ONCAT Student Pathways in Higher Education

Constructing Pathways:

Ideas for Collaboration, Communication and Implementation – Build it and they will come!

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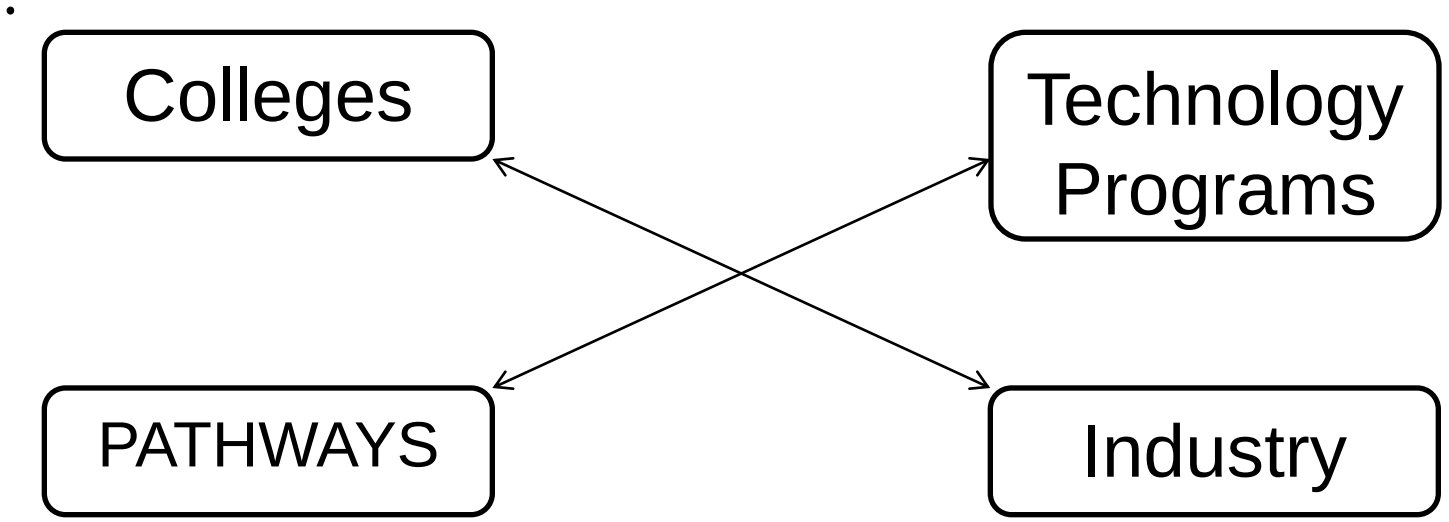
GOALS



Introduction to George Brown College

Centre for Construction & Engineering

- Located at Casa Loma campus
  - 4 Schools: Mechanical Engineering; Computer Technology; Architectural Studies; and Construction Management & Trades
    - More than 4,000 full-time students
    - Average age is 25
    - Incredibly diverse

School of Construction Management & Trades

- Program areas include:
  - Bachelor of Technology (Construction Management)
  - 2 and 3 year Diplomas in Construction and Civil Engineering; Renovation; Heating, Refrigeration and Air – Conditioning(HRAC);
  - 1 year programs in Construction Management for internationally educated professionals and trades techniques
  - Apprenticeships in the carpentry, plumbing, sheet metal, electrical trades.
- Pathways from the 3-year technology programs into the Baccalaureate program

Industry Relations Strategy

CONSTRUCTING PATHWAYS

- The increase in industry demand for graduates in construction and architectural-related programs is resulting in growing student demand for pathways between programs and post-secondary institutions. In this context, when George Brown College launched its degree in Construction Science and Management in 2004, it also established its strategy to develop pathways among diploma programs and from diploma programs to the degree.

CONSTRUCTING PATHWAYS

- The first part of this presentation will share the insights from the process George Brown undertook to develop, launch and manage pathways for its construction and architectural programs. It will provide insights to the challenges that arose, as well as discuss ideas and best practices on how to structure, implement and market pathways to students.

CONSTRUCTING PATHWAYS

- The second part of this presentation will focus on a five-college, ONCAT-funded project conducted in late 2012 to develop inter-college pathways with appropriate transfer credits for Construction Engineering Technician or Construction Engineering Technology students. An overview of the templates and process used to collaborate on inter-college pathways will be provided. As well, the results, promising practices, challenges and recommendations from the project will be introduced and discussed.

Pathways for Ontario Community Colleges technology graduates to GBC B.Tech. Program in Construction Science and Management.

- Due to changing demographics and industry need, **bridging** gives colleges the opportunity to develop a broader selection of talented graduates to fill an increasing need for diversely-skilled professionals.
- These pathways enhance our ability to provide job-ready graduates from various technical disciplines and geographic areas and to maximize our current educational infrastructure provincially.

Bridge Pathways (originally to sustain the degree)

There are currently 5 separate articulation pathways to the degree

- Began with **2 GBC internal bridges** (5 years ago) - (**went external in 2011**)
- Program-to-program, course- to-course mapping was necessary to work out gaps and establish pathways for the Construction Engineering Technology(T105) and Architectural Technology(T109) programs
- Migrated some of the management courses from diploma to degree level (higher level)

INTERNATIONAL OPPORTUNITIES

- **3rd Bridge**: China has a growing need for trained CMs and students looking for overseas educational opportunities that recognize Chinese college credentials
- Provincial directive to attract foreign students resulting in exposing our students to international practices. GBC developed this link with Shanghai Urban Management College(SUMC) in 2007
- For the Chinese students, this meant a shift to outcomes-based learning.

MORE BRIDGES

- **4th bridge** (2012) open to all Ontario grads from a **Renovation Technology** program
- **5th bridge** open to all Ontario grads from a **Civil Technology** program
- **6th bridge (in progress)** for Architectural and Construction Engineering 3 year diploma grads who have been working in the construction industry for 3 years (they can stay in their jobs while completing their degree)

Partnerships: Industry, Colleges + Universities

- Determine NEEDS from industry through consultation with industry partners.
- Strong, rich Professional Advisory Committee
- Need critical mass of students to support program (40)
- Need qualified faculty as per Ministry requirements :50% PhD (full and part time) in the core discipline; balance must be Masters.
- Should have a strong diploma program to build on

Partnerships: Industry, Colleges + Universities

- Because of the success of our degree we have created another bridge to York U to train High School technology teachers (started with 5 on that pathway in Spring 2012)
- Taking the lead in the ONCAT-funded project conducted in late 2012 to develop inter-college pathways with appropriate transfer credits for Construction Engineering Technician or Construction Engineering Technology students is critical to the overall success of these Pathways.

College to College Pathways
Construction Engineering Technician
Construction Engineering Technology

- The College to College Pathways project was funded by the Ontario Council on Articulation and Transfer (ONCAT).
- The project focus was to develop and document pathways for students who want to transfer between programs related to construction engineering.
- Due to our internal and external experience in pathway and bridge development George Brown College was well positioned and enthusiastic to be the lead college.

Project Participants

- The project participants included:
  - Algonquin College
    - 2yr CE
  - Fanshawe College
    - 2yr Technician (Supervisor)
    - 3yr Technology
  - Mohawk College
    - 2yr CE (Building Renovation)
    - 2yr CE
  - St. Clair College
    - 2yr CE
  - In addition a number of other colleges that deliver Construction Engineering programs in Ontario were invited to participate.

The Pathways Process

As the lead college, George Brown developed and implemented the project plan on behalf of the project team. George Brown also conducted the detailed analysis and comparison of the construction engineering programs, including:

1. The first step involved Gathering all course outlines for each program and developing a template to map course-level learning outcomes with established Ministry program outcomes.

The Pathways Process

2. The next step involved conducting a preliminary sort to identify which courses from each participating colleges align with each Ministry program outcome.
   - This sorting process identified at which level of Bloom's Taxonomy of Learning the course outcomes fulfill the program outcomes. Steps in this sorting process included:
   - Course outcomes were mapped against the appropriate Ministry Technician or Technologist program outcomes. This identified how the course outcomes applied to each of the program outcomes in each year of the program.

The Pathways Process

3. Once Each course was given a weighting according to the percentage of course outcomes that applied to each Ministry program outcome. This weighting involved designating low, medium or high percentages to each course outcome based on how closely it applied to each program outcome.
   - Sorting courses by their application to each program outcome and then by the weighting of the percent of the course outcomes that apply to each program outcome.
   - Courses that applied to each program outcome and have similar weightings were compared by verbs used in the Course Outcomes according to Bloom's Taxonomy of Learning.

The Pathway Process

5. The weighting process facilitated identification of courses which were similar in these categories. These courses were then analyzed outcome by outcome to identify gaps and similarities in each year.
6. Comparing and analyzing program maps to identify common learning outcomes at the end of each year of the programs.
7. Synthesizing data and developing proposed common learning outcomes by year.
8. Circulating proposed year-by-year learning outcomes to colleges to achieve consensus in preparation for one day workshop

An ah ha moment!!

- Clarity on what this all means when preparing for the one day workshop:
  - Colleges must satisfy MTCU program standards.
  - Receiving college must ensure that student will graduate from their program having met MTCU program standards.
  - Receiving college must ensure that student will not be placed in a position where they can't succeed due to missing prerequisites.

Paradigm Shift

- Traditional (college) barriers to pathways include the mindset that students should meet MTCU outcomes and all the outcomes of the program to which they are seeking admission. At least that seems to be the prevailing way that people interpret transcripts for bridges.
- The Paradigm Shift is that students need to meet MTCU outcomes and they need a pathway from the college they are migrating to in order to meet these outcomes.

You likely already knew that, but we think the majority does not necessarily agree with that, Yet.

46 Pathways

Ontario Colleges
Pathways for Construction Engineering Technician
and Construction Engineering Technology Programs

Pathway	Target Program	Originating Program and Year
4	St. Clair/T026 CE Technician - Civil	George Brown/T161 CE Technician or T105 CE Technology (After 1st Year)
5	St. Clair/T026 CE Technician - Civil	Fanshawe/CSN2 Construction Engineering Technician - Supervisor (After 1st Year)
6	St. Clair/T026 CE Technician - Civil	Fanshawe/CMY1 Construction Engineering Technology - Management (After 1st Year)
7	GBC/T161 CE Technician or GBC/T105 CE Technology	Mohawk/462 CE Technician – Building Renovation (After 1st Year)
8	GBC/T161 CE Technician or GBC/T105 CE Technology	Mohawk/451 CE Technician (After 1st Year)
9	GBC/T161 CE Technician or GBC/T105 CE Technology	Algonquin/0190X01 CE Technician (After 1st Year)
10	GBC/T161 CE Technician or GBC/T105 CE Technology	St. Clair/T026 CE Technician - Civil (After 1st Year)
11	GBC/T161 CE Technician or GBC/T105 CE Technology	Fanshawe/CSN2 Construction Engineering Technician - Supervisor (After 1st Year)
12	GBC/T161 CE Technician or GBC/T105 CE Technology	Fanshawe/CMY1 Construction Engineering Technology - Management (After 1st Year)
13	GBC/T105 CE Technology	Mohawk/462 CE Technician – Building Renovation (After 2nd Year)
14	GBC/T105 CE Technology	Mohawk/451 CE Technician (After 2nd Year)
15	GBC/T105 CE Technology	Algonquin/0190X01 CE Technician (After 2nd Year)
16	GBC/T105 CE Technology	St. Clair/T026 CE Technician - Civil (After 2nd Year)
17	GBC/T105 CE Technology	Fanshawe/CSN2 Construction Engineering Technician - Supervisor (After 2nd Year)
18	GBC/T105 CE Technology	Fanshawe/CMY1 Construction Engineering Technology - Management (After 2nd
19	Fanshawe/CSN2 CE Technician - Supervisor	Mohawk/462 CE Technician - Building Renovation (After 1st Year)
20	Fanshawe/CSN2 CE Technician - Supervisor	Mohawk/451 CE Technician (After 1st Year)
21	Fanshawe/CSN2 CE Technician - Supervisor	Algonquin/0190X CE Technician (After 1st Year)

46 Pathways

Ontario Colleges
Pathways for Construction Engineering Technician
and Construction Engineering Technology Programs

Pathway	Target Program	Originating Program and Year
22	Fanshawe/CSN2 CE Technician - Supervisor	St. Clair/T026 CE Technician - Civil (After 1st Year)
23	Fanshawe/CSN2 CE Technician - Supervisor	George Brown/T161 CE Technician or T105 CE Technology (After 1st Year)
24	Fanshawe/CMY1 CE Technology - Management	Mohawk/462 CE Technician - Building Renovation (After 1st Year)
25	Fanshawe/CMY1 CE Technology - Management	Mohawk/451 CE Technician (After 1st Year)
26	Fanshawe/CMY1 CE Technology - Management	Algonquin/0190X CE Technician (After 1st Year)
27	Fanshawe/CMY1 CE Technology - Management	St. Clair/T026 CE Technician - Civil (After 1st Year)
28	Fanshawe/CMY1 CE Technology - Management	George Brown/T161 CE Technician (After 1st Year)
29	Fanshawe/CMY1 CE Technology - Management	George Brown/T105 CE Technology (After 1st Year)
30	Fanshawe/CMY1 CE Technology - Management	George Brown/T105 CE Technology (After 2nd Year)
31	Mohawk/462 CE Technician - Building Renovation	Fanshawe/CSN2 CE Technician - Supervisor (After 1st Year)
32	Mohawk/462 CE Technician - Building Renovation	Fanshawe/CMY1 CE Technology - Management (After 1st Year)
33	Mohawk/462 CE Technician - Building Renovation	George Brown ?? Not completed (After 1st Year)
34	Mohawk/462 CE Technician - Building Renovation	Algonquin/0190X CE Technician (After 1st Year)
35	Mohawk/462 CE Technician - Building Renovation	St. Clair/T026 CE Technician - Civil (After 1st Year)
36	Mohawk/451 CE Technician	Fanshawe/CSN2 CE Technician - Supervisor (After 1st Year)
37	Mohawk/451 CE Technician	Fanshawe/CMY1 CE Technology - Management (After 1st Year)
38	Mohawk/451 CE Technician	George Brown/T161 CE Technician or T105 CE Technology (After 1st Year)
39	Mohawk/451 CE Technician	Algonquin/0190X CE Technician (After 1st Year)
40	Mohawk/451 CE Technician	St. Clair/T026 CE Technician - Civil (After 1st Year)
41	Algonquin/0190X - CE Technician	Mohawk/462 CE Technician - Building Renovation (After 1st Year)
42	Algonquin/0190X - CE Technician	Mohawk/451 CE Technician (After 1st Year)
43	Algonquin/0190X - CE Technician	George Brown/T161 CE Technician or T105 CE Technology (After 1st Year)
44	Algonquin/0190X - CE Technician	St. Clair/T026 CE Technician - Civil (After 1st Year)
45	Algonquin/0190X - CE Technician	Fanshawe/CSN2 CE Technician - Supervisor (After 1st Year)
46	Algonquin/0190X - CE Technician	Fanshawe/CMY1 CE Technology - Management (After 1st Year)

Example Pathway

Pathway 18	The student's GPA must meet the minimum program requirements for promotion from the originating college. If a student has a course grade lower than the minimum program requirements of the originating college, the receiving/target college may assess the course on an individual

To George Brown (T105 Construction Engineering Technology)
From Fanshawe (CMY1 Construction Engineering Technology - Management) After 2ndYear

Semester 1		**Exemptions**	**Direct Transfer**	**Bridge Course Requirements**
Course Code	**Course Title**			
BLDG 1025	Construction Field Practices	SURV 1001 - Construction Surveying		
BLDG 1026	Housing & Small Building Construction	CONS 1006 - Construction Tech., MATS 3002 Construction Materials		
BLDG 1041	Building Industry Practices			
GSCI 1022	Building Science & Environment	ENVR 1017 - Sustainability in the Built Env.		
COMP 1082	Computer Skills & Applications	COMP 1327 - Computer Applications		
MATH 1109*	Math for Building Technologies	MATH 1023 - Mathematics		
COMM 1007*	College English	WRIT 1039 Reason & Writing		
Semester 2		**Exemptions**	**Direct Transfer**	**Bridge Course Requirements**
Course Code	**Course Title**			
BLDG 1013	Site Planning & Regulations	CONS 3005 Construction Technology		
BLDG 1042	Construction Theory – Methods & Materials	MATS 3002 - Construction Materials, MATS 1002 Cpmstruction Materials		
BLDG 1043	Quantity Surveying	CONS 1009 - Quantity Surveying		
BLDG 1046	Science of Architecture			
GHUM 1106	History of Architecture			
MATH 1122	Strength of Materials & Statics	MATH 1062 - Statics		

Example Pathway (continued)

Semester 3		Exemptions	Direct Transfer	Bridge Course Requirements
Course Code	**Course Title**			
BLDG 1027	Structural Engineering – Timber Design	MATS 1006 - Mechanics of Materials		
BLDG 1050	Portfolio	Y		
BLDG 1164	Building Science – I Fundamentals	ENGR 1005 - Env. Engineering (HVAC)		
BLDG 2012	Building Code	ENGR 3008 Structural Design		
BLDG 2019	Estimating-Small Buildings	CONS 1010 - Quantity Surveying and Estimating		
BLDG 2045	Const. Site Mgmt, Super. & Inspection	SURV 3001 or 3002 (code seemed to change) - Construction Surveying		
COMM 1113	Professional Communications for Building Technology			Take COMM1113
GNED	General Education Elective (Select One)	x		
Semester 4		**Exemptions**	**Direct Transfer**	**Bridge Course Requirements**
Course Code	**Course Title**			
BLDG 2021	Construction Planning & Scheduling			Need to take BLDG 2021
BLDG 2022	Law & Construction Contracts	LAWS 1030 - Contracts in Society		
BLDG 2034	Structural Engineering – Steel Frame	CONS 1006 - Construction Tech.		
BLDG 2046	Mechanical & Electrical Installations	ENGR 1002 - Env. Eng. - Plumbing, ENGR 1005 Env Eng HVAC, ENGR 1003 ENV. Eng. Elect 1		
BLDG 3003	Construction Safety Practices	SFTY 1029 - Health and Safety		
BLDG 3004	Pricing Construction Works	CONS 3012 - Quantity Surveying and Estimating		
GNED	General Education Elective (Select One)			

Example Pathway Continued

Semester 5		Exemptions	Direct Transfer	Bridge Course Requirements
Course Code	**Course Title**			
BLDG 3052	Construction Business Management		x	
BLDG 3021	Structures & Concrete Engineering	ENGR 3008 - Structural Design	Exempt	
BLDG 3017	Estimating & Bidding Construction Works		x	
BLDG 3006	Construction Project Management: Contractual Viewpoint		x	
BLDG 3001	Building Science II - Enclosures		x	
BLDG 2171	Technical Report Writing I			Take COMM1113 before BLDG 2171
Semester 6		**Exemptions**	**Direct Transfer**	**Bridge Course Requirements**
Course Code	**Course Title**			
BLDG 2172	Technical Report Writing II		After GBC 5th Sem	
BLDG 3008	Specifications & Documentation		After GBC 5th Sem	
BLDG 3019	Construction Project Management – Cost Control		After GBC 5th Sem	
BLDG 3020	Computer Applied Construction Practices		After GBC 5th Sem	
BLDG 3026	Sustain. Building Rating Systems & Prac.		After GBC 5th Sem	
BLDG 3027	Deconstruction Methods		After GBC 5th Sem	

Legend

Reach back courses required to complete program*	
Courses not driectly required to meet MTCU Program Outcomes**	

*** Reach back courses are courses that students are required to take in order to be successful in further semester and/or to meet all of the MTCU outcomes for the program.**

**** These courses are course that meet MTCU outcomes but that other colleges have met these outcomes in variety of ways without necessarily having an individual course that**

***** X? General Education course are required in order to graduate from a 2 or 3 year program at George Brown College**

Pathways Workshop

On October 12, 2012, representatives from four of the five colleges (Fanshawe, George Brown, Mohawk and St. Clair) met for a full-day workshop. The workshop goals were to:

- Review the learning outcomes mapping results and agree on the process to develop pathways between programs.
- Discuss areas of the analysis and pathways that need more clarity or consensus (e.g. GPA requirements).
- Begin documenting possible pathways from each program to another college's program(s).
- The workshop provided a valuable opportunity to discuss how the program standards are met by each program. Course-level discussions also advanced each college's understanding of possible pathway opportunities. By the end of the workshop, several pathways between the programs had been drafted.
- College then were to complete the pathways on their own which if necessary would require a number of further phone calls and face to face interactions.

Challenges and Opportunities

- Community flavour:
  - By far the biggest challenge that we encountered were the local differences and pressures that various colleges have in different catchment areas
- Course outlines and maintaining updates in the bridges and pathways.
- Timing of course offerings
- Grade Point Average Requirements and their variability amongst colleges.

Challenges and Opportunities

- Math Requirements
  - Level of detail in MTCU standards makes some areas difficult to pinpoint when assessing course outcomes by college.

Recommendations

- Course outlines are regularly updated and program delivery schedules can be modified as a result of formal or informal program reviews.
- To ensure ongoing currency of the pathways, it is recommended that the pathways be reviewed and updated by each college on an annual basis.

Recommendations

- When the Ministry next reviews these program standards, it is recommended that such a review consider the pathways developed between 2-year, 3-year and 4-year (degree) programs.
  - The program standards should consider level of outcomes achieved by year.
  - The program standards however also need to provide flexibility for community flavour.

Recommendations

- An increasing number of students are reviewing course outlines to understand how the course helps them to achieve the overall program outcomes. It would be helpful for the student and for mapping exercises if the course curriculum addressed how it aligns with the overall MTCU program outcomes

Q&A