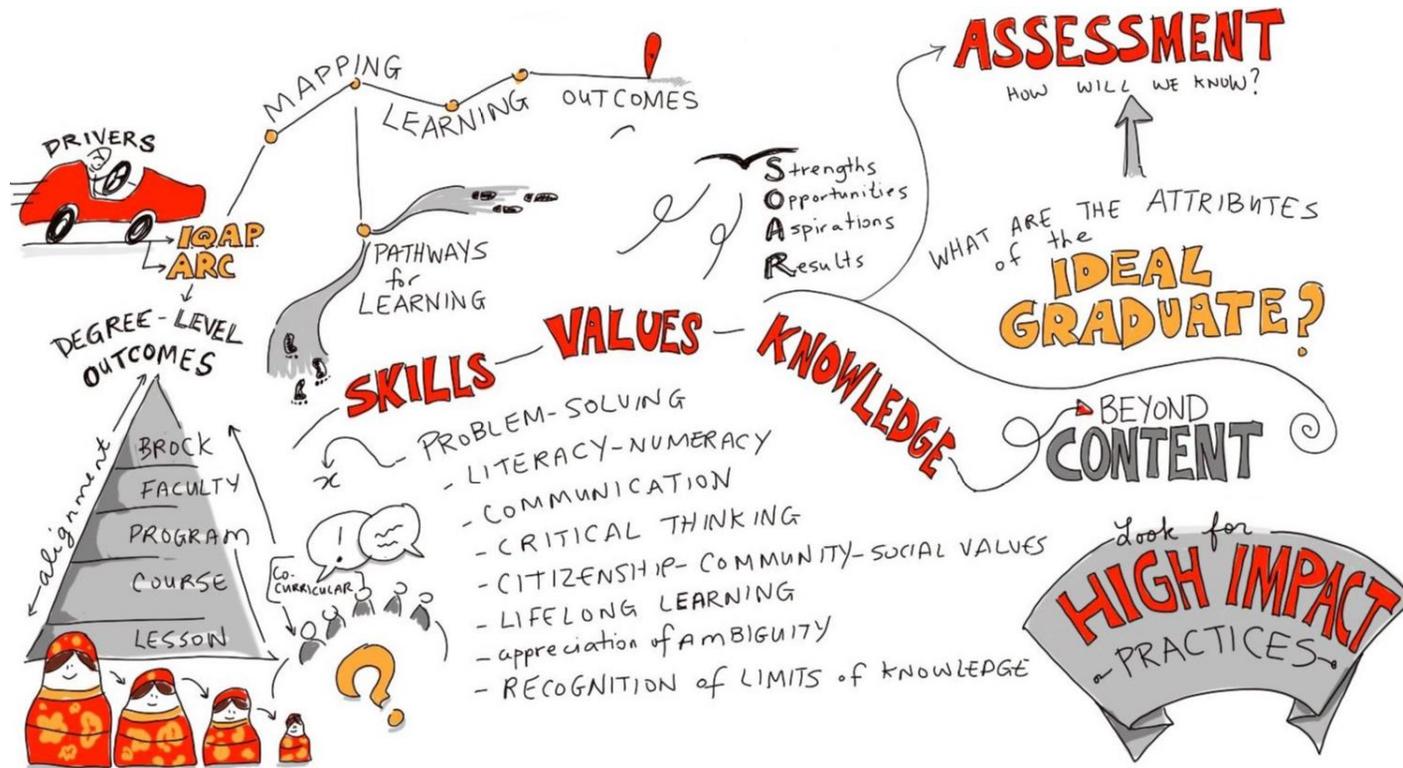


GUIDE TO CURRICULUM MAPPING AT BROCK UNIVERSITY



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What is curriculum mapping?

Curriculum mapping is a process of determining and documenting where, when, and how program learning outcomes are taught and assessed across a program. The result of the process is a visual map which can be used as a tool to analyze the alignment between learning outcomes at various levels with assessment and instructional methods. Additionally, the map is useful in identifying gaps and opportunities to improve the overall coherence and effectiveness of the curriculum and the student learning experience in the program (Kopera-Frye, Mahaffy & Messick Svare, 2008). Curriculum mapping is most effective when engaged in as a collaborative and collegial process involving all faculty members and instructors (Pippin Uchiyama & Radin, 2009).

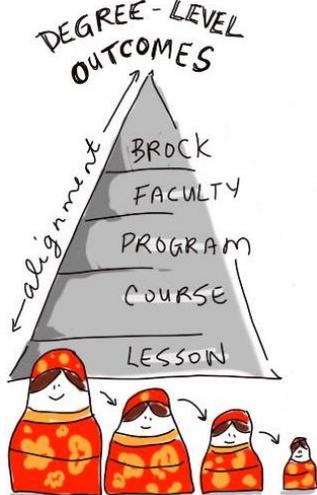


Why engage in curriculum mapping?

- Opportunity for **curriculum renewal** to reflect new directions, trends, or developments in the discipline
- **Identify the strengths and signature methodologies**, instructional strategies and/or learning experiences of the program to inform decisions
- **Identify gaps, misalignment, and redundancies** to inform decisions and discussion about program quality
- Provides students and stakeholders with a **better understanding of what is expected of learners** and what they will accomplish in the program
- Increase **faculty collaboration** and collegiality (especially helpful for new faculty)
- Determine **alignment with current institutional priorities** for teaching and learning
- Document learning outcomes for **Institutional Quality Assurance Process (IQAP)** and **accreditation** purposes

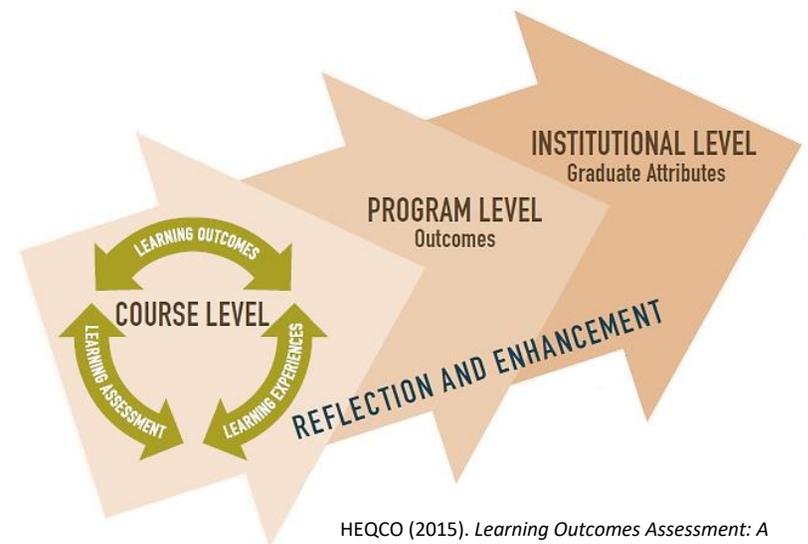


Mapping learning outcomes



Learning outcomes (LOs) **describe the knowledge, skills, and attributes that students should be able to demonstrate upon completing a learning experience.** You can also think of these as statements of what students will know, do, and value at the end of a course, program, or degree. The focus of LOs is on the student; these are not statements of instructional objectives. LOs operate at a micro-level (lessons, courses) through the meso-level (program) to the macro-level (faculty, university).

The curriculum mapping process involves mapping LOs across these levels to determine how individual course LOs align to the program LOs and how the program LOs align to Brock's degree level expectation (DLEs).



HEQCO (2015). *Learning Outcomes Assessment: A Practitioner's Handbook*.

Step 1: ESTABLISH PROGRAM LEARNING OUTCOMES

Program LOs focus on what a **graduate** of a program should know, do, and value. **These outcomes articulate the cumulative knowledge, skills, and attributes that integrate**

across the entire program, rather than for an individual course. Program LOs also include expectations from additional experiences that students participate in during the program, such as mandatory co-op placements, practicums or internships, or capstone experiences such as a thesis or a senior-level integrated design project. The curricular content, admission requirements, modes of delivery, bases of evaluation of student performance, allocation of resources, and overall quality of any academic program and its component courses are all related to program LOs.

SKILLS — VALUES — KNOWLEDGE — BEYOND CONTENT

Expectations of the ideal graduate

Establishing program LOs can start as a **visioning process** involving the department's **curriculum committee** and/or **multiple stakeholders** (e.g. faculty, alumni, students, professional partners) to address the following questions:

WHAT ARE THE ATTRIBUTES of the IDEAL GRADUATE?

- What are the attributes of an ideal graduate from this program?
- What knowledge, skills, and values should they have?
- What learning experiences or assessments can we use as evidence that a graduate has achieved these outcomes?

Writing program learning outcomes

Program LOs are statements that articulate **measurable behaviours or qualities** that a graduate should have demonstrated by the end of their program. The focus should be on **behaviours/actions the student** will exhibit rather than on instructional goals or intentions. Each LO should start with an **action verb** that describes an observable behaviour followed by a description of the specific content target. Avoid using verbs that are vague or difficult to measure/assess; if written effectively, you should be able to **objectively assess** if a graduate has achieved the outcome. While each LO should focus on a single **specific expectation or aspect of learning**, the program LOs as a whole should be **comprehensive** and reflect the learning across the program rather than learning specific to an individual course or activity.

ASSESSMENT
HOW WILL WE KNOW?

Examples

Better

By the end of the program, graduates will be able to:

- **Define, describe, and discuss** the major theories and concepts of the field
- **Identify assumptions** in documents
- **Demonstrate** effective analysis of arguments through written and oral communication
- **Generate ideas, proposals, solutions, and arguments** independently and/or collaboratively in response to challenges posed or as a self-directed activity
- **Plan, design, and carry out** projects addressing stakeholder requirements
- **Write** effective reports, essays and technical documents for various audiences

Why?

Each program LO:

- articulates a **specific behaviour/action** that graduates can demonstrate at the **end of the program**.
- is **measurable**
- is **broad in scope** to encompass the entire program
- is focused on a **single outcome**

Poor

This program will aim to introduce students to the major theories and concepts in the field and will cover a variety of practical applications and disciplinary skills.

Students will write a clear lab report with precise scientific language that is free of errors.

Students appreciate the benefit of critical inquiry and have more confidence in their abilities to be critical thinkers.

Why?

This LO is **not focused on the student** (but rather the program), refers to **more than one outcome**, is **not measurable**, and **focuses on intentions** rather than outcomes.

This outcome is **too specific** and more appropriate as a course LO.

This outcome is **vague** and **difficult to measure**.

Domains and levels of learning

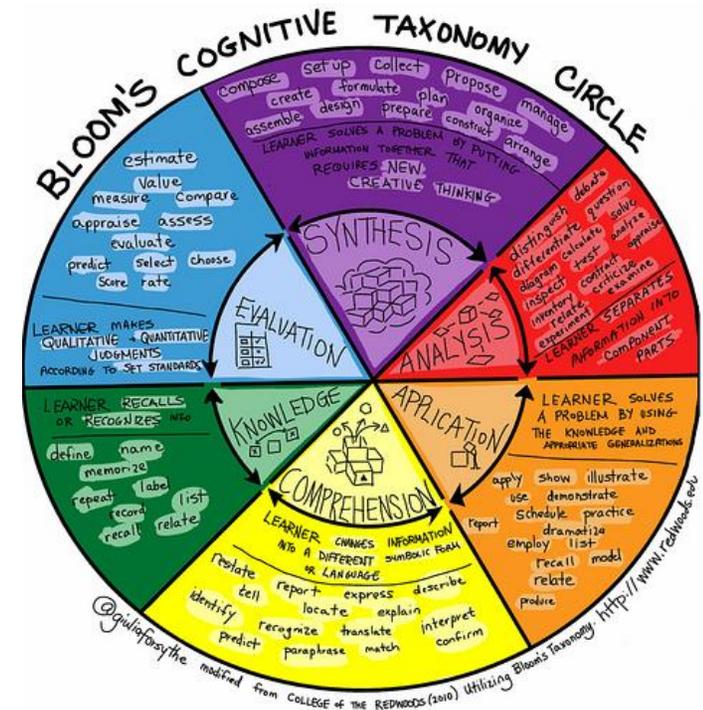
When designing program LOs it is important to consider the **domains of learning** as well as the **level of sophistication**. As program LOs reflect the attributes of a graduate, rather than a student, the outcomes should reflect an appropriate degree of complexity. **Bloom's taxonomy of educational objectives** (1956) is a well-established model that can be useful when drafting outcomes.

Domains of learning

Cognitive	Affective	Psychomotor
Knowledge and intellectual skills	Attitudes, interests, values, and feelings	Motor and manipulative skills

Levels of learning

Knowledge	Learners are able to recall or recognize information. Learners can identify, define, recognize, or label specific facts, terms, concepts, principles and theories.
Comprehension	Learners are able to change information into different form in order to communicate their understanding. Learners can discuss, classify, describe, explain, generalize, or distinguish between elements of knowledge.
Application	Learners are able to solve problems using their knowledge and appropriate generalizations. Learners can relate, practice, interpret, manipulate, construct, organize, demonstrate, or translate using their acquired knowledge.
Analysis	Learners are able to separate information into component parts to understand the organizational properties or relationships between principles. Learners can examine, experiment, compare, relate, test, differentiate, or categorize concepts, principles, systems, and theories.
Synthesis	Learners are able to integrate information or create something new or in a novel way. Learners can design, arrange, produce, perform, propose, assemble, compose, formulate, or manage new concepts and ideas.
Evaluation	Learners are able to make judgements based on a set of standards, values, and logic. Learners can estimate, rate, interpret, critique, assess, conclude, choose, predict, measure, and appraise concepts, theories, principles or ideas.



Measurable learning outcomes

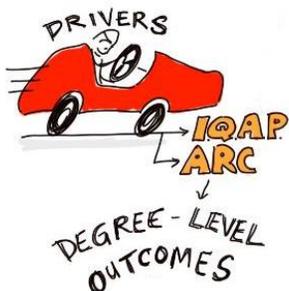
Bloom's domains and levels of learning can guide the design of LOs that not only reflect the appropriate breadth and depth of graduate attributes, but also ensure that these outcomes are measurable. When crafting program LOs, careful consideration should be given to **verb choice**. Consider asking 'how would this be measured?' and 'how would a student demonstrate that they have achieved this outcome?' when developing or refining program LOs.

Hard to measure		Still difficult to measure		Straightforward to measure	
Appreciate	Develop	Value	Understand	Explain	Demonstrate
Access	Have more confidence	Recognize	Identify	Evaluate	Exhibit

Step 2: MAP PROGRAM LEARNING OUTCOMES TO DEGREE LEVEL EXPECTATIONS (DLEs)

What are DLEs?

Degree level expectation (DLEs) form an integral part of the Council of Ontario Universities' (COU) *Quality Assurance Framework* which establishes the protocols for the approval of new undergraduate and graduate programs and the review of existing programs at publicly



assisted universities. Brock has adopted the DLEs established by the Ontario Council of Academic Vice-Presidents (OCAV).

Undergraduate degree level expectations (UDLEs) and graduate degree level expectations (GDLEs) describe the attributes that all graduates of Brock University will be able to demonstrate, regardless of their program.

The UDLEs and GDLEs are organized into six broad categories. Descriptors and specific learning expectations are articulated for each category based on the level of the degree (Bachelor vs. Honours; Master vs. Doctoral). These can be found under the quality assurance section of the VP Academic's website: <https://brocku.ca/vp-academic/quality-assurance/documents/>

UDLEs	GDLEs
1. Depth & breadth of knowledge	1. Depth & breadth of knowledge
2. Knowledge of methodologies	2. Research & scholarship
3. Application of knowledge	3. Level of application of knowledge
4. Communication skills	4. Professional capacity/autonomy
5. Awareness of limits of knowledge	5. Level of communication
6. Autonomy & professional capacity	6. Awareness of limits of knowledge

Mapping program learning outcomes to DLEs

As all Brock graduates, regardless of program, are expected to exhibit the DLEs it is important to consider how the LOs of a program align with the DLEs. Mapping program LOs to DLEs is also an integral component of the **academic program review self-study** which is part of **Brock's Institutional Quality Assurance Processes (IQAP)**. **Table 3.1A of the cyclical academic review materials** provides a template for mapping program LOs to DLEs. This tool also allows for mapping to Faculty-specific DLEs should these be present in your Faculty. Table 3.1A is available in the cyclical academic review section of the VP Academic's website: <https://brocku.ca/vp-academic/quality-assurance/cyclical-academic-reviews/>

Table 3.1a: Honours Bachelor's Degree - Mapping Program Outcomes to the Degree Level Expectation
Program: **SAMPLE PROGRAM - BA(Hons)**

Brock University UDLEs A graduate of Brock University will be able to demonstrate:	Faculty specific UDLEs A graduate of the Faculty of ? will be able to demonstrate:	Program Outcomes aligned with UDLEs At the end of this program, the successful student will be able to demonstrate:
1. Depth and Breadth of Knowledge a) developed knowledge and critical understanding of key concepts b) developed understanding of many major fields c) developed ability to gather and interpret information and compare merits of alternate views d) detailed knowledge and experience in an area of the discipline e) developed critical thinking and analytical skills f) apply learning from outside discipline	INSERT FACULTY LEVEL DEGREE LEVEL EXPECTATIONS IN THIS COLUMN	INSERT PROGRAM LEVEL LEARNING OUTCOMES Examples include: 1a The ability to describe concepts, principles, and overarching themes in <i>the discipline</i> 1b The ability to develop a working knowledge of <i>the discipline's</i> content domains 1c The ability to explain complex behavior by integrating concepts developed from different content domains 1d The ability to interpret, design, and conduct basic <i>disciplinary</i> research ...

The department's curriculum committee should discuss the following when completing Table 3.1A:

- **What program LOs do not align to the DLEs?** This is an opportunity to **identify discipline specific outcomes**.
- **Are there DLEs that are not addressed by any of the program LOs?** This is an opportunity to revisit your program LOs to **address gaps**.

Step 3: COLLECT COURSE LEVEL DATA

Collecting course level data involves more than collecting course outlines. The goal is to document the **LOs of each course** within a program and assess what **learning activities and assessments** are being used to support and measure each outcome. Documenting the curriculum at this level provides rich data that is useful when identifying trends in learning experiences across the program.

Collecting course level data is also a component of the **academic program review self-study** that is part of cyclical academic review in Brock's IQAP structure. **Table A.1 of the cyclic academic review materials** provides a template that can be used by individual course instructors for documenting the **LOs, learning activities/experiences, assessments, and strategies for improvement** for their course(s). Departments should consider having instructors complete this table at the end of each term so that this important information can be documented and collected in a timely and systematic fashion. Table A.1 is available in the cyclical academic review section of the VP Academic's website: <https://brocku.ca/vp-academic/quality-assurance/cyclical-academic-reviews/>

Table A.1
Course Learning Outcomes

Course: SMPL 1P00
Course Calendar Description: Examination of sample course material using a systematic approach, emphasizing the function, application, and current trends of discipline-specific concepts. Introduction to discipline-focused academic skills and epistemology.

Learning Outcome A student will be able to:	Learning Activity/Experience A student will learn this by:	Assessment Achievement of this outcome will be demonstrated by:	Strategy for Improvement
Identify the main concepts describing sample and example periods.	<ul style="list-style-type: none"> - Attending lecture and seminar - Reading primary and secondary sources for lecture and seminar - Studying for exam 	<ul style="list-style-type: none"> - Weekly multiple-choice quizzing of lecture material using clickers - Weekly graded seminar participation - Final exam 	Consider including a mid-term to allow for feedback midway through term.
Practice oral communication skills and demonstrate improvement.	<ul style="list-style-type: none"> - Participating in seminar discussions - Student-led seminar discussion 	<ul style="list-style-type: none"> - Weekly graded seminar participation - Graded student-led seminar discussion 	Consider offering formative feedback on seminar participation at mid-semester point using a rubric.

PROBLEM-SOLVING
 - LITERACY-NUMERACY
 - COMMUNICATION
 - CRITICAL THINKING
 - CITIZENSHIP-COMMUNITY-SOCIAL VALUES
 - LIFELONG LEARNING
 - appreciation of AMBIGUITY
 - RECOGNITION of LIMITS of KNOWLEDGE

Remember ... it's an iterative process

While we recommend that you begin with program LOs, map up to the Brock DLEs, and then map down to the individual course LOs, remember that this is an iterative process. At each step, you may **identify gaps or areas of opportunity that make it necessary to return to the previous step**. For example, you may notice that the program LOs do not address a particular DLE category which necessitates returning to the program LOs to consider whether there is a gap in the curriculum or if the outcomes themselves just require modification. Once you review the course LOs across the program, you may find a trend or thread of learning experiences that are not addressed by the program LOs; or conversely you may find that a program LO is not addressed in a meaningful way or to a robust capacity across the program's course roster. You may wish to return to the program LOs at this point to consider whether the scope of these outcomes needs refinement or if the misalignment truly lies at the course level.

Step 4: MAPPING THE CURRICULUM (putting it all together!)

The curriculum map allows you to **compile all the information** collected throughout the curriculum mapping process into a **single comprehensive visual representation** of the program. The map links the DLEs, program LOs, and course LOs while also mapping the methods of assessment used to measure each LO and the degree of implementation.

Compiling a curriculum map is required as part of the **self-study for the cyclical academic review process**. **Table 3.3 of the cyclical academic review materials** can help you prepare your program's curriculum map and already includes the six UDLE/GDLE categories. The Table is formatted in Excel to easily capture the necessary information. You can access Table 3.3 in the cyclical academic review section of the VP Academic's website: <https://brocku.ca/vp-academic/quality-assurance/cyclical-academic-reviews/>.

Name of the program and degree level

Program learning outcomes are mapped to the six DLE categories. The number of program LOs for each DLE will vary by program. Abbreviations (e.g. LO1a) can be used for the purpose of the map; however, the nomenclature must match that used in Table 3.1A. The program LOs can also be included in the legend at the right side or bottom of the curriculum map.

Degree of implementation can be mapped through a colour-coding system. The 'introduced/reinforced/mastered' framework can be used or substituted for a discipline-specific framework. A legend must be included to articulate the framework and colour-coding system.

SAMPLE PROGRAM - BA(Hons)

Course No	Course Title	Depth and Breadth of Knowledge			Knowledge of Methodology				Application of Knowledge		Communication Skills		Awareness of Limits of Knowledge		Autonomy and Professional Capacity		
		LO1a	LO1b	LO1c	LO2a	LO2b	LO2c	LO2d	LO3a	LO3b	LO4a	LO4b	LO5a	LO5b	LO6a	LO6b	LO6c
SMPL 1F00	Introduction to Sample	1,2,3	2,3			3	1,2,3				1,2,3,4						
SMPL 1P01	Sample in the Community		2,3	1,4,6,7	1,4,6,7	2,6,7		2,6,7	2	7	3,4,9	4,6,9	1,2,3,4		2		3,5
SMPL 2P20	Power and Practice in Sample	1,4,6,7				2,6,7	5		2	1,4,6,7	11		1,2,3,4		1,2,3,4	1,2,4, 11	2,5,9
SMPL 2P21	Sample in the Community II		11		1,4						1,2,3,4	1,2,3,4		1,2,3,4	1,2,3,4	2,5,9	
SMPL 2P22	Sample in Digital Contexts		9,10		2,6	1,7			3,5	5,6	5	1,2,3	5		2	5	5
SMPL 2P30	History of Sample		2,3					3,4			5	5,6	5			2	
SMPL 3P07	Conflict Resolution of Sample		4,5		11			5, 11	4	4	5, 11	11			4,5, 11		4,5
SMPL 3P51	Equity Issues in Sample	2,5,6		5,6	2,5,6,9						1,6			5,9		9	
SMPL 3P90	Research Methods in Sample	1,4,6,7	1	1,2	10	10, 11		9	4,10	10		10,11	5		11		2,5,9
SMPL 4P20	Sample Internship		3,6		4			4	9		9	9	8		3,8	8	8
SMPL 4F30	Sample Thesis		8		8,9			8,9	8,9	8,9	8,9		8			8	9

Degree of Implementation:

- Introduced
- Reinforced
- Mastered

Assessment Key:

- 1 = test/quiz
- 2 = exam
- 3 = skill exercise
- 4 = presentation
- 5 = assignment
- 6 = essay
- 7 = performance
- 8 = thesis/creative project
- 9 = critical discourse
- 10 = discussion
- 11 = group-based project

Courses in the program should be listed in sequential order. It can be helpful to include a notation for courses that are required for the program vs courses that are electives offered by the department.

Assessments for each course are mapped to the program learning outcomes to demonstrate how each outcome is measured.

Degree of implementation is mapped through colour-coding to demonstrate to intensity/depth to which each program learning outcome is addressed within each course.

Assessment key includes each category of assessment/evaluation measure that is used across the program. This key can include as many categories as needed to adequately capture the assessment techniques used in the program.

Step 5: ANALYZE THE CURRICULUM MAP

The purpose of any map is to help us navigate. Once you have created your curriculum map it can be a valuable tool to help **inform decisions** about the direction of the program. Additionally, a thorough analysis of the map is required for the **self-study for the cyclical academic review process**.

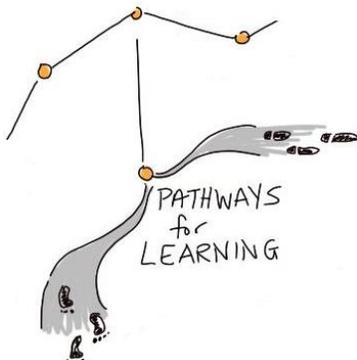
Consider the following questions when analyzing the curriculum map with your department:

Alignment between program learning outcomes and courses:

- **Do all the courses contribute to the program LOs?** Are there outliers? If so, should the courses be changed or removed, or should new program LOs be added?
- Where are the **gaps in learning?** Where are the **redundancies?** What changes should be made and why? Should changes be made to the program LOs or to the course roster?

Sequencing of learning and student pathways:

- Does the current roster and **arrangement of courses support the scaffolding of the program LOs** from introductory to mastery in a sequential way? Are there outcomes that are 'mastered' before they are 'introduced'? Are there outcomes that are never 'mastered'? If there are gaps or misalignment, what courses can be introduced or re-ordered to streamline the learning experience in a more logical order?
- **What are the various student pathways** through the program (streams/concentrations, co-op, etc.)? Is the sequence of courses logical? Do all pathways incorporate all the program LOs and to what level?



Assessment of learning outcomes:

- What are the most **commonly used assessments** in the program? What assessments are **missing**? Do the assessments **align authentically** with the program LOs?

Teaching and learning experiences:

- What is the "**signature pedagogy**" of the program? Does this align with the assessment methods and program LOs?
- Which courses include **high impact practices (HIPs) and experiential education (EE) opportunities**? Do all students experience these or are they optional? Is there opportunity to expand HIPs and EE to ensure that students experience at least two before completing the program (one in first year and one in senior years)? How can you map these experiences on your curriculum map?
- What is happening in the program that contributes to the curriculum but is not mapped here (e.g. experiential education, co-op, co-curricular alignment, etc.)? How can you represent this on your map?
- Is there an opportunity to introduce **more meaningful learning experiences** that move beyond lecture-based courses (e.g. internships/practicum, capstone courses, learning communities, cross-disciplinary learning, service learning, field experiences, research, etc.)?



Seek feedback

Getting input on the curriculum map from multiple sources is important. **Different stakeholders** (faculty members, administration, students, CPI, academic advisors, etc.) can offer **diverse insights**. **Documenting the discussion and analysis** of the curriculum map is important to inform decision making as well as the **cyclical academic review self-study process**. Consider documenting:

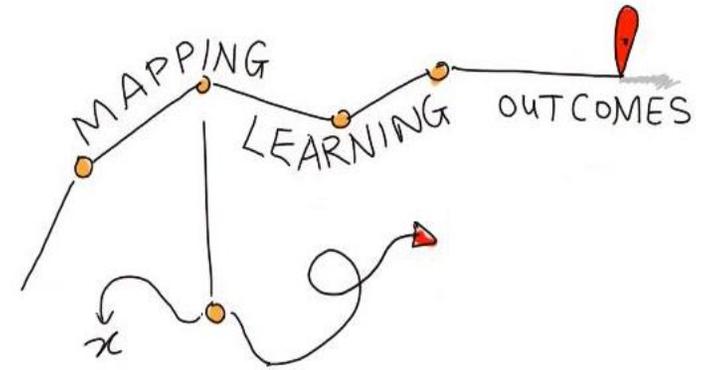
- What insights emerged?
- What decisions were made about the curriculum?
- What was not changed and why?

SUPPORT FOR CURRICULUM MAPPING

The **Centre for Pedagogical Innovation (CPI)** is available to facilitate departments through the process of curriculum mapping at any stage. Designing your curricula by examining your program's LOs and mapping the curriculum is a departmental exercise that can be done as part of the **cyclical academic review process** or as a **curriculum renewal exercise**.

CPI offers a variety of options to support curriculum design at the course level and program level including:

- **Individual consultations** with faculty on developing course LOs (and completing Table A.1)
- **Department-wide curriculum retreats** to:
 - **Develop/revisit program LOs** in alignment with the DLEs (to complete Table 3.1A)
 - **Map the curriculum** from the course to the program to the DLE level (to complete Table 3.3)
 - **Analyze the curriculum map** based on student pathways and strategic priorities (to inform the self-study narrative)
- Consultations with the department or Curriculum Committee members to discuss **curricular renewal options** (to address recommendations arising from the cyclical academic review process for the annual implementation reports and the final assessment report)



CPI also compiles and provides an **EdTech Report** to each department undergoing cyclical academic review. The report details the range of **educational technology options** available to the department and provides data on the department's use of Brock's learning management system (LMS), **Issak/Sakai** and other educational technology tools such as the online course evaluation platform.

Curriculum Development Support from CPI

The purpose of the curriculum mapping process is to **inform decisions and identify opportunities for program improvement**. Opportunities to refresh, realign, or redevelop the curriculum at the course and program level will arise from the curriculum mapping process. The **CPI team** is ready to support you with this work and can consult with individual faculty members, departments, or Faculties on:

- High impact practices
- Experiential education
- Authentic assessment
- Universal design for learning
- Educational technology options
- Online and blended learning
- Open educational resources (OER)
- Instructional development for faculty, instructors, and TAs
- Evaluation of teaching
- Reflective practice
- Appreciative inquiry
- Library resources

Contact the **Centre for Pedagogical Innovation** for support in navigating the journey of curriculum mapping.



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