapprenticeshipnetwork.com/earat-staticcontent-137. See PDF files:

- 02R M08 (Imperial Measurement.pdf)

- 02R M09 (Metric Measurement.pdf) for electrician math.

How did this numeracy activity incorporate trades-related learning?

Using this material, students learned how to convert between the units of measure, how to perform basic math functions using metric, how to perform basic math functions using imperial measures, how to convert between units in metric, and how to convert between units in imperial. For example, mechanics convert parts measurements, and cooks and carpenters convert between fractions and decimals to determine dimensions and quantities.

> *A trades instructor brought down a few students who had failed some of the math for pre-apprenticeship carpentry program. The trades instructor came in with their tests and the AU professor was able to see the areas that they were struggling in and could work to help the students pass the test. He worked on the math foundation skills using trades training material, ERAT, and upgrading materials to help them pass their exam.*
>
> From interviews with AU professors, 2010

Numeracy Sample 3

The goal of this activity: To assist the students with their understanding of trigonometry functions.

In the Durham pilot*, Numeracy Rules* from Skillplan[13] was another resource used. Sections D4 and D5 of the booklet were used to supplement the Academic Upgrading material on trigonometry as it related to recognizing common angles. These sections contained trigonometry questions that were construction trade-based and provided real-world examples such as trigonometry functions to a right angle triangle and solving for a missing component of a right angle triangle. While the *Numeracy Rules* material was not specifically electrician-based material, the descriptions, examples, and exercises were all construction-based and consistent with the wording found from HRSDC's Essential Skills profile for a construction and industrial electrician.

[13] SkillPlan - BC Construction Industry Skills Improvement Council. (2004). *Numeracy rules.* Burnaby, Canada: Author. Available from http://www.skillplan.ca/

How did this numeracy activity incorporate trades-related learning?

Using this material, students learned how to calculate angles using trigonometry when measurements were missing to complete electrical related tasks such as verifying the placement angle of a component to meet code.

Numeracy Sample 4

The goal of this activity: To teach students how to set up and solve math problems.

One AU professor said that, typically, students struggled with questions incorporating math word problems. Students found the most success in solving word problems by visually seeing a diagram or picture representation of the word problem and then solving the numeracy aspect of the question once a visualization cue was put into place. As an example, students doing trigonometric word problems involving angles of depression or angles of elevation struggled to solve the question by just reading the text, but achieved improved results after a picture of the word problem was created.[14]

How did this numeracy activity incorporate trades-related learning?

From this activity, the students learned how to set up math problems, to create or interpret drawings to explain tasks, and to perform trigonometric calculations related to workplace tasks.

On-the-job apprentices will work from actual or virtual drawings so making their learning contextual is motivating and transfers learning to the real world.

> *"I have tried to run specific AU programs that focus on fractions or ratios. Students had a hard time understanding the context. But when I used their trades training worksheets, the information became relevant and the students understood the math related to their trade."*
>
> From interviews with AU professors, 2010

[14] From interviews with AU professors 2010

As the AU instructor became more familiar with the trades and worked with the trade instructors, it became easier to develop his own material. It was not necessary to have the background in the trades as long as the trade teachers provided materials they used in class. He picks the material apart to find relevant math questions.

From interviews with AU professors, 2010

The example above demonstrates the importance of integrated programming. It supports a deeper understanding and increased confidence and motivation for the student.

Reading[15]

Pre-apprentices need strong reading skills to read and interpret technical materials such as manuals, codebooks, and policies.

Global Reading Text Strategies

1. Review technical training and workplace materials (textbooks, recipes, codebooks, manuals, and other reading material) with pre-apprentices to help them understand the structure and relevance of the materials
   - Explain the relevance of reading material structure such as table of contents, chapter objectives, paragraph headings, glossaries, appendices, and indexes. Make sure students understand how to navigate documents; see Document Use strategies.
   - Have students practice locating information using the table of contents and the index in codebooks, textbooks, and manuals.
   - Ask students to predict what they will be reading based on chapter headings.
   - Teach students how to record terms and definitions.
   - Demonstrate highlighting techniques to highlight key words, main points, and other important information.

[15] Reading Strategies were adapted from *Tips on Introducing Essential Skills into Construction Training*, Construction Sector Council, Skillplan, & The Canadian Apprenticeship Forum (2010).

- Show students how to label, earmark, or write down page numbers to indicate importance for easy access later.

2. Explain to students why they are reading:
   - Explain to students the purpose for reading (i.e., what they should learn from reading). Give a focus to the reading (e.g., review key words and hand out questions about what they are reading before students start reading).
   - Describe what students are reading, have them develop questions to answer while reading, and encourage them to discuss other strategies they can use to help remember important information (e.g., highlight key words and sentences, make bullet points every couple of paragraphs to break text down into manageable chunks, etc). This encourages students to develop their own reading strategies that work best for them.
   - Identify and highlight key words in chapter questions and then use those key words to locate important information throughout the text.
   - Ask students to summarize the information when they have completed the specific reading task.

2. Integrate information:
   - Have students combine notes about a topic in one place, using key words and summaries.
   - Have students practice combining information from several parts of a text or several sources.

Reading Sample 1[16]

The goal of this activity: To have students practice reading for a purpose

The AU instructor created vocabulary lists of commonly-used trade terms. She used this as a weekly activity for a communication class. Each week she assigned the students several new trade-specific words that came up during the trades class. The students were asked to look up and record the definitions. The instructor took up the words as a class discussion. The class created the final definition to be included in the class vocabulary list. The vocabulary list was then posted online.

How did this reading activity incorporate trades-related learning?

Students used different sources to locate particular trades-specific information, they summarized what they read, and they integrated information from several sources. They learned common trades-specific language of their chosen trade which would help when they read other trades-specific materials in the future. In addition, this activity helped students to practice reading strategies independently.

Reading Sample 2[17]

Goal of the activity: To have students research, summarize, and combine information from several sources.

As part of a communication class for plumbing pre-apprentices, students were assigned a research project about a plumbing task of their choice. They were provided with a list of questions to answer about the plumbing task they chose. The second part of the project was to create a 5-minute instructional video for the tasks they chose. Students were coached on creating notes and preparing the videos.

[16] From interviews with AU professors, 2010

[17] From interviews with AU professors, 2010

How did this reading activity incorporate trades-related learning?

Students were able to apply reading strategies for a specific purpose and to summarize trades-related information. They then enhanced their communication skills and had an opportunity to create teaching materials for classmates. In the end, the project was an effective confidence-building activity for the whole class.

Document Use

Document use is a distinct type of reading task. When using documents, pre-apprentices need to not only locate and understand information or data, but also know how to navigate through tables, graphs, drawings, schematics, and diagrams. Use reading strategies to help students find the information they need, but they will also need strategies to:

- identify the purpose of documents
- locate, enter, and apply single and multiple pieces of information
- understand and use technical vocabulary, abbreviations, symbols, and other document features
- integrate information and data from multiple documents

Global Document Use Strategies

- Familiarize students with different types of documents, including forms in which they locate and enter information and data, drawings, schematics, flowcharts, lists, and simple and more complex tables
- Discuss purpose and use of documents
- Identify the information that different types of documents provide
- Explain and demonstrate how information on different documents such as drawings, blueprints, diagrams, and schematics is related
- Discuss what common symbols and icons are (from the trade) and create reference sheets for further use
- Review trade specific vocabulary, technical terms, and abbreviations common to different types of documents
- Have students practice using documents in other learning activities
- Have students create and label drawings, diagrams, and schematics

Document Use Sample 1[18]

Goal of the activity: Use recipes as part of document use and numeracy learning activities.

As a part of a communication class, the professor used recipes to help pre-cook students with reading and document use. The recipes were then used as part of math and document use tasks. For example, students practiced converting measurements, using fractions, and creating ingredients lists from the recipes. The class then created reference sheets for how to complete the steps in the math, reading, and document use tasks. These exercises were all kept in their portfolio so that they could have them for later use.[19]

How did this activity incorporate trades-related learning?

Students learned how to complete numeracy tasks in their trade, navigate documents, and incorporate reading strategies using trades-related material. They also developed portfolios of reading, writing, and numeracy tasks that they could reference in the future. At the same time, they were able to see their learning progress throughout the course.

Document Use Sample 2[20]

Goal of the activity: Navigate trades-related workplace documents

The AU professor did a basic introduction on reading and document use strategies for work-related materials. The professor used trades-related scenarios and materials that students would encounter at the workplace. For example, he used invoices, work orders, email, and other business correspondence. The instructor set up the workplace scenario, providing a completed example of a work order or an email. Then he asked the students to complete the activity of locating information or writing information on the form related to the sample activity and document that he provided. One situation was a mechanic's order in which the students had to locate information on what they had to do, what materials they needed, and when it had to be done by. These scenarios were then taken up in class. The students created a booklet of their work so they could reference it later.

[18] From interviews with AU professors, 2010
[19] From interviews with AU professors, 2010
[20] From interviews with AU professors, 2010.

How did this activity incorporate trades-related learning?

The activity provided students with strategies for working with trades-related documents, specifically in finding information and completing documents. This provided examples for future reference. It built students' confidence in working with trades-related forms and documents. In addition, it provided a valuable opportunity to show the transference of skills to work and other life contexts.

Other essentials skills enhancement activities related to the trades

Example 1:
Goal of the activity: To prepare for employment

As part of employment preparation, the students in the Durham pilot were asked to complete Skillplan's *Tools of the Trade.*[21] The apprentice-based booklet contains both employment resources and numeracy requirements that pre-apprentices and apprentices should be aware of. Students completed all five chapters of the booklet in order to gain a better understanding about apprenticeship and the essential skills involved in the trades.

Students read and responded to questions involving the history of apprenticeship; problem solving strategies; importance of essential skills in the trades; and workplace culture, attitude, and behaviours. Mathematical strategies were practiced using numeracy questions related to mathematical foundation skills involving area, perimeter, and volume; trigonometry; fractions, percent, ratio and proportion; and measurement.

How did this activity incorporate trades-related learning?

The book provided the students with an opportunity to link course material with workplace-based scenarios as well as providing an opportunity to learn more about apprenticeship and expectations of working within a trade.

[21] SkillPlan - BC Construction Industry Skills Improvement Council. (2000). *Tools for the trade.* Burnaby, Canada: Author. Available from http://www.skillplan.ca/

Example 2:

Goal of the activity: Develop communication and computer skills

As part of the AU communications component for a pre-apprenticeship assistant cook program, students were asked to create a recipe book using recipes from their cooking classes. The students edited the recipes, wrote an introductory page for each recipe section, and formatted the cookbook for production.

How did this activity incorporate trades-related learning?

The activity provided students with practice in reading and writing trades-related information. They also had to find information, create and edit recipes, and use a variety of computer programs. This built students' confidence in working with computers as well as reading and writing materials related to their trade. In addition, it provided a valuable opportunity to show how these AU skills relate to work and other life contexts.

Step 4: Conduct Initial Essential Skills Assessment

Before AU learning occurs, identify students' learning needs based on pre-apprenticeship trades requirements.

Each student who comes to your classroom has unique background knowledge, experiences, and skills. Some may have finished school, while others may have not. Some may have experienced difficulty in some areas and done well in others. Some students may just need refreshers while others may not have learned the necessary skill. Many students do not see the connection between what they learn in school and the trades training.

An essential skills assessment of pre-apprenticeship students gives instructors some of the information they need to assist students within the scope of the pre-apprenticeship program. It provides detail about students' essential skills strengths and gaps and learning supports they may need.

The assessment will help you to:

- develop AU plans that are flexible and based on the needs expressed by the students
- meet pre-apprenticeship program goals and be responsive to student learning needs

There are a variety of assessment tools you can use.

What do we mean by formal and informal assessment?

Formal Essential Skills Assessment

These tools are scientifically validated with the IALS 500 point scale. TOWES[22], PDQ and ESOT [23]are three such tests. TOWES measures three essential skills: reading text, document use, and numeracy. PDQ measures three literacy proficiencies: prose, document, and quantitative. Formal assessments are often used to determine entry into a pre-apprenticeship program. ESOT, a free online assessment, currently measures three essential skills - reading text, document use, and numeracy specifically referenced to Ontario's 53 Red Seal Trades. Listening will be added in the near future. Additional assessments for speaking and writing will be added in 2011-2012.

Evaluating Academic Readiness for Apprenticeship Training project (EARAT)[24] also includes academic assessments for 46 trades which are criterion referenced and based on the particular requirements of a trade.

Informal Essential Skills Assessment

Informal assessment is used to determine learner gaps and starting points. Informal assessments can be used to inform instruction and to track progress throughout a course. Informal assessments could include existing in-house AU assessments and trade-specific assessments. Many AU professors use their own informal assessments to determine needs.

In-house AU assessments can assess specific subjects and skills. For example, a math quiz could be administered during the first week of training to determine if students can work with fractions and use formulas. The test question format may be short answer, complete the sentence, multiple choice, or a combination of these. Informal assessments can be general indicators of skill levels.

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[22] The Test of Workplace Essential Skills (TOWES) was developed in 1998 by SkillPlan and Bow Valley College, with funding from HRSDC. See http://www.towes.com for more information.

[23] Essential Skills for Ontario Tradespeople (ESOT) was developed in 2010 by the CSC. It is an expansion and customization for Ontario of the Industry training Authority (ITA) on-line tool. See http://csc.essentialskillsgroup.com for more information.

[24] For more information please see http://www.theapprenticeshipnetwork.com/earat-staticcontent-137

Both formal and informal assessments identify learning strengths and gaps.

When to assess students

The initial assessment should take place before the program begins. It is the first step in an ongoing process of determining participants' needs. Once the classes begin, the participants will engage in learning activities that involve more extensive oral communication, reading, writing and basic math skills, and this will enable the instructor and participants to develop a more detailed awareness of abilities and difficulties. This initial assessment will help you determine appropriate activities with respect to trades-related essential skills. Finally, the initial assessment provides a baseline for future reflection by both students and instructors on the learning process in terms of evaluating progress and finding out whether participants' needs are being met.

Pre-assessment is often a procedural problem because colleges often do not have enough lead time to conduct them because they don't know who is coming. This can however be accommodated in Pre-Apprenticeship programs because students apply to colleges for admission.

Whenever possible, conduct brief informal interviews and essential skills assessments with learners to find out their learning strengths and needs and interests as they relate to essential skills and their chosen trade. This provides information about what areas they are currently comfortable with and what they know. This will help you determine learning objectives for them within the scope of their program time available and the AU you are offering.

C. Developing a training plan

In Academic Upgrading programs, it has been recognized that learners with clear, achievable goals have a better chance of succeeding. The training plan process used in the AU program can support students to set goals and keep their learning on track.

The following information should be included in the training plan:

- Learner name
- Date the plan was developed
- Dates for the learner and faculty to meet to review progress
- Short-term goals that follow the “SMART” rule of goal-setting (**s**pecific, **m**easurable, **a**ttainable, **r**ealistic, **t**ime framed) and outline the specific skills that the learner needs to learn
- Details of the instruction to be provided to enable learners to achieve their short-term goals
- Short-term goals that indicate the links between demonstrations of successfully achieved learning outcomes and the next steps toward their goals

Durham College Students Map Their Sequence for Learning

In the Durham College pilot, the students, with the assistance of the instructor, mapped out a sequence for their learning and the time necessary to achieve their goals. The training plan process provided ongoing review of the student's demonstrated achievements at key points in their course of study.

The training plan was developed on a monthly basis by the student and reviewed with the student mid-month and end of month for progress by the AU faculty. For example, a student might set a goal of achieving a minimum mark of 80 % on his or her geometry test. The student documented activities and timeframe to complete the goal. The faculty reviewed and worked with the student to make sure the activities, time frame, and academic goals were achievable.

The students assumed responsibility for their own learning through the training plan process.

See the two pages that follow for a sample Training Plan

SAMPLE

School of Interdisciplinary Studies and Employment Services

Pre-Electrical Academic Upgrading: Training Plan

Name: Bob Smith **Date:** _____

Current Status (check one): ☑ Full time ☐ Part time **Schedule:** _____

Next Training Plan Session: _____

PREVIOUS TRAINING PLAN GOALS:

UNIT TOPIC	GOAL	OUTCOME
Fractions	Complete Fractions booklet, practice sheets and pre-tests with a mark of 75%. Earned a mark of 79%.	☑ Complete ☐ Incomplete
Decimals	Complete Decimal booklet, practice sheets and pre-tests earning a mark of 75%. Earned a mark of 82%.	☑ Complete ☐ Incomplete

If any goals are incomplete, explain:

To stay motivated, it's helpful to set goals. Goal achievement leads to satisfaction, pride and self confidence. You've decided to take this program and it will require time and effort to succeed. Most students at the beginning of their program will say to themselves that they are going to study a lot. But sometimes other things get in the way. You've planned to study tonight, but there is a great concert playing. Or you've just had an argument with a best friend. Or your children's needs come first. To help you stay on track, follow the **SMART** rule for setting your goals.

Specific: Be clear. List the details. What activities will you be doing or what behaviours are required for success in this course? What will you be able to do or what will you learn?

Measurable: What grade do you want to attain?

Attainable: Are your goals achievable (given your skills, abilities, strengths, resources, constraints)? Is spending 10 hours per week on this course realistic for you? What can you complete in a month? What grade do you want to achieve?

Realistic: Ask yourself: "Are my goals personally meaningful?" Your goal and the activities and behaviours you exhibit in order to accomplish this goal need to be supportive of other goals.

Time framed: Set target dates, i.e., the number of hours, days, weeks, months, years (e.g., *I will devote 10 hours per week for this course. I will cover 30% of this course in one month*)

NEW GOALS:

UNIT TOPIC	GOAL	PLANNED COMPLETION DATE
Orders of Operations	*Work on Order of Operations Booklet, focusing on exponents and combining operations, complete practice sheets, and pre-test with a mark of 75%.*	*November 30, 2010*

Student Signature: _____ **AU Faculty Signature:** _____

On-going monitoring and assessment

On-going monitoring and assessment is used when classes start and throughout the course. When classes begin, an informal interview and class discussions will help you in planning and adapting the program to the participants with a focus on what is important to them.

Early on, think about how you will monitor progress; develop your materials with this in mind. You need to determine:

- What are you going to assess
- How are you going to assess it

It is important to provide students with opportunities to reflect regularly on their learning progress. Assessing progress is making sure that participants are achieving their own goals and acquiring the skills and knowledge to better equip themselves for requirements of the trade training and work. Assist learners in identifying changes in their skills, knowledge, and confidence.

This is also a good point to check with the relevant trade instructors to identify how the strategy is working and what enhancements or improvements are needed.

Practice tests

Not everyone will be familiar or comfortable with test-taking. Practice tests and exercises allow students opportunities to become familiar with the content of the test and know where they need to focus additional study.

Durham College AU Faculty Create Practice Tests for Students

In the Durham College pilot, practice tests were created by the AU faculty to introduce students to the type of questions they will experience prior to a unit assessment date. These tests were completed after doing all of the unit work and practice assignments. Practice test questions were a combination of academic and word problems.

Once the student had completed the practice test, the student would meet with the AU faculty to take up the answers and discuss any areas of weakness. As these practice tests were part of the unit learning material, students could use these tests to review and practice unit material before the actual marked assessment.

Having practice tests also provided the students with an opportunity to seek additional assistance on unit concepts before the assessment date.

D. Creating a successful learning environment

Knowing your students' learning styles

Working with students' learning styles is key for success in making learning not only relevant to the trades but also to how a student learns best. From consultations with students, faculty, and support staff, we know that adults going into the trades are usually a combination of visual learners and/or kinaesthetic learners and, as such, learn best from watching and listening and from hands-on activities.[25]

For this reason it is important to assess the learning styles of pre-apprentices you are working with. There are many short and quick learning style inventories that will help. Quite often, a student's learning style can be accessed through working with that student on an individual basis. However, we suggest that both students and faculty would benefit from using learning style exercises at the beginning of a new class. For students, it provides an opportunity to understand how they learn best. For faculty, it allows for the tailoring of instruction to how students learn best. If you would like to learn more about learning styles, the Durham College website contains a few different learning style inventories and related information. See: http://www.durhamcollege.ca/EN/main/places_to_go/places_to_study/student_academic_learning_services/services/workshops/learning_styles_workshop.php.

[25] Durham Consultation report (Hall & Folinsbee, 2010).

Identifying How Students' Learning Styles and Instructors' Teaching Strategies Affect Student Success

In the Durham College pilot, it was informally discovered that the students in this pilot were a combination of visual learners and/or kinaesthetic learners. This was evident through the types of questions the students were asking. Typically, students struggled with word problem questions. Students found the most success in solving word problems by visually seeing a diagram or picture representation of the word problem and then solving the numeracy aspect of the question once a visualization cue was put into place. For example, students doing trigonometric word problems involving angles of depression or angles of elevation struggled to solve the question by just reading the text, but achieved improved results after a picture of the word problem was created.

Other important teaching strategies are to work students at their own pace and show them many different ways of doing things. It is important to do things in many different ways to accommodate different learning styles. Some students prefer to work on the computer to do these activities. Patience and understanding are important as are repetition and practice.

Pre-apprentice and apprentices students would like to see more diagrams, visuals, and videos beyond the textbook that show how what they are learning applies to the work they will be doing.

In addition, they felt that the faculty would benefit from more supports and teacher training. There was support for additional training to help faculty support apprentices with learning needs.

Making learning active

Active learning strategies are any activities where students are engaged in the learning process. This is different than having students sit and listen to a lecture and then receive assignments or worksheets to complete.

As discussed, many students who enter into trades occupations are hands-on learners. See the following list for active learning activities that work well with trades-related learning.

Examples of active learning strategies include:

- case studies
- activities related to workplace scenarios (problem solving)
- group work (cooperative learning)
- role plays
- facilitated discussions
- simulations
- student presentations
- using technology (creating a video)
- peer teaching
- making things (following a recipe)
- journaling or blogging
- making a learning website (creating an online trade-specific vocabulary list)
- conducting interviews for research, etc.

Active learning allows students to:

- to be actively involved in their learning
- relate their learning to their trade
- reflect on their learning
- use essential skills in a wide variety of everyday occupational tasks

Creating the classroom environment

Having a comfortable learning environment is paramount for student success. The classroom needs to be big enough for students and active learning and made up of moveable tables and chairs. This allows for students to work independently or within small groups. Students also need access to white boards and chalkboards to practice their work.

You might find yourself using a combination of working with students in a group and individual learning to accommodate the different learning pace and needs of students.

On a final note:

All learning and training works to support students in becoming effective learners. To ensure success in college, students require a host of learning skills. These skills involve how to take notes in class, how to study, how to prepare for tests and exams, how to manage time, how to conduct research, how to write a college-level essay, how to prepare a research essay or report, how to prepare and deliver a presentation, and how to use word processing and presentation software, etc.

Essentially, these are the kinds of skills that can fall under continuous learning and that will bode well for learners throughout their working lives as they upgrade their skills or even change industries. Most of these skills can be integrated through courses including English, Communications & Self-Management, and Computers, in addition to the required Math courses. While these skills are important, there are a lot of resources available on these and, therefore, we are not including them in this handbook. But that said, it is important to note how integrated programming can support the transference of these skills to trades-related training and at work.

Durham College Students Learn to Work Independently and in Small Groups

In the Durham College pilot, students were presented with all of their trades math unit learning material (i.e., module, resources and practice tests) at the beginning of the lesson topic. The students were instructed to work on the material independently. This allowed for the students to learn according to their pace, and have AU faculty work with them as they needed the assistance.

Just-in-time teaching methods and frequent communication with each student enabled AU faculty to identify any difficulties that students were having with concepts presented in the unit, and to clarify on an individual basis what the student did not understand.

If the faculty found several students struggling with the same concept, the faculty grouped those students together for a small group lesson. This method provided those struggling students with additional attention from the instructor while the rest of the class proceeded without interruption.

Chapter 5: Useful trades-related learning resources

This chapter identifies useful resources for essential skills and AU related to the trades. It identifies organizations, websites, and materials that can be helpful in teaching AU and essential skills to pre-apprentices.

Organizations, Websites and Materials

1. **Essential Skills for Ontario's Tradespeople**
   This CSC website is a free online essential skills tool for the Red Seal Trades. The purpose of this interactive website is to help individuals interested in exploring trades, pre-apprentices, apprentices, and journeypersons interested in improving their skills. The website includes updated Essential Skills profiles for all the Red Seal trades. It includes online assessments tailored to each of the 53 Red Seal trades. The assessments focus on reading, document use, and numeracy skills and identify gaps that need to be addressed. Listening assessment will be added in the fall 2011 and Speaking and Writing by March 2012. Finally, the website provides customized learning plans that guide instructors to free learning materials to address learning needs.
   www.csc.essentialskillsgroup.com

2. **Skillplan**
   Skillplan: BC Construction Industry Skills Improvement Council has a variety of free and for purchase workplace-based resources ready to use. Much of Skillplan's early work focuses on workplace material designed for the construction industry, but they have also developed publications designed for other trades and sectors. Skillplan has over 20 publications designed to help educators improve a learner's essential skills in areas such as document use, numeracy, oral communication, reading, and writing. Skillplan also offers workshops and online training opportunities. Helpful trades-related workbooks and documents by Skillplan include:
   - *Numeracy Rules*
   - *Numeracy at Work*
   - *Tools of the Trade*

   www.skillplan.ca

3. Essential Skills website from Human Resources and Skills Development Canada

Human Resources and Skills Development Canada (HRSDC) has a list of tools and resources and Essential Skills profiles. The tools and resources, available free from the website or by ordering directly from HRSDC, offer support in awareness, assessment, learning, and training of literacy and essential skills. The Essential Skills profiles describe how workers from various occupations use the nine Essential Skills. The profiles can help develop training plans or skills development for educational development by describing and giving examples of the most important Essential Skills. The profiles also provide a complexity rating for each Essential Skill, a description of any physical aspects of a particular occupation, and any future trends that could have an impact on an occupation. There are also a number of Essential Skills tools specific to apprenticeship.
http://www10.hrsdc.gc.ca/es/english/ES_Profiles.aspx

4. Literacy Networks

Some literacy networks have developed materials that are trades specific. Please see the links that follow:

***Literacy Link Eastern Ontario* (LLEO)**

LLEO recently created *Essential Skills for the Trades*. This curriculum is a seven-module binder that gives the pre-apprenticeship student an opportunity to examine essential skills, an apprenticeship overview, health and safety, and continuous learning.
www.lleo.ca

Literacy Link South Central

Literacy Link South Central has posted a number of employment-specific tools appropriate to pre-apprentices seeking employment opportunities.
www.llsc.on.ca/

Literacy Northwest

Literacy Northwest has created *Apprenticeship Support Tools and Resources Guide for LBS Agencies*. This PDF document provides a listing of various resources and the agencies through which these resources can be found.
www.literacynorthwest.on.ca

5. **Evaluating Academic Readiness for Apprenticeship Training (EARAT) project**

The EARAT project provides a variety of skills manuals for different trades. These skills manuals focus on document use, reading strategies, and math for each trade. The PDFs for the ERAT manuals can be found on the Apprenticeship Network.com website.
http://www.theapprenticeshipnetwork.com/earat-staticcontent-137

6. **Construction Sector Council**

The Construction Sector Council has produced a practical handbook, *Tips on Introducing Essential Skills into Construction Trades Training*, for how to integrate document use, reading, and math into the construction trades. Please see their website for this handbook and several other useful resources.
http://www.csc-ca.org/en/products/tips-introducing-essential-skills-construction-trades-training

7. **Trades Essentials**

Trades Essentials is a program for people working in a trade who need to improve their essential skills. The website contains trades-specific essential skills inventories and manuals for trades-specific essential skills curriculum for 14 common trades. The website is co-managed by the Federal government and the Prince Edward Island Department of Innovation and Advanced Education.
http://www.tradeessentials.ca/index.php?page=trade_educational-and-delivery-tools

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Appendix 1 The cycle of apprenticeship and pre-apprenticeship / trades programming

This appendix provides an overview of apprenticeship, pre-apprenticeship, and pre-trades programs and how they work in Ontario.

1. Overview of apprenticeship

Most trades require candidates to have OSSD, GED, ACE, or equivalent. Some construction trades require grade 10.

The steps to becoming a journey person are:

- Apprentice + employer/sponsor + training contract/agreement
- 90% on the job training + 10% in-school training (2–5 years)
- Completion of competencies/time on the job + in-school + (in some cases) examination = journeyperson

Third pillar of postsecondary education

Apprenticeship training has been called the "third pillar" of postsecondary education, along with the college and university options in Ontario. It is a combination of primarily on the job training (90%) and in-school or classroom based training (10%).

Key to apprenticeship is legal contract

The key to an apprenticeship is the legal contract between the apprentice and the employer/sponsor. This contract or apprenticeship training agreement is registered with the apprenticeship authority. In Ontario, the authority is the Ministry of Training, Colleges and Universities. The contract begins the training agreement which includes both on-the-job training from the employer or sponsor and classroom-based, trades-related theoretical and practical training, or the "in-school" training.

Apprenticeship programs

Apprenticeship programs can range in length from two to five years and generally require three levels of in-school training: Level 1, Level 2, and Level 3. In-school training can be delivered in a variety of scheduling formats: full time, usually in 8-week blocks (block release); part time, either one day per week (day release); or evenings/weekends. Depending on the hiring date, apprentices may work a few weeks or many months before they enter Level 1 of in-school training.

Once an apprentice is signed on, MTCU will notify the apprentice of available and upcoming in-school training. In some cases, apprentices must travel or plan to spend their 8 weeks in-school, away from home and work. At times, employers are reluctant to send apprentices to training, particularly the 8-week block release programs, because of business demands. Apprentices now pay a tuition fee for in-school training. Ontario's Colleges of Applied Arts and Technology deliver approximately 85% of all in-school training for apprentices.

Learning on the job

The majority of the apprenticeship is spent working and learning on-the-job with experienced journeypersons. Depending on the trade, the apprentice must complete either (a) training standards as prescribed by affiliated industry committees (ACA); or (b) hours and training as established by regulation (TQAA).

Once an apprentice has completed both the in-school and on-the-job training, she or he may be required to write an examination for the trade often called the Certification of Qualification (C of Q).

2. Entry into Apprenticeship Training

There are now several ways to access apprenticeship training:

- **Traditional:** To begin or "enrol" in a traditional apprenticeship, an individual must find and be hired by an employer. Most trades require the OSSD, GED or ACE, or equivalents

for entry. The apprenticeship begins once a contract or training agreement has been signed by the employer, the apprentice, and the Government of Ontario (MTCU).

- **Union-sponsored:** The individual must be sponsored by a union. The apprenticeship contract/agreement is held by a Local Apprenticeship Committee (LAC) rather than a single employer.

- **Pre-apprenticeship programs:** MTCU funds programs designed to provide trade-specific preparation and training, usually the completion of the Level 1 in-school portion of training for the trade. Many programs also offer academic upgrading for those who do have their OSSD but require an academic refresher (often math and communications) or those who do not have their OSSD or equivalent. Short term work experience is also provided in most pre-apprenticeship programs. To gain entry into a pre-apprenticeship program, individuals must meet defined admission requirements.

- **Co-op Diploma Apprenticeship Programs:** These are college-based postsecondary programs that offer both a diploma and in-school apprenticeship training. Interested individuals must gain entry into the postsecondary program in the regular way, and once admitted, must also be selected as an apprentice. In this case, a sponsoring group holds the apprenticeship contract with the *individual* rather than an individual *employer*. The student/apprentice completes the postsecondary program, which includes Levels 1 and 2 of the in-school training, and gains work experience during the co-op work terms. Once the student/apprentice has graduated with a diploma, he/she must continue working as apprentice, transferring his/her apprenticeship agreement from the sponsoring group to an individual employer. Once the remaining competencies and in-school training have been completed, the apprentice may then qualify for journeyperson status.

- **Ontario Youth Apprenticeship Program (OYAP):** High school students combine academic studies and co-operative work experience to gain and assess trades-related interests. School staff monitor student progress and assess competencies. Some students may be signed as apprentices while still in secondary school, but this is not a requirement.

3. Types of Apprenticeships

Just as there are many types of college postsecondary programs of varying duration and professional regulatory and certification requirements, it is also true of apprenticeship and the skilled trades.

There are two legislated acts in Ontario which govern apprenticeship. The *Trades Qualification and Apprenticeship Act* (TQAA) is a time-based model and applies to the 33 construction trades in Ontario. The *Apprenticeship and Certification Act* (ACA) applies primarily to service, motive power, and manufacturing/industrial sectors, representing 122 trades. The ACA emphasizes the demonstration of competencies as prescribed by industry representatives of the trades, and is considered a competency-based model.

Under both the TQAA and ACA, trades may have different designations and legal requirements as follows.

- **Compulsory Trades:** Legally, only registered apprentices or journeypersons who hold a Certificate of Qualification (license) may practice in the trade. There are 10 compulsory trades of the 33 construction trades under the TQAA, including construction maintenance electrician, hoisting engineer, plumber, refrigeration and air-conditioning mechanic, and sheet metal worker.

- **Restricted Trades:** Legally, only registered apprentices or journeypersons who hold a Certificate of Qualification (license) may practice in the trade. There are 11 restricted trades under the ACA, including automotive service technician, auto body repairer, truck and coach technician, and hairstylist.

- **Voluntary (TQAA) or Non-Restricted (ACA) Trades:** Under both acts, individuals may legally work in the trade without being registered as an apprentice or licensed as a journeyperson. Examples of voluntary or non-restricted trades include: cook, baker, horticulturist, tool and die maker, and general machinist.

4. The Credential

There are three types of credentials for completing requirements of a trade, listed as follows:

- **Certificate of Apprenticeship**: Once an apprentice has completed the full program requirements for the trade, including both on-the-job and in-school training, the apprentice receives a *Certificate of Apprenticeship* (C of A).

- **Certificate of Qualification:** Some ACA and TQAA trades require that a trade certification examination be taken and passed. Once passed, the apprentice is issued a *Certificate of Qualification*.

- **Red Seal Certificate**: A number of trades (53 in Ontario) are recognized nationally, allowing those with the additional *Red Seal* endorsement to work as a tradesperson anywhere in Canada.

5. Pre-apprenticeship

Purpose of pre-apprenticeship programs

Pre-apprenticeship programs are relatively new in Ontario and are part of the government's strategy to increase interest in the skilled trades and the number of potential entrants to the apprenticeship system. Most apprenticeships begin with an employer hiring an apprentice and then signing and proceeding with the training contract /agreement. Most employers will not consider hiring anyone who does not have some demonstrable interest in a trade, and the candidate must meet the educational requirements for the trade, usually OSSD, GED, ACE, or equivalent.

Pre-apprenticeship programs provide trainees with both skills and experience. The programs were designed to appeal to those students who may require job readiness skills and trade readiness experience prior to gaining employment as an apprentice. The programs may also include academic upgrading for those who do not possess their OSSD or equivalent (ACE, GED), which is required for entry into all competency-based or ACA trades.

Yearly Request for proposals from MTCU

Each year, the Ministry of Training, Colleges and Universities (MTCU) issues a *Request for Proposals* to all Training Delivery Agents (TDAs), outlining the priorities for the upcoming pre-apprenticeship programs. In previous years, MTCU has focused on trades in demand based on identified labour market requirements. The interest in delivering pre-apprenticeship programs has been significant and MTCU now limits each TDA to three proposal submissions.

Length and features of pre-apprenticeship programs

The length of the programs may vary depending upon the trade, the inclusion of academic upgrading, and the work experience component. Typically, the pre-apprenticeship program will include academic upgrading; in-class, theoretical, and practical training; the completion of Level 1 of the in-school training for the trade; and a work experience component. A feature of many successful pre-apprenticeship programs has been the collaboration among service providers: the college as TDA, the college academic upgrading program, and the monitored work placement, often through the college or local Employment Service provider. Successful outcomes for pre-apprenticeship programs are graduates who find employment as an apprentice in the trade.

Appeal of programs to employers

Employers are generally wary of hiring individuals for apprenticeships for many reasons, including both the expense of training the apprentice and productivity concerns. Many employers state that they do not have the time or resources to allow individuals to test out their interests in a trade while on the company's payroll. Having successfully completed a pre-apprenticeship program, the student/graduate will be more attractive to a prospective employer because he or she now has the minimum educational requirements, the trade-related Level 1 in-school training, and some hands-on experience in a workplace.

The same is true of graduates of the college-based, pre-trades programs. Employers are always looking for employees and prospective apprentices who have already demonstrated their interest and aptitude for a particular trade. By completing a pre-trades program, individuals can demonstrate both academic achievement and technical skills, thereby improving their prospects in a competitive labour market. While some pre-trades programs focus on one

specific trade, others offer students a “sampling” of several trades to help students assess their interests and abilities. Employers generally prefer candidates who have chosen an apprenticeship path based on first-hand knowledge of and exposure to the trade, and are unwilling to risk investing in someone who has neither.

Generally, pre-trades programs and one year “techniques” programs offer theoretical and practical hands-on training, quite often incorporating Level 1 in-school training, giving graduates a competitive edge if they wish to pursue an apprenticeship. Techniques programs are included in a college’s postsecondary program listing and involve the standard college postsecondary application process and cycle. Graduates of techniques programs earn a postsecondary Ontario College Certificate, thereby providing several additional career pathways, including access to additional postsecondary studies at the college and university level. Many graduates of 1-year techniques programs move directly into the labour market, but not necessarily into an apprenticeship.

Program availability

In order to provide any level of in-school training in an apprenticeship program, pre-apprenticeship program or co-op diploma apprenticeship program, colleges must be an approved Training Delivery Agent (TDA). MTCU approves TDAs based on an extensive application and approval process. Check with your college’s Apprenticeship representative to find out which apprenticeship training your college is approved to deliver.

MTCU annually issues a call for proposals for both pre-apprenticeship and co-op diploma apprenticeship programs. Approvals are based on TCU funding availability, demonstration of successful outcomes in previous offerings, employer/industry support, and TDA status.