

Guide to Curriculum Review



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Introduction to Curriculum Review

Understanding Curriculum

Curriculum, with Latin roots – ‘currere’ – means running of the course (Pinar, 2011), a racecourse. In an academic environment, our curriculum – the race course – becomes prescribed and described as the program of study, made up of a series of individual courses. Toombs & Tierney (1993) also describe curriculum as “an intentional design for learning negotiated by faculty in the light of their specialized knowledge and in the context of social expectations and student’s needs” (p. 183).

However, curriculum is not static, but remains fluid and dynamic, ever changing. With learning being interpreted and experienced differently by diverse participants, making it important that we develop an awareness of our curriculum as constructed everyday by participants in our educational program. How are our participants experiencing the ‘race course’? What is their lived experience? Are we meeting identified program learning outcomes? How can we enhance the learning experience of our participants?

Definition of Curriculum Review (CR)

The curriculum review process provides an evidence-based means to answer questions we may have about our program. At the University of Calgary, curriculum review is defined as:

An academic, staff-led critical examination of each undergraduate and course-based master’s program for the purpose of optimizing the learning outcomes of that program (University of Calgary, 2015, p. 3).

At the University of Calgary, curriculum reviews are a formative component of the overall quality assurance strategy and are focused on the continuing development of students’ learning experiences. The curriculum review process will generate an action plan for improving the program, and the impact of the review will be determined by evidence of implementation success (University of Calgary, 2015, p. 2).

Benefits of Curriculum Review

The main benefit of curriculum review is to improve the student learning experience by:

- Articulating the strengths of a program
- Identifying specific actions to address gaps within an academic program
- Increase discussion and collaboration between instructors and others who play a role in the program
- Improve teaching and learning practices
- Provide an opportunity for critical reflection on the program's curriculum
- Provide evidence to guide decision-making within the program
- Understand the relationship among courses within a program

Guiding Principles of Curriculum Review at the University of Calgary

The curriculum review process at the University of Calgary is guided by the principles that the process will be faculty-led, evidence informed, focus on improving student learning, encompass a program level perspective, and an on-going effort to continuously improve the program.

Collaboration among Instructors and Others:

- Faculty-led investigation
- Contributions from and collaboration among instructors
- Consider how students can be involved

Evidence-informed:

- Several data sources are used to inform discussions about the curriculum
- Data sources may include: standard report from the Office of Institutional Analysis (OIA), curriculum mapping data, student surveys, instructor feedback, and an environmental scan

Focus on Student Learning:

- Discussions are framed to put the focus on enhancing the student learning experience

Program-level Perspective:

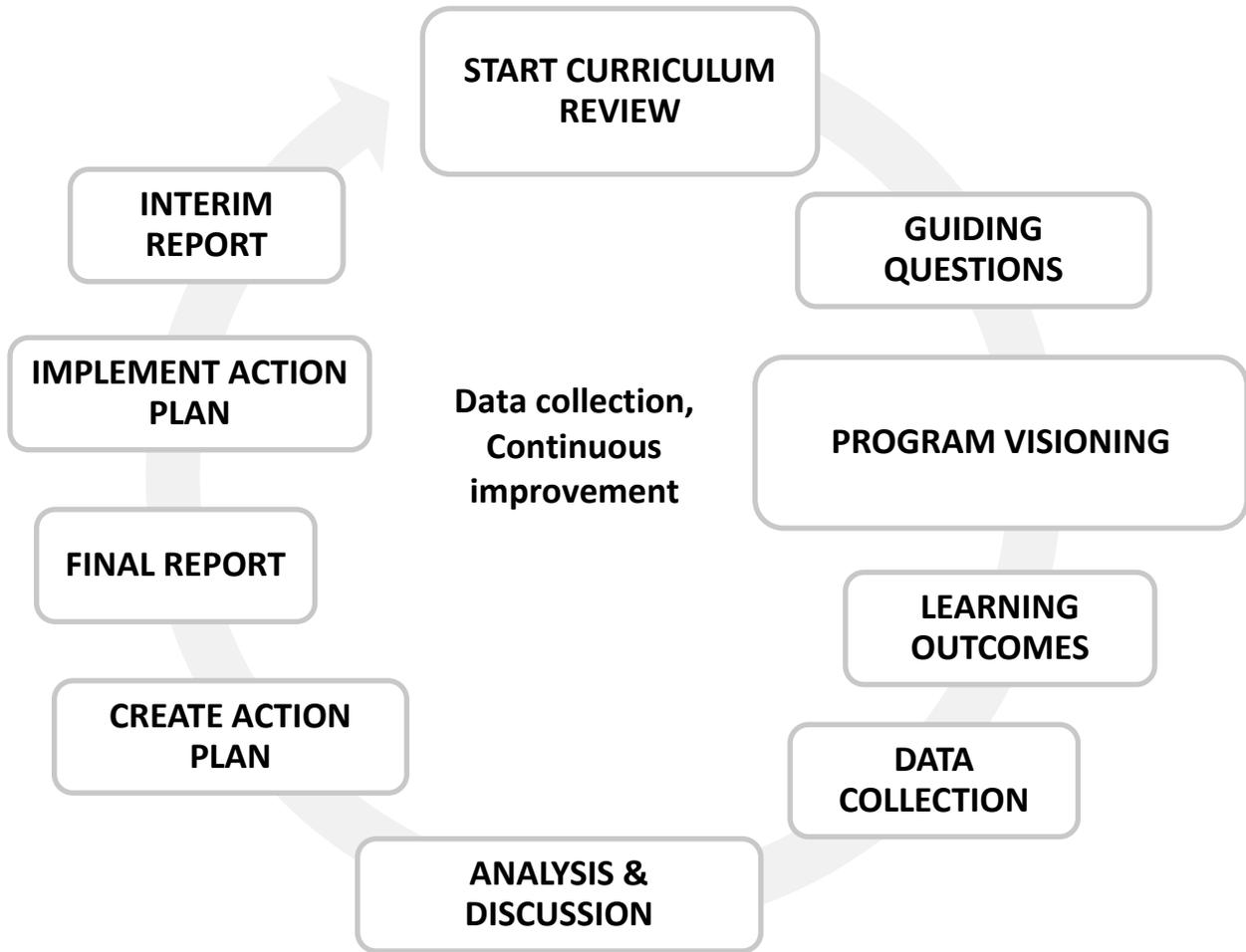
- Curriculum review examines the program as a whole
- Considers the learning experience of students throughout the program

Continuous Improvement:

- Action plan guides the implementation of changes over time
- Iterative process to be conducted every 5-7 years

Curriculum Review Process

Curriculum review at the University of Calgary is an iterative process that involves the following components, which are discussed in detail in later sections.



Suggested Project Timeline

The following outline is taken from the Quality Assurance Handbook, Curriculum Reviews. (University of Calgary, 2015). It is a suggested timeline only, so you will customize it as needed for your review. For example, programs that already have program-level learning outcomes may not need to spend a significant amount of time on that step, while programs that do not have them or that require significant revision may need to spend 3 months or more on writing them.

Preparation Phase: July – September

- Review Lead is appointed
- Provost's Office requests a standard report from the Office of Institutional Analysis (OIA)
- Review Lead drafts guiding questions for the review and gathers feedback
- Review Lead meets with the Unit Lead to discuss CR goals, processes and timelines
- Review Lead consults with the Curriculum Development Consultant to organize support required
- Create the curriculum review plan: data to be collected, how the curriculum will be mapped and what method will be used, how to support instructors, committees needed, the points at which feedback will be gathered from all faculty members (note that some of these decisions may be revised over time as needed)
- Review Lead continues to meet with the Curriculum Development Consultant or Unit Lead as needed

Review Phase: October – April

- Introduce CR to all faculty members teaching in the program
- Write or revise program-level learning outcomes
- Write/revise course outcomes as needed
- Organize an orientation to curriculum mapping
- Monitor and support the mapping process
- Gather other data
- Data representation
- Data analysis
- Write action plan

Report Writing: May – June

- Draft the internal report
- Gather feedback on the Internal and Public reports
- Submit the Internal and Public Report to your Dean and Associate Dean of Teaching and Learning for feedback and approval
- Submit the Public Report to the Provost's Office
- Meet with the Vice-Provost of Teaching and Learning by the end of August

Implementation: Next 5 years

- Interim report submitted after 2 ½ years

Roles and Responsibilities

Review Lead

- Is a faculty member
- Acts as a project manager
- Makes decisions about the review process
- Tracks the progress of the review
- Delegates responsibilities

Review Team

- Includes all full-time faculty teaching in the program; sessional instructors are invited to participate
- Provide feedback on program-level learning outcomes
- Maps the curriculum for courses they teach
- Can assist with data analysis and generating the action plan

Unit Lead

- Department Head or Associate Dean responsible for the unit
- Makes decisions
- Approves the CR internal and public reports
- Supports the process as needed (University of Calgary, 2015)

Students

Students can be involved in curriculum review in a variety of ways, such as the following suggestions:

- Use a survey, interviews or focus groups to gather data on student perceptions of the program
- Include student representatives on the review team (undergraduate and graduate, different specializations, etc.)
- Hire an RA to do work such as implementing surveys and focus groups
- If you have a student council or committee, get feedback from them at strategic points of the process and input into the action plan

Educational Development Consultants

- From the Educational Development Unit of the Taylor Institute for Teaching and Learning
- Provides consultative expertise when needed
- Supports the process with resources and templates
- Provides facilitative leadership for working sessions as time permits

As consultants or facilitators, we can play a role in your curriculum review. The chart below provides some ideas for involving us in the process.

Your Role	Consultant’s Role
Make decisions, eg. data collection strategy	Provide guidance and strategies
Arrange workshops and set agenda	Provide options for curriculum mapping
Support curriculum mapping	Advise, provide templates, instructions for your customization
Write the CR report	Provide feedback
Implement the action plan	Facilitate a session to introduce the process or discuss the review

Dissemination and Curriculum Reviews

Dissemination of the results of your curriculum review at a conference or as a journal article may be possible.

- Faculty or Department: Check with your Associate Dean of Teaching and Learning, dean and/or department head. You will likely need several levels of approval.
- CFREB: Get ethics approval or a certificate of exemption.

Some of the issues we have encountered:

- Secondary use of data
- Using student data? What sort of data?
- How have people been informed about process and dissemination?
- Are the data publicly available? For example, are course outlines posted online? Expectations of privacy? Impact on professional aspects?
- Data presented in aggregate or individual?
- Use of proprietary data (faculty, department)

Curriculum Review and Dissemination: Helpful Links

Research Activities Exempt from CFREB Review:

http://www.ucalgary.ca/research/files/research/150130-cfreb_research_exempt_from_review.pdf

Mount Royal University Guidelines for Differentiating between Quality Assurance and Research:

<http://research.mtroyal.ca/wp-content/uploads/2015/01/QAguidelines.pdf>

Guiding Questions

Definition

Guiding questions are critical questions or concerns that guide the curriculum review process (University of Calgary, 2015). Similar to a research study, a curriculum review uses guiding questions to focus inquiry on specific avenues of curriculum issues. You will not be able to investigate every aspect of a curriculum, so the guiding questions identify what you most want to explore in the review, which could range from broad encompassing questions to specific curricular concerns.

Importance of Guiding Questions

Guiding questions:

- Help you define your investigation
- Help identify what types of data to collect and can be used to write questions for student and instructor surveys and focus groups
- Structure the findings section of the curriculum review report
- Help to develop an action plan
- Form the foundation of the interim report

Your internal and public reports will both include a section on the critical questions used to guide the curriculum review process. You will probably have 3 – 5 questions that you address in your review. You may be given one or more guiding questions from your Unit Lead or Associate Dean of Teaching and Learning, so check to see if they have any standard questions you are expected to address in your review.

Feedback on the Guiding Questions

It is advisable to get feedback on the rough draft of your guiding questions. Every project is different, but you may want to get feedback from the review team, students, advisory committees, and/or the dean, department head, or associate dean of teaching and learning. You might elicit feedback at a department meeting, through email, or informal means.

Questions to Consider for Your Review

This list can provide a starting point of questions to guide a curriculum review process:

General questions:

- What are the strengths of the program?
- How are program-level learning outcomes (PLOs) addressed in specific courses of the program? Are there any program-level learning outcomes that are not adequately addressed?
- Looking at the scope and sequence of the courses within the program, are there any gaps and/or overlaps in learning outcomes? If so, where?

Accreditation:

- If your program has an external accrediting body, you might add guiding questions to fulfill their requirements to allow you to complete both accreditation and the U of C's curriculum review process simultaneously.

Purpose of the program:

- How current is the program? What is being emphasized? Are we preparing graduates for traditional and/or emerging roles?
- What careers do graduates of the program go on to have?
- How can we make the program more innovative?
- What is the right balance of discipline-specific courses and interdisciplinary courses to give students a solid grounding in the discipline yet enhance their learning of broader perspectives? What might a multidisciplinary approach look like?

Students:

- Who are our students?
- Why is there so much drop-off in registration after the introductory course? Why do students decide not to continue in the discipline?
- What aspects of the program are problematic for students and how might we address them?
- What do students want out of the program? What are their career goals?
- What percentage of alumni go on to graduate studies at our institution?

Student learning experiences:

- To what extent do teaching and learning activities across the program scaffold student learning, building it from an introductory level to more complex concepts? Is there a need for more diversity of teaching and learning activities used in the program?
- What high-impact educational practices (Kuh, 2008) do we have in our program, and where are they located? Do we need to any or distribute them differently across the program?
- What aspects of the National Survey of Student Engagement (NSSE) do we excel at? What results are we dissatisfied with, and how might we address them?
- How might we plan a non-traditional learning experience for students? What would that look like? How would it be scaffolded and assessed?
- How are we connecting theory to practice? What improvements should be made in this area?
- What teaching methods are currently being used? Is there sufficient diversity?

Student assessment:

- To what extent do student assessment strategies across the program support and capture student learning? Is there a need for more diversity of student assessment strategies used in the program?
- What are the DFW rates (grades of D or F, withdrawals) for the program? What is the rate to completion? If the statistics are not reasonable, what measures should we take to improve?
- How do we approach formative feedback across the program?
- Are our policies around (grading, deferrals, etc.) effective or do we need to set/ examine specific policies?

Prerequisites:

- Do we have the right prerequisites for upper-level courses?
- Are more prerequisite courses needed for students to be successful in upper-level courses? Less?
- Is a lack of prerequisite courses in certain upper-level courses problematic for students in terms of their success in certain upper-level courses? Do they have the necessary understanding in order to succeed in these courses?

Consistency across sections of a course:

- What approaches are different instructors taking to multiple sections of a course? How consistent are course outcomes, student learning experiences, and student assessments? Are there any issues, especially in courses that are prerequisites for other courses?
- How much flexibility should we give different instructors in multiple sections of a course to bring their own expertise and research interests to the learning experience?

Content coverage:

- Are students getting opportunities to acquire foundational knowledge in the field?
- Is there a balance between foundational knowledge/ content and other curricular concerns such as critical thinking and communication?
- To what extent does the program facilitate student learning of (writing skills, critical thinking, professionalism, innovation, research skills or other initiative or strategy being targeted)? How can improvements be made?

Core courses:

- Do we have the right core (required) courses in the program?
- How are the content and theories in core courses built upon in subsequent courses? How are we scaffolding student learning throughout the program?
- Is there adequate flexibility in the program to allow students to take courses of interest to them, such as the embedded Sustainability Certificate?

Time to completion:

- Where are the bottlenecks in the program and how do we resolve them?
- What courses have high percentages of failure rates and/or withdrawal?
- What courses are out of sequence or offered in the wrong term?
- Who is graduating from our program, and who isn't? Why do students transfer out of the program?

Intended and Perceived Curriculum:

- How effective are instructors at conveying course expectations to students? What is the difference between the intended curriculum and what students actually learn (the perceived curriculum)?

Academic integrity:

- How do students learn about academic integrity? Are we doing enough and the right things in this area?
- How do we help students who are struggling?

Staffing:

- Where should we put our resources? Should we be “realizing efficiencies”, lowering class sizes, using sessional instructors more/ less?
- Do we concentrate on the learning experience in service courses that have students from all faculties (for example, first-year tutorials) or dedicate more resources to advanced courses that have more of our majors?

Faculty/ department and institutional priorities:

- How does our program align with graduate attributes, at the faculty and/or institutional level?
- Does our program align with strategic priorities?
- How are Indigenous perspectives being incorporated into the program in terms of Indigenous pedagogies and/or content?
- Are there any new or emerging priorities or initiatives that we should examine as part of our review; for example:
 - How do we enhance mental health and wellness in our students and staff?
 - What are our priorities regarding technology integration into teaching and learning?
 - What are our priorities regarding the internationalization strategy?
 - How is experiential learning enacted in the program and what opportunities exist to further incorporate it?

Non-majors:

- Which of our courses are required by students in other faculties/ programs?
- To what extent are our courses meeting the needs of non-major students?

Data Sources to Inform Your Review

Various sources of data can be used to inform decisions made during the curriculum review process at the University of Calgary. In addition to the mandatory data sources, you might want to rely on your disciplinary research strengths.

For each guiding question you will gather data from at least one source. If the data are readily available, there is no need to do further data collection. If not, determine what is realistic given practical constraints (usually time and money).

Mandatory Data Collection:

According to the Quality Assurance Handbook Curriculum Reviews (2015), data collection from certain sources is mandatory:

1. Standard Report from the Office of Institutional Analysis (OIA)
 - a. Demographic information, such as number of students, DFQ rates, attrition
 - b. NSSE engagement indicators and responses (%) for specific questions, if applicable
2. Curriculum mapping data
3. Student data (survey, focus group)

In addition, a review team can collect other data as needed to inform their review.

Potential Sources of Data:

There are many potential sources of data which could inform a curriculum review. The classification scheme that follows has been adapted from Worthen, Borg and White (1993), and is not exhaustive.

1. Data collected directly from individuals associated with the program, including students, alumni, and instructors:
 - a. Self-reports: attitudes, opinions, satisfaction, behavior, or history
 - i. Surveys or questionnaires: administered on paper, orally, by telephone, by computer, or in person. Eg. annual student exit survey, satisfaction survey
 - ii. Interviews, Eg. exit interviews
 - iii. Focus groups
 - b. Teaching and learning artifacts
 - i. Quantitative student performance indicators, Eg. test results, grades on assignments
 - ii. Assignments: papers, essays, discussion board posts, portfolios (including digital portfolios) and other indicators of student learning
 - iii. Learning activities: simulations, debates, presentations in person or online
 - iv. Personal records such as journals or logs
2. Data collected from existing organizational information or formal repositories or databases

- a. Records
 - i. Standard Report from the Office of Institutional Analysis
 - ii. Program documentation
 - iii. Past curriculum and unit reviews
- b. Curriculum mapping data (collected from instructors)
- c. Canadian Graduate and Professional Student Survey (CGPSS)
- 3. Data collected through unobtrusive measures
 - a. Environmental scan or an examination of similar programs across the province or across Canada
 - b. Literature review
- 4. Data collected by an independent (external) reviewer, often associated with accreditation
 - a. Open-ended observations
 - b. Reports and reviews which may include other data collection methods
- 5. Other data sources as identified by the review lead
 - a. Current or potential employer data

Creating a Curriculum Review Plan

Once you have determined your guiding questions, you can start to create a plan for data collection, analysis, action planning, and writing the report. For each guiding question, you will use at least one data source to inform it. If the necessary data are already collected or available, there is no need to conduct further data collection. For example, the Standard Report from the Office of Institutional Analysis includes several years of demographic information, which could be sufficient to answer some questions. Other guiding questions can be better informed from multiple perspectives, such as students and instructors.

Some considerations when creating a curriculum review plan

When creating your review plan, you might want to consider the following:

- What data have already been collected can you use to inform your guiding questions?
- What types of data collection can inform multiple guiding questions?
- How can we get multiple perspectives in both data collection and analysis?
- How can we involve students in the curriculum review plan?
- What is reasonable given practical constraints (usually time and money)?
- How can we leverage existing processes and committees to get the work done? For example, is there an undergraduate curriculum committee that could provide feedback on program-level learning outcomes (PLOs), analyze data, or take on some other aspect of the work?
- If you think you might want to disseminate some of the results, get ethics approval or a certificate of exemption, as advised by Research Services.
- Have we built in a bit of flexibility to accommodate unforeseen circumstances?

Example of a Curriculum Review Plan

Below are three examples of how guiding questions can be used to create a curriculum review plan.

Guiding Question	Rationale	Data Sources	Collection Strategy (Who, when)	Analysis Strategy (Who, how)	Notes
Do we have the right prerequisites for upper-level courses? Are more prerequisite courses needed for students to be successful in upper-level courses? Less?	DFW rates are high in some of our upper-level courses. Also, comments from the student exit survey indicate some duplication in the program.	Curriculum mapping Instructor survey Student exit survey Program docs OIA Standard Report	Mapping workshop in November, all due in Dec. Review Lead to implement student survey in Feb/ March	Curriculum data in aggregate charts All faculty invited to 2 data analysis discussions. Invite student council to participate.	Combine instructor survey questions about prerequisites with the curriculum mapping exercise.
How are we incorporating group work into the program?	Our National Survey of Student Engagement (NSSE) scores are low in Collaborative Learning: Worked with other students on course projects or assignments.	Curriculum mapping Instructor survey Student survey	Ask instructors to identify courses with group work, and what type Ask students about their experiences with group work	Curriculum data about group work to be presented in aggregate charts. All faculty invited to 2 data analysis discussions. Invite student council to participate.	Add a couple of questions on group work to the curriculum mapping exercise and instructor/ student surveys.
How do we enhance mental health and wellness in our students and staff?	Not only is this an institutional priority, students and staff have mentioned workload issues, especially around exam time.	Instructor and/or student focus groups Student survey Curriculum mapping	Close to the end of term (fall and winter)	Create a Mental Health and Wellness Subcommittee with students and faculty, to analyze the data and come up with an action plan. Discuss recommendations at a faculty retreat.	Customize curriculum mapping to include timing of midterms and major assignments.

Template for Creating a Curriculum Review Plan

Guiding Question	Rationale	Data Sources	Collection Strategy (Who, when)	Analysis Strategy (Who, how)	Notes

Curriculum Review Timeline Worksheet

	Sept. 2017	Oct.	Nov.	Dec.	Jan. 2018	Feb.	March	April	May	June	July	Aug.
Write guiding questions												
Create a curriculum review plan												
Write program-level learning outcomes												
Write/ revise course outcomes												
Orientation to curriculum mapping												
Do curriculum mapping												
Gather student data												
Gather other data												
Literature review												
Data representation												
Data analysis												
Write the internal report												

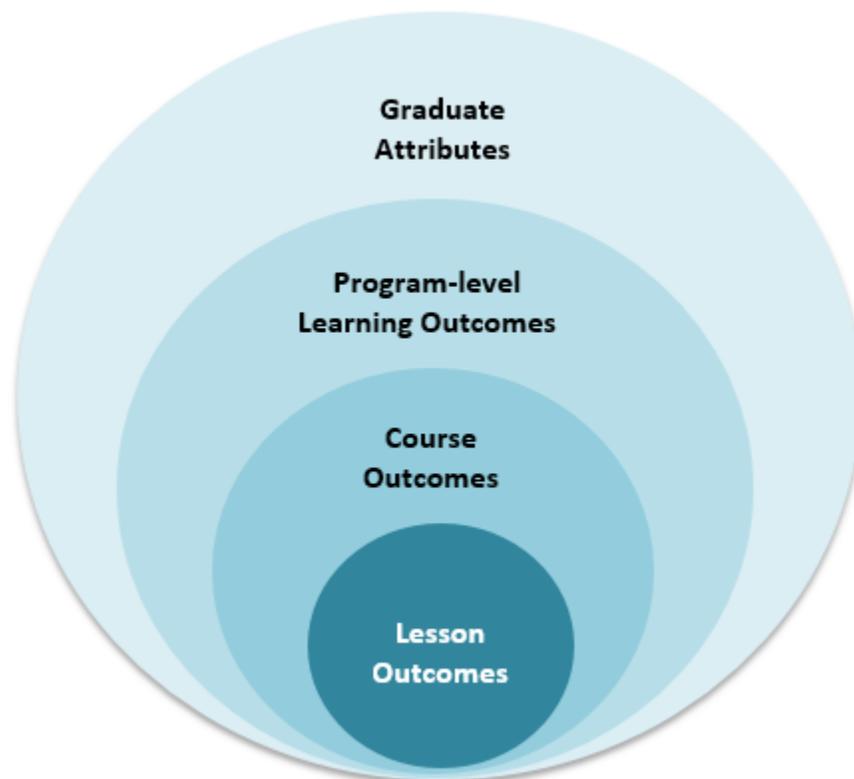
	Sept. 2017	Oct.	Nov.	Dec.	Jan. 2018	Feb.	March	April	May	June	July	Aug.
Feedback from all faculty												
Submit the reports to the Dean and Assoc. Dean T&L												
Send to Dean/ Assoc. Dean T&L for feedback												
Submit the public report to the Provost's Office												
Meet with the VP T&L												
Create a communication plan												

Add dates for: Department meetings, retreats, internal deadlines, major conferences, as relevant

Learning Outcomes

A learning outcome is “an intended effect of the program educational experience that has been stated in terms of specific, observable, and measurable student performance” (Veltri, Webb, Matveev & Zapatero, 2011). They define the knowledge, skills, and attitudes that students should be able to attain by the end of a unit of study.

The term ‘learning outcome’ is an umbrella term that is used. Learning outcomes can be articulated at the lesson level, course level, program level, faculty or institutional level. Faculty or institutional learning outcomes are typically discussed in broad terms and usually referred to as graduate attributes.



Learning outcomes at different levels

Graduate attributes: Broad and long-term descriptions of learning expectations of students who attend a particular institution/ faculty (Driscoll & Wood, 2007).

Program-level learning outcomes (PLOs): The knowledge, skills and attributes that students are expected to attain by the end of a program of study.

Course outcome: The knowledge, skills and values/ attitudes that students should be able to attain by the end of a course.

Lesson objectives: A specific and measurable statement of the learning that students should be able to acquire by the end of a lesson (in a face-to-face environment) or piece of instruction (in an online environment).

Example:

- **Graduate attribute:** Communication
- **Program-level learning outcome:** Students will be expected to write an evidence-based research paper, drawing upon salient literature in the field.
- **Course Outcome:** Students will be expected to evaluate the literature and select appropriate sources to support their arguments.
- **Lesson Objective:** Students will be expected to use a standard citation style in their written work.

Program-level Learning Outcomes (PLOs)

PLOs are the *knowledge, skills and attributes that students are expected to attain by the end of a program of study*. They are broader than course outcomes in that students typically cannot attain them by taking one course; usually, they need to take more than one course in order to build knowledge, grasping the essentials. They may be taken up in various ways in different courses, deepening students' understanding as they progress through the program.

For example, a PLO might be:

Students will be expected to write a research paper that is informed by academic literature in the field.

This statement is very broad and needs to be articulated in more specific, measurable ways at the course level. Here are some examples of potential course outcomes that map directly back to the PLO, though there could be many others:

Students will be expected to find appropriate academic articles to inform their written work.
Students will be expected to evaluate the suitability of specific academic articles that inform their written work.

Students will be expected to write a clear, concise research paper that relates to course concepts
Students will be expected to use APA in their citations, references and paper formatting.

Why PLOs are Important

PLOs are important because they communicate what is critical, intentional and special about a program. They indicate what is valued, to the extent that it needs to be articulated to students (and more broadly) as well as reflected in student learning experiences. PLOs set the stage for what students will learn and help guide decision-making about the program.

Strategies to Write PLOs

For those of you who already have PLOs written, super! If they have not been revisited in three years or more, you might want to review them to make sure they still reflect the values and intentions of the program. Also, if your program goes through accreditation it might be preferable or even necessary to use the outcomes, competencies or standards that are set out by your accreditation board. In that case, the decisions are made for you.

If there are no PLOs for your program yet, you will need to establish some before you can proceed with curriculum mapping. First of all you will need to determine who should be involved in the writing process. For example, the review lead might write the first draft of the PLOs, then get feedback from a curriculum committee before presenting them to all faculty and student representatives for comments. Other review leads have sent out a general invitation to all instructors and student representatives, with the ones who express interest forming an ad hoc working group.

Some strategies for writing PLOs include:

- Work from your program description
- Adapt course outcomes to more global statements
- Use accreditation requirements
- Examine competencies or guidelines issued by professional organizations
- Examine PLOs used for similar programs at other institutions
- Strike a subcommittee or ask your curriculum committee to draft PLOs
- Hold a faculty retreat to draft or revise PLOs
- Ask potential employers what competencies are expected of their employees
- Use alumni surveys to ask people what was essential about the program

Writing PLOs collaboratively can result in immediate benefits. As people discuss their perceptions of the program, aspirations and future directions, what is working well and how to make things even better, they gain a fuller understanding of the curriculum and what other people are doing in their courses, making connections and thinking about things in a different way. Also, instructors can be more accepting of PLOs when they have had the opportunity for input rather than being presented with statements that are set in stone.

How many PLOs?

A general guideline of how many PLOs are effective is 8 – 12. However, there are many examples of programs that have more, and some examples of programs that have less. The right number of PLOs would be the number that is needed to express the intentions for student learning in the program. Please note that if you have too many PLOs it can be wieldy. Some groups have dealt with this by clustering their PLOs into categories or themes. A more difficult issue is when there are too few PLOs, as these tend to be global. As a result all courses map to the PLOs and it is difficult to discern useful information from the curriculum maps.

Future Aspirations

Your faculty or department may be considering a new program focus or highlighting a new initiative. For example, a group might want to investigate ways in which the program promotes mental health and wellness in order to identify gaps as well as strategies that can be leveraged. In this scenario, they might add an additional PLO:

By the end of the program, students will be expected to develop personal resilience and self-management regarding their academic studies.

The PLO serves as a reminder to instructors that supporting students in this way is a shared responsibility. The mapping process can identify what is already being done at the course level. Examples of course outcomes that could be associated with this PLO include:

By the end of the course, students will be expected to

- Keep a daily log indicating their stress level.
- State three resources on campus they can access when they feel stressed.

Evaluating Your PLOs

Writing or revising program-level learning outcomes is an opportunity for all staff to discuss the purpose of the program. Even if your staff is in general agreement about what should be accomplished in the program, you might find that there are some subtle differences in perspective. Involving all instructors in the process of writing or revising PLOs can have immediate benefits as people discuss the program, gain new understanding about the goals of the program, and shift their perspective from what they are doing in individual courses to what everyone is doing collectively in the program. Some discussion questions for your faculty and/or advisory group are:

- Do they convey the purpose of the program?
- Do they convey what is important about the program?
- Do they outline the critical competencies, skills and knowledge that students are expected to learn by the end of the program?
- What do you value about the program? What is special or innovative about it? Are they captured in the PLOs?
- What would the program need to be like in order for it to be the most sought after of its kind in Canada?
- Is anything missing?

Examples of Program-level Learning Outcomes – Undergraduate Programs

Example of Interdisciplinary PLOs based on the Council of Ministers of Education, Canada

By the end of the program, students will be expected to:

- Develop a knowledge base of theories and concepts within their primary area of study.
- Use different approaches to solving problems using well established ideas and techniques within the discipline.
- Locate and critically evaluate qualitative and quantitative information.
- Formulate and communicate orally and in writing arguments based on information, theories, and concepts.
- Apply knowledge and skills in a variety of contexts, including situations that are new to the student.
- Conceptualize, design, and implement research for the generation of new knowledge or understanding within the discipline (Council of Ministers of Education, 2007).

Bachelor of Arts in Sociology from Indiana University (2012)

The student learning outcomes for the degree are as follows:

- Theoretical: Graduates will be able to analyze and evaluate major theoretical perspectives in sociology
 - Graduates should be able to identify the general theoretical orientation.
 - Graduates should be able to apply theoretical analyses of social structure and social processes.
 - Graduates should be able to interpret social issues in terms of the major theoretical perspectives.
- Methodological: Graduates will be able to utilize and evaluate research methods and data analysis used in sociology.
 - Graduates should be able to demonstrate appropriate use of both quantitative and qualitative methodologies.
 - Graduates should be able to evaluate different research methods.
 - Graduates should be able to interpret the results of data gathering.
 - Graduates should be able to demonstrate appropriate use of statistical techniques.
 - Graduates should be able to demonstrate competent use of statistical software.
- Critical Thinking: Graduates will be able to evaluate critically arguments and situations.
 - Graduates should be able to critically evaluate theoretical arguments.
 - Graduates should be able to develop evidence-based arguments.
 - Graduates should be able to critically evaluate published research.
- Communication Skills: Graduates will be able to communicate effectively in both written and oral form.
 - Graduates should be able to write a research report.
 - Graduates should be able to develop an oral research report.

- Professional Ethics: Graduates will be knowledgeable of appropriate ethics concerning both professional conduct and the use of human subjects.
 - Graduates should demonstrate a mastery of the ethical standards for conducting research with human subjects.
 - Graduates should demonstrate an understanding of the ethical standards of the American Sociological Association (Indiana University, 2012).

Bachelor of Arts in Philosophy

The University of British Columbia (n.d.)

<http://philosophy.ubc.ca/undergraduate/learning-outcomes/>

After successfully completing a BA in Philosophy:

1. Students will be able to explain philosophical texts and positions accurately, to identify and apply philosophical research methods consistently, to articulate and defend precise philosophical positions, and to anticipate and rebut objections to those positions.
2. Students will be able to apply their philosophical learning to important public issues and to articulate why philosophical understanding is valuable in such debates.
3. Students will develop their own philosophical areas of interest and investigate them from various perspectives.
4. Students will attain the research skills necessary for writing a research paper that engages with primary and, where applicable, secondary literature on a topic in philosophy.
5. Students will learn to recognize and articulate fundamental questions about what exists, what we can know and how we should live our lives. Students will understand influential attempts to answer such questions, along with evaluating their advantages and disadvantages.
6. Students will acquire competence in translation, interpretation, and proof in sentential and predicate logic and will understand how these processes aid in the evaluation of arguments.
7. Students will be able to describe the ways in which the formal techniques of logic are important to philosophical research.
8. Students will acquire reading skills necessary to understand and critically engage with historical and contemporary philosophical texts.
9. Students will be able to identify some of the central concerns and methods of philosophy in at least two periods in its historical development, and will be able to explain the relations between those eras of philosophy and contemporary philosophy. Students will be able to show sensitivity to issues of translation, textual transmission and the historical and cultural context in which philosophical ideas develop.
10. Students will be aware of the existence of multiple philosophical traditions, and will be able to reflect on the cultural specificity of some of their own concepts and values.
11. Students will be able to explain and discriminate between major approaches to moral philosophy such as consequentialism, deontology and virtue ethics, and to summarize and evaluate the views of at least one philosopher associated with each.
12. Students will be able to explain and discriminate between major approaches to political philosophy such as Libertarianism, Marxism, Liberalism and Communitarianism, and to summarize and evaluate the views of at least one philosopher associated with each.

13. Students will be able to explain epistemological concepts such as the nature of knowledge, justification, evidence and skepticism, and to summarize and evaluate major philosophical positions in relation to each.
14. Students will be able to explain metaphysical concepts such as necessity, reality, time, God and free will, and to summarize and evaluate major philosophical positions in relation to each.

Materials Engineering Degree from the University of British Columbia

At the end of the program, students will be able to:

1. Characterize and select materials for design by evaluating the linkages between material properties, microstructures and processing.
2. Analyze materials engineering problems using a balance of mathematics, physics and chemistry including thermodynamics, mass, momentum and energy transport, kinetics and mechanics of materials.
3. Solve materials engineering problems. Identify and formulate problems, develop and apply analytical and experimental methods of investigation, identify contributing factors and generate, validate, and evaluate alternative solutions.
4. Design processes for the extraction, synthesis and processing of materials to meet technical, economic, environmental and ethical needs and constraints.
5. Communicate effectively in a professional environment through technical reports and presentations. Articulate and justify technical solutions to diverse audiences.
6. Recognize and evaluation the societal benefits of materials engineering. Appreciate and evaluate the environmental and societal impact of materials. Recognize the importance of professional and ethical responsibilities, the evolving nature of materials engineering and the importance of lifelong learning (University of British Columbia, n.d.).

Bachelor of Science in Biology, York University

Upon successful completion of any program in Biology, students will be able to demonstrate:

- General knowledge and understanding of the major concepts, methodologies and assumptions in biology.
- General understanding of the basic structures and fundamental processes of life at the molecular, cellular, organismal and population levels, with detailed knowledge in certain topics.
- The ability to gather, review, evaluate and interpret biology information (in scholarly reviews, primary sources and mass media articles).
- The ability to apply learning from other areas (e.g. chemistry)
- The ability to effectively apply the scientific method for problem solving and experimental design in biology.
- The ability to carry out basic biological laboratory activities safely and reliably
- The ability to collect, organize, analyze, interpret and present quantitative and qualitative biological data.

- An understanding of the research methods in biology that enable the student to effectively evaluate the appropriateness of different established strategies/ techniques to solve problems, and to devise and to solve problems using these methods.
- Awareness of current issues relating to biology (including one or more detailed areas within biology).
- The ability to effectively work with others in the laboratory and class setting.
- (continued) behavior consistent with academic integrity and social responsibility (York University, n.d.)

Examples of Program-level Learning Outcomes – Graduate Programs

Master’s Certificate in Elearning, Werklund School of Education, University of Calgary

By the end of the program, students will be expected to:

1. Demonstrate a solid understanding of the research, practices, and trends in the field of elearning (in Canada).
2. Investigate the continuum of elearning, from digital technologies used to support learning, to blended and fully online course delivery.
3. Investigate complex elearning issues using a variety of information sources, including current elearning research and practice.
4. Select existing media and methods to meet specific student learning needs within elearning environments.
5. Create plans that integrate appropriate educational media and technology to enhance student learning in face-to-face, blended, and fully online methods of delivery.
6. Design and develop digital content and environments that meet specific student learning needs.
7. Evaluate technology-enabled learning experiences based on different criteria.

Adapted from: Ministerial Statement (Council of Ministers of Education Canada, 2007)

Master's Certificate in Software Security, Computer Science, University of Calgary

By the end of the program, students will be expected to:

1. Gain foundational knowledge in the principles of secure systems: systems security and applications security.
2. Develop a secure software system or product that will be connected to the Internet: anticipate potential threats and design options to secure a product.
3. Apply existing tools and practices into the software development process in order to enhance the security of their software.
4. Apply threat modeling, security design, and security assessment skills in the process of developing an innovative product such as a mobile application or other smart device.
5. Recognize the limitations of technical security measures, and strategize and evaluate ways to address gaps, including non-technical solutions such as deployment of policies and programs.
6. Communicate systems design and security assessment results to a technical audience who may not be security experts.
7. Decide on a course of action based on relevant legal and ethical considerations.

Student Surveys

It is mandatory to collect student data in some form, such as a student survey, focus group, or interviews. The suggestions in this section are in the form of surveys, but they are readily adaptable as needed for your data collection method and purposes. If you decide to do a student survey, you may want to use Qualtrics, an online survey tool. The University of Calgary has an institutional license, making it free of charge to use it for your curriculum review. For more information about creating a Qualtrics account, go to:

<https://oia.ucalgary.ca/qualtrics-login>

You are allowed to collect student survey data without applying for ethics approval, as long as you are using the results for program evaluation purposes. More information about exemptions from ethics review can be found at:

http://www.ucalgary.ca/research/files/research/150130-cfreb_research_exempt_from_review.pdf

If you think you may want to use the data for other purposes, such as dissemination (conference presentations and/or articles), please seek guidance from the Conjoint Faculties Research Ethics Board:

<https://www.ucalgary.ca/research/researchers/ethics-compliance/cfreb>

Purposes of the Survey

As with any survey, the purpose of the survey will determine what questions you ask of students. Some groups want to know general student perceptions of the program, while others would like to know students' future career goals, satisfaction with the program, which courses they found problematic, or the likelihood that they will apply for graduate school.

In the next section we offer some samples of student survey questions as a starting point. Please adopt or adapt the ones that will be useful for you and create new ones as needed to gather the data that will be most helpful for your review.

Instructions for a Student Survey

Please adapt these instructions as needed for your survey:

Welcome to the Student Survey for [program] majors. You are receiving this survey because you are in your third or fourth year of studies. Your feedback is very valuable to us as we review the [name of program]. The information you provide will help us improve the student learning experience of [program] majors.

The survey should take about 15 minutes to complete. Your responses are completely confidential and your name will never be associated with your responses or comments. No personal identifying information will be shared. Only aggregate data will be used for program evaluation purposes.

Sample Student Survey Questions

With grateful thanks to Dr. Chris Sears, Psychology Department, for many of the questions listed below:

General Questions

I will be graduating in:

- Fall 2018
- Spring 2019
- Fall 2019
- Spring 2020

Did you complete 75% or more of your [program] courses at the University of Calgary?

- Yes
- No

Please estimate your overall GPA for the fall 2017 and winter 2018 terms combined:
(text response)

Did you work full-time or part-time during the past academic year?

- Yes
- No

If so, how many hours per week did you work during the past academic year?
(text response)

Please indicate the degree you will receive at graduation:

- (List potential degrees, including Honours)
-
-

Student Satisfaction Questions

Please rate your satisfaction with your learning experiences in [faculty or department] on each of these items (matrix table):

	Very Satisfied	Satisfied	Somewhat Satisfied	Not Sure	Somewhat Dissatisfied	Dissatisfied	Very Dissatisfied
Variety of courses available	<input type="radio"/>						
Level of academic challenge	<input type="radio"/>						
Quality of teaching in lectures	<input type="radio"/>						
Quality of teaching in labs	<input type="radio"/>						
Opportunities for research experience	<input type="radio"/>						
Career information	<input type="radio"/>						

Please rate your overall satisfaction with your learning experiences in the [program name]:

- Very satisfied
- Satisfied
- Somewhat satisfied
- Not sure
- Somewhat dissatisfied
- Dissatisfied
- Very dissatisfied

How likely are you to recommend the [name of program] at the University of Calgary to others?

- Very likely
- Likely
- Somewhat likely
- Not sure
- Somewhat unlikely
- Unlikely
- Very unlikely

Course Availability

After starting the [program name] major, how frequently did you experience difficulties fitting [program name] courses into your academic schedule?

- Never
- Rarely
- Sometime
- Often
- All the time

Student Perceptions About the Program

Please rate the extent to which you agree or disagree with the following statements:

	Strongly Agree	Agree	Somewhat Agree	Not Sure	Somewhat Disagree	Disagree	Strongly Disagree
There are too many students in [program name] courses	<input type="radio"/>						
I was able to take all the [program name] courses I wanted	<input type="radio"/>						
There should be more [program name] courses offered in the evenings	<input type="radio"/>						
There should be more [program name] courses offered in block week	<input type="radio"/>						
There should be more [program name] courses offered online	<input type="radio"/>						
It is easy to get an A in [program name] courses	<input type="radio"/>						
I am proud to be a [program name] major	<input type="radio"/>						
The volume of work in the program has been manageable	<input type="radio"/>						
I have found the program to be intellectually stimulating	<input type="radio"/>						

Please comment on any aspect of the above.
(text box)

Why did you select [program name] as a major?
(text box)

Quality of Instruction

Compared to other University of Calgary courses you completed, how would you rate the quality of instruction in your [program name] courses?

- Much better
- Better
- Somewhat better
- About the same
- Somewhat worse
- Worse
- Much worse

Prerequisites

Core courses are intended to teach essential concepts and theories that are needed for success in higher-level courses. In your experience, to what extent have the following required core courses adequately prepared you for success in higher-level courses? If you have not yet taken a particular core course, select N/A

	Well Prepared	Prepared	Somewhat Prepared	Not Sure	Somewhat Unprepared	Unprepared	Not at all Prepared	N/A
XXXX 211	<input type="radio"/>							
XXXX 231	<input type="radio"/>							
XXXX 301	<input type="radio"/>							
XXXX 331	<input type="radio"/>							

Please comment on prerequisite courses and how well they prepared you for subsequent courses:
(text box)

Program-level Learning Outcomes

The following table shows the broad expectations for student learning in the program. How well do you think the course work that you have completed so far has helped you to learn these knowledge and skills?

	A Lot	Somewhat	A Little Bit	Not at all	Not Sure
Develop a knowledge base of theories and concepts within their primary area of study.	<input type="radio"/>				
Use different approaches to solving problems using well established ideas and techniques within the discipline.	<input type="radio"/>				
Locate and critically evaluate qualitative information.	<input type="radio"/>				
Locate and critically evaluate quantitative information.	<input type="radio"/>				
Formulate and communicate oral arguments based on information, theories, and concepts.	<input type="radio"/>				
Formulate and communicate arguments in writing based on information, theories, and concepts.	<input type="radio"/>				
Apply knowledge and skills in a variety of contexts, including situations that are new to the student.	<input type="radio"/>				
Conceptualize, design, and implement research for the generation of new knowledge or understanding within the discipline.	<input type="radio"/>				

Effectiveness of Learning Experiences

Please indicate the extent to which the following experiences have contributed to your learning in the [name of program]:

	To a great extent	To a moderate extent	A little bit	Not at all	N/A
First-year courses	<input type="radio"/>				
Seminar-based courses and experiences	<input type="radio"/>				
Laboratory-based courses and experiences	<input type="radio"/>				
Studio-based courses	<input type="radio"/>				
Co-op experiences, internships, or clinical placements	<input type="radio"/>				
Community-based projects or service learning	<input type="radio"/>				
Writing-intensive courses	<input type="radio"/>				
Undergraduate research projects	<input type="radio"/>				
Capstone courses and projects	<input type="radio"/>				
Study abroad program or intercultural learning experiences	<input type="radio"/>				
Integrative studies and experiences that transcend disciplinary boundaries	<input type="radio"/>				

Honours Program

Are you in the honours program and enrolled in the honours thesis seminar?

- Yes
- No

Was your honours thesis supervisor a regular faculty member in the [department, faculty] or an adjunct faculty member?

- Regular faculty member
- Adjunct faculty member
- Not sure

Please rate how satisfied you are with your honours thesis supervisor:

- Very satisfied
- Satisfied
- Somewhat satisfied
- Not sure
- Somewhat dissatisfied
- Dissatisfied
- Very dissatisfied

Please rate how satisfied you are with the research experience you acquired as an honours student:

- Very satisfied
- Satisfied
- Somewhat satisfied
- Not sure
- Somewhat dissatisfied
- Dissatisfied
- Very dissatisfied

Please rate how useful the honours thesis seminar was to you:

- Very useful
- Useful
- Somewhat useful
- Not sure
- Somewhat useless
- Useless
- Very useless

Please rate how useful each of the following honours seminar activities was to you:

	Very Useful	Useful	Somewhat Useful	Not Sure	Somewhat Useless	Useless	Very Useless
Scholarship information sessions	<input type="radio"/>						
Graduate school information sessions	<input type="radio"/>						
Giving presentations	<input type="radio"/>						
Watching other students' presentations	<input type="radio"/>						
Presentation tips and advice	<input type="radio"/>						
Receiving feedback on my presentations	<input type="radio"/>						
Advice on writing the honours thesis	<input type="radio"/>						
Peer feedback on my honours thesis	<input type="radio"/>						
Instructor feedback on my honours thesis	<input type="radio"/>						
Meeting as a group throughout the year	<input type="radio"/>						

Please rate your overall satisfaction with your honours thesis experience:

- Very satisfied
- Satisfied

- Somewhat satisfied
- Not sure
- Somewhat dissatisfied
- Dissatisfied
- Very dissatisfied

Do you have any other comments about your honours thesis experience that you would like to share with us?

(text box)

Future Plans

Please select one of the following statements to best describe your situation in September [next academic year]:

- I will be starting a graduate program in [program name]
- I will be starting a graduate program in [other program associated closely]
- I will be starting law school
- I will be starting a graduate program not listed above
- I will be studying in a different undergraduate program
- I will be working full-time
- I hope to be working full-time, but I don't have a job waiting
- I will be traveling most of next year and not working full-time or going to school
- I am not sure what I will be doing
- None of the above (If you select this option, please respond to the next question)

If you chose "None of the above" for the previous question, please tell us what your plans are for September [next academic year]

(text box)

Do you plan on returning to school (university, college, SAIT, etc.) sometime in the next 5 years?

- No, I do not plan on returning to school in the next 5 years
- Yes, I will be a full-time student next year
- Yes, I will be a part-time student next year
- Yes, I plan on returning to school in the next 1-3 years
- Yes, I plan on returning to school in the next 4-5 years

Concluding Questions

In your opinion, what are the strengths of the [name of program]?

(text box)

Thinking about the program as a whole, if you could KEEP one thing that was most impactful in terms of your learning, what would that be?

(text box)

Thinking about the program as a whole, if you could CHANGE one thing that would be most impactful for your learning, what would that be?

(text box)

Do you have any final comments about the [name of program] you would like to share with us? We greatly value your thoughts and opinions.

(text box)

Curriculum Mapping

What is curriculum mapping?

Curriculum mapping is the *process of associating course outcomes with program-level learning outcomes (PLOs) and aligning elements of courses with a program, to ensure that it is structured in a strategic, thoughtful way that enhances student learning* (adapted from Harden, 2001). While the language of mapping is used in the literature and these resources, the resulting diagrams often resemble a matrix more than a traditional map.

University of Calgary Definition and Description of Curriculum Mapping

- The process in which the learning outcomes, teaching and learning strategies, and assessment processes for each course in a program can be represented to create a summary of the learning plan for an entire program of study so that the relationships between the components of the program can be observed (University of Calgary, p. 3, 2015).
- Each faculty member will enter the learning outcomes for each course they teach, the primary teaching and learning strategies employed, and the assessment methods used. It is expected that all courses will be mapped (University of Calgary, p. 8, 2015).

Benefits of Curriculum Mapping

- Enhances standards of excellence in student learning (University of Calgary, 2015)
- Evidence-based means of evaluating programs
- Provides a view of the curriculum as a whole (Jacobs & Johnson, 2009)
- Relationships within the curriculum can be easily identified, such as connections between learning outcomes, student assessments, and teaching and learning activities (Tariq, Scott, Cochrane, Lee & Ryles, 2004)
- Encourages communication amongst faculty members within a program (Metzler, Rehrey, Kurz & Middendorf, 2017)
- Provides an opportunity for reflection (Fraser, Crook & Park, 2007; Tariq, Scott, Cochrane, Lee & Ryles, 2004)
- Helps faculty members to articulate tacit understandings about a program
- Helps faculty members to document program strengths (Uchiyama & Radin, 2009; University of Calgary, 2015; Wolf, 2008)
- Provides a context for planning and discussing the curriculum
- Easy identification of strengths, gaps and redundancies in a curriculum (Jacobs & Johnson, 2009)
- Supports the process of curriculum review and evaluation (University of Calgary, 2015)

Aligning Course Outcomes to Program-level Learning Outcomes (PLOs)

This example shows the alignment of a course outcome from a course to program-level learning outcomes (PLOs). The PLOs are listed across the top in abbreviated form. The instructor lists his or her course outcomes down the left-hand side. The instructor recorded the course outcome, and decided which of the PLOs it was associated with to a MODERATE to STRONG degree, not a weak or peripheral one.

The instructor will continue to add all course outcomes to the chart and note the alignment to PLOs.

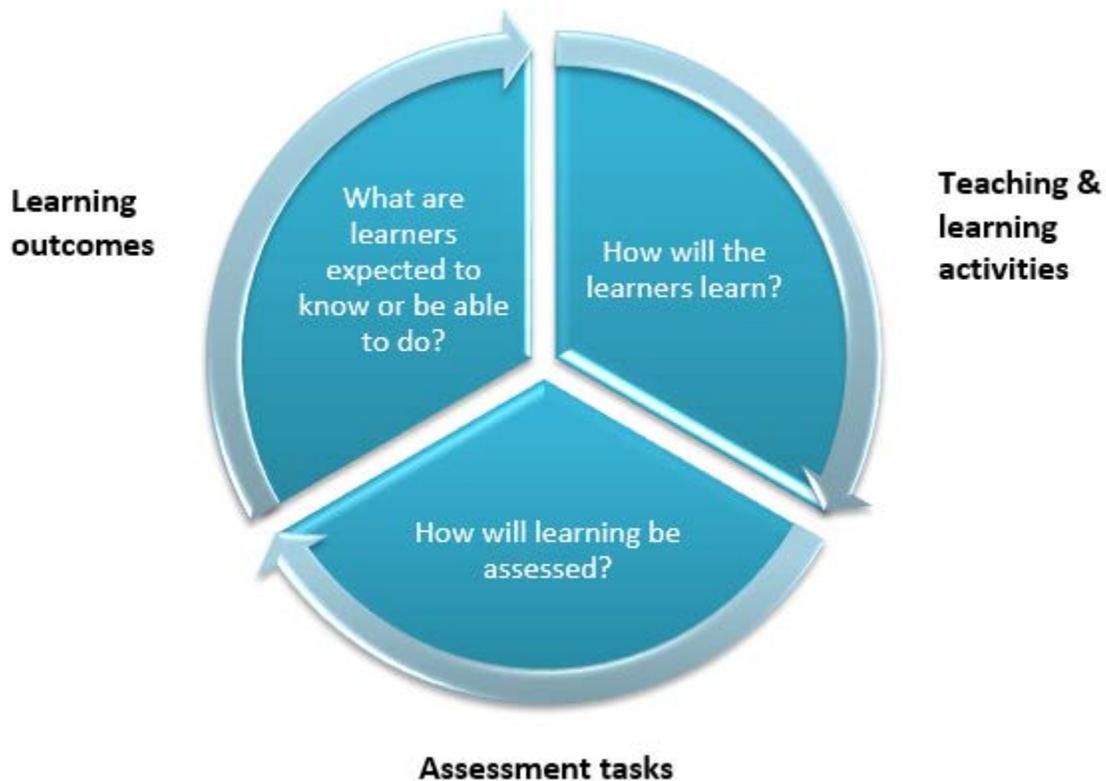
	Disciplinary Knowledge	Critical Thinking	Communication	Research Skills	Ethical Reasoning
Write an essay, analyzing complex issues using multiple forms of evidence to support their argument.		X	X	X	

Aligning Learning Outcomes, TLAs, and Student Assessments

In addition to mapping learning outcomes, we can also map other activities such as teaching and learning activities and student assessments.

Constructive Alignment

Constructive alignment is a term used to describe *the fidelity between course outcomes, student assessment, and teaching and learning activities* (Biggs, 2014). Ideally an instructor will first define the course outcomes, and then align the student assessment and TLAs with the outcomes. A lack of alignment can be problematic in a course.



The following chart is similar to the one shown previously, but has two extra columns for teaching and learning activities (TLAs) and student assessments. The instructor has added information on the TLAs being used in the course to support student learning of the course outcome, and how it is being assessed.

	Teaching & Learning Activities	Disciplinary Knowledge	Critical Thinking	Communication	Research Skills	Ethical Reasoning	Student Assessments
Write an essay, analyzing complex issues using multiple forms of evidence to support their argument.	Lecture, readings, online resources		D	D	I		Research paper

I = Introduced: Key ideas, concepts or skills related to the learning outcome are introduced and demonstrated at an introductory level. Instruction and learning activities focus on foundational knowledge, skills and/or competencies and entry-level complexity.

D = Developing: The learning outcome is reinforced with feedback; students demonstrate the outcome at an increasing level of proficiency. Instruction and learning activities concentrate on enhancing and strengthening existing knowledge and skills, as well as expanding complexity

A = Advanced: Students demonstrate the learning outcome with a high level of independence, expertise and sophistication expected upon graduation. Instructional and learning activities focus on and integrate the use of content or skills in multiple levels of complexity. Adapted from California State University, Long Beach (n.d.) and Veltri, Webb, Matveev & Zapatero (2011).

In this example, the instructor has organized lectures, readings, and online resources for this learning outcome so that students can write an essay analyzing complex issues. The assessment is for students to write a research paper. While the teaching and learning activities should be helpful for students to achieve the learning outcomes, the instructor could strengthen the constructive alignment by building in some hands-on activities such as in-class writing, samples of multiple forms of evidence, peer feedback, and an example critique.

Mapping Scale

This chart also shows the degree to which a program-level learning outcome is addressed by a particular course outcome by using a mapping scale. In this example, the scale used is I-D-A: Introductory, Developing, Advanced. The scale indicates the expectations in the course regarding student learning. For example, at the introductory level, key ideas, concepts or skills are focused on foundational knowledge, skills and/or competencies and entry-level complexity. The mapping scale is particularly useful when examining courses across a program of study to see if student expectations of learning are scaffolded and progressing throughout.

Each program will identify a mapping scale that reflects their discipline and that people can use to indicate expectations of student learning. It is critical to define all mapping scale terms, and to discuss them with the group that will be doing the mapping. Everyone needs to be on the same page about the meaning of the terms to ensure that curriculum mapping data are valid. Working sessions or department meetings are both excellent opportunities to discuss mapping terms.

The University of Calgary does not require that a certain mapping scale be used. Each group can determine what works best for them. For example, if you are required to use a certain mapping scale for accreditation purposes, there is no need to repeat the mapping exercise. It makes most sense to use the same scale for both accreditation and curriculum review.

More examples of mapping scales can be found further on in the manual.

FAQs

Can I pick the mapping method?

- Typically the Review Lead picks the method that everyone will use to map the program
- Sometimes the Unit Lead, Associate Dean or Dean will define what mapping method will be used so that there is consistency across the faculty
- Individuals do not select what method they would like to use to map their course. Everyone mapping a course within the same program will use the same tool and the same process.

Which courses are mapped?

- All required courses in a program: This is the bare minimum
- Courses that fulfill a requirement, if possible
- Courses within the discipline, if possible
- Optional courses: if feasible
- Courses from other disciplines: Consider on a case-by-case basis
- Relevant educational experiences in graduate programs for instance professional development activities
- Thesis or dissertations when appropriate

What elements of a course are mapped?

- Course outcomes are mapped to program-level learning outcomes (PLOs)
- Student assessments are recorded and may be mapped to individual course outcomes or the course as a whole
- Teaching and learning activities are recorded and may be associated with individual course outcomes or the course as a whole
- Other elements of a course may be mapped, depending on what the review team is investigating. Examples include high-impact practices (Kuh, 2008), labs, and faculty or institutional initiatives.

Who does the mapping?

- The instructor of the course
 - If there have been several instructors who taught it, who did it most recently? Most frequently? Is there a course coordinator who should do the mapping?
- If there isn't an instructor to do the mapping:
 - RA, program coordinator or review lead can map the course working from the syllabus

What about courses with multiple sections?

- If only one section needs to be mapped, who does the mapping?
 - Is there a lead instructor or course coordinator?
 - Is there a section that is typical of most sections of the course?
- If you want to compare multiple sections of a course:
 - Have most/all instructors map their section
 - Enables you to check for consistency of student learning experiences

How long will it take?

- The first map typically takes about half an hour
- After that, instructors might take 15-20 minutes to map each course

How to determine if a course outcome aligns to a PLO?

- Look for MODERATE to STRONG alignment
- If a course outcome is weakly or peripherally associated with a PLO, do not indicate an alignment
- Charts that include weak or peripheral association make it harder to interpret where the focus of the program is

What does the output of the mapping process look like?

- Depends on which method you use
- If done on paper or in a .doc file, the data will have to be aggregated before you can see trends and patterns in a program
- If done using a tool such as an online survey tool, the report can vary based on how you set up the mapping process.
- Whatever the method, you will likely have to work with the data to create the reports you want
- Mapping data can be aggregated to show strengths, weaknesses, alignment and trends across the program

Methods for Curriculum Mapping

This section will provide an overview of four commonly-used methods for inputting curriculum mapping information and creating reports from the compiled data.

1. Paper-based approach and .doc files
2. Curriculum links
3. Online survey tools
4. Excel spreadsheets

1. Paper-based Approach and .doc Files

In the past, mapping a program on paper was essentially the only option, and many programs relied on this method for decades. We have expanded the paper-based approach to include both hard copies of a document and using a .doc file to do it electronically. This allows for additional flexibility. For example, if you have instructors who are remote or on research leave, they can map their courses from their location and submit their documents to the review lead electronically.

Benefits	Drawbacks
Chart format makes it easier to see the constructive alignment (or lack of it) in a course	No report is automatically generated
Can be done electronically or in a face-to-face setting	Someone has to manually aggregate the data; the higher the number of courses that are mapped, the larger the workload
Complete flexibility to structure the mapping process to suit your department or faculty	

Using a paper-based approach offers a number of benefits when setting it up and during the mapping process. Mapping on paper allows for complete flexibility to structure the process to suit your group. Everything can be adjusted: the terms used, the number of course outcomes people can input, how the chart is arranged – things can be changed as needed. Piloting the mapping process is helpful in determining the changes needed prior to all faculty mapping their courses. A paper-based method is also beneficial for instructors when doing the mapping. Using a chart format makes it simple for them to see if their course is aligned with the program-level learning outcomes. The chart format makes intuitive sense to many instructors, and they can tell at a glance what is being asked of them (unlike online surveys that are often completed over multiple pages).

Challenges with this approach often occur when it is time to aggregate the data. In contrast to online surveys and Curriculum Links, there is no auto-generated report. Usually someone will have to put the data in electronic format so that charts can be made and the data can be properly analyzed. If there are only a few courses in the program, this isn't particularly problematic; in fact, it may be more time-consuming to use an online tool than paper-based if you are only mapping a few courses. However, the more courses that are being mapped, the greater the workload in digitizing and working with the data.

An additional factor to consider when deciding whether or not to use a paper-based approach is the preferences of your faculty members. If they vastly prefer a paper-based approach and you are not likely to get broad participation or buy-in using Curriculum Links or an online survey tool, then a paper-based approach makes the most sense.

More templates can be found at: <https://curriculummapping.weebly.com/mapping-templates.html>

Paper Based Approach and .doc File Example

Course Outcomes to Program-level Learning Outcomes: Adapted from an Undergraduate Program

Course Number and Name:	Teaching and Learning Activities (Identify)	Program-level Learning Outcomes									Student Assessment
		1. Knowledge of theories and concepts	2. Apply knowledge and skills in different contexts	3. Evaluate qualitative information	4. Evaluate quantitative information	5. Communicate orally	6. Communicate in writing	7. Critical thinking	8. Design and implement research	9. Ethical understanding	
Course Outcomes											

I = Introduced: Key ideas, concepts or skills related to the learning outcome are introduced and demonstrated at an introductory level. Instruction and learning activities focus on basic knowledge, skills and/or competencies and entry-level complexity.

D = Developing: Learning outcome is reinforced with feedback; students demonstrate the outcome at an increasing level of proficiency. Instruction and learning activities concentrate on enhancing and strengthening existing knowledge and skills, as well as expanding complexity

A = Advanced: Students demonstrate the learning outcome with a high level of independence, expertise and sophistication expected upon graduation. Instructional and learning activities focus on and integrate the use of content or skills in multiple levels of complexity.

Adapted from California State University, Long Beach (n.d.) and Veltri, Webb, Matveev & Zapatero (2011).

Examples: Teaching and Learning Activities	Legend: Aligning Outcomes	Examples: Student Assessment
Lecture, demonstrations, reading, discussion, debates, problem solving, case studies, group projects, inquiry, essays, journals, research projects, field trips, practicum, simulations	<p>I: Introduced: Concepts are introduced in this course but not explored in depth</p> <p>D: Developing: Students apply concepts to the level of competency</p> <p>A: Advanced: Students explore concepts to an advanced level</p>	Exam with closed questions (multiple choice, true/false), Exam with open-ended questions (short answer, essay), report, research paper, portfolio, journal, reflection, written assignment, presentation, oral project, project, skill demonstration

2. Curriculum Links

Curriculum Links is an online application that is being developed at the University of Calgary for the purpose of curriculum mapping. The tool will be piloted in the fall of 2018 and launched in the spring of 2019. If you are interested in piloting or using the tool, please contact one of the Educational Development Consultants below:

Patti Dyjur
pdylur@ucalgary.ca

Kim Grant
grantka@ucalgary.ca

Benefits	Drawbacks
Curriculum Links was designed specifically for curriculum mapping	Less functionality than Qualtrics
Step-by-step process to set up the tool	Fewer support materials than other approaches
The tool allows you to create multiple reports with subsets of the data	Less flexibility than paper-based
Does not require previous experience with other software (i.e., Excel)	

Because the tool is designed and built specifically for curriculum mapping, Curriculum Links will offer a number of benefits. The tool is straightforward to use. The program walks the administrator through a step-by-step process to set up the review, and initial feedback from instructors indicates that they find it easy to use. The power of the tool is evident after the mapping, though, when compiling reports on aggregate data. Curriculum Links allows you to create multiple reports using different subsets of the data. For example, you might create a report on all courses, one on required courses, focus only on 400-level courses or those with labs, and so on. Certainly you can do the same using Qualtrics; however, that requires you to download the data into an Excel file to work with it while Curriculum Links does not require advanced knowledge of Excel.

As with the other options, there are drawbacks to using Curriculum Links. It is not as robust as Qualtrics, which has far greater functionality. It also has fewer support materials than commercial tools such as Qualtrics. Also, if you prefer a certain way of mapping learning outcomes that requires a more paper-based approach, Curriculum Links may not be the best choice for you.

3. Online Survey Tool – Qualtrics

The University of Calgary has purchased an institutional license to the online survey tool Qualtrics. The tool can be used to conduct curriculum mapping through a web browser, with results compiled into a basic report. Further analysis can be done by downloading the data into an Excel spreadsheet and working with it further.

Benefits and Drawbacks of Using Qualtrics

Benefits	Drawbacks
Flexibility with the number and types of questions and response formats	Vertical and horizontal scrolling
Better reporting than some of the other methods for those with expertise	If people are completing the survey from a distance, you need to give very clear directions so that they understand the task
Many participants will be familiar with the tool; support issues are likely to be fewer than other methods	Advanced reports will require time and effort to generate (just like other methods)

There are many benefits of using Qualtrics for curriculum mapping. It is a great option when some of the faculty members who will be doing the mapping are at a distance, or you have sessional instructors who will not be coming to campus to attend a mapping session. It allows for a wide range of flexibility in almost every aspect, including choice of terms, number and types of questions, and response formats. The generated report may be adequate for your purposes, and if not, you can download the data into an Excel spreadsheet for further analysis. Additionally, many participants are familiar with online surveys.

Several drawbacks also merit attention. First, if using the table format to indicate alignment between course outcomes and PLOs, the participant will probably have to contend with both vertical and horizontal scrolling, something that many users dislike. Instructions for the mapping process need to be very clear so that people understand the task. If not, the data collected will be less accurate. Additionally, creating advanced reports will require time and effort.

For more information about creating a Qualtrics account, go to:

<https://oia.ucalgary.ca/qualtrics-login>

To see an example of curriculum mapping done through Qualtrics, access the following survey:

[try-curriculum-mapping-survey](https://survey.ucalgary.ca/jfe/form/SV_8Cc1k5K6LM0qBWB) (or the following)
https://survey.ucalgary.ca/jfe/form/SV_8Cc1k5K6LM0qBWB

The sample survey is for test purposes so please feel free to test it out and submit any information.

Setting Up Your Qualtrics Survey

If you have a Qualtrics account, we can send you a copy of our curriculum mapping survey to modify. Please contact one of us for more information:

Patti Dyjur
pdylur@ucalgary.ca

Kim Grant
grantka@ucalgary.ca

Course Mapping in Qualtrics:

It is possible to map course outcomes to program-level learning outcomes in different ways, depending on the functionality of the tool. The following example in Qualtrics uses text entry (form) to add course outcomes. Then a side by side table was added, using text piping to pull in previous answers (course outcomes) in the left-hand column.

1. Please enter your course outcomes. If you have fewer than 10 course outcomes, please leave the remaining fields blank. (text entry format, form)

Please enter your course outcomes. If you have fewer than 10 course outcomes, please leave the remaining fields blank.

Course outcome 1	<input type="text"/>
Course outcome 2	<input type="text"/>
Course outcome 3	<input type="text"/>
Course outcome 4	<input type="text"/>
Course outcome 5	<input type="text"/>
Course outcome 6	<input type="text"/>
Course outcome 7	<input type="text"/>
Course outcome 8	<input type="text"/>
Course outcome 9	<input type="text"/>
Course outcome 10	<input type="text"/>

2. Please indicate how each of your course outcomes, listed down the left-hand column, relates to the program-level learning outcomes (PLOs) which are located across the top.

Please indicate how each of your course outcomes relates to the program-level learning outcomes.

	Develop a knowledge base of theories and concepts within their primary area of study				Use different approaches to solving problems using well established ideas and techniques within the discipline	Locate and critically evaluate qualitative information	Locate and critically evaluate quantitative information	Formulate and communicate arguments in writing based on information, theories, and concepts	Formulate and communicate arguments orally based on information, theories, and concepts
	N/A	Introductory (I)	Developing (D)	Advanced (A)	N/A I D A	N/A I D A	N/A I D A	N/A I D A	N/A I D
Critically examine program evaluation approaches and processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/>
Apply appropriate standards in program evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/>

Note: As you can see, if you have several course outcomes and PLOs, it will require the instructor to do both horizontal and vertical scrolling in order to complete the mapping process in Qualtrics.

4. Excel Template

Using Excel to conduct curriculum mapping is not done frequently as we have tools that are generally easier to use and produce simple reports. However, if your faculty or department is accustomed to working in Excel, it could be the method for you.

Benefits	Drawbacks
You can produce some amazing charts and graphs if you have the skills to work in Excel	No report is automatically generated
Can be done electronically or in a face-to-face setting	Someone has to work in Excel to aggregate the data
If your group is accustomed to working with Excel it could make the most sense to use it	The Taylor Institute cannot provide support for curriculum mapping or data analysis in Excel

Excel Template Example

Please contact one of us for a sample curriculum mapping template in Excel:

Patti Dyjur
pdyjur@ucalgary.ca

Kim Grant
grantka@ucalgary.ca

	A	B	C	D	E	F	G	H	I	J
1	Program:		LOC Table							
2	Instructor:		Program-level learning outcomes (PLOs)							
3	Course number									
4		Course learning outcomes	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

In what ways do you incorporate collaborative learning into the course?

Do the Students generally knowledge and skills to be

Instructions for Curriculum Mapping Online

It is critical to have clear, detailed instructions for online curriculum mapping, especially if some of the participants are mapping their courses from a distance and have limited or no opportunity to discuss the process in person. Although it is preferable to offer a workshop or drop-in session so people within the same program can discuss the mapping scale and the process of mapping their course, this is not always possible. Good instructions will help to ensure that the mapping information is accurate.

The following introductions will give you a starting point for your instructions. Please use or adapt them as needed.

Introduction:

Thank you for filling out this survey. In it you will be asked questions about a course that you teach that is currently part of the curriculum review process. Please fill out a separate survey for EACH course that you are mapping, as identified by the Review Lead. You may find it helpful to work from your most recent course outline. It will take approximately 15 - 30 minutes to complete each survey.

Information from all courses under review will be compiled to produce a report on the program. These data, along with student survey data, will inform discussions around what is working well in the program and changes that should be considered

Thank you for your participation!

Mapping Instructions:

On this page, enter your course outcomes. For each course outcome, indicate which program-level learning outcomes (PLOs) it is associated with to a MODERATE or STRONG degree. Please do not indicate an alignment if the course outcome is associated weakly or peripherally to the PLO.

To indicate the expectations of the level of student learning we will be using the scale Introduced, Developing, Advanced. A description of the scale is as follows:

Introduced: Key ideas, concepts or skills related to the learning outcome are introduced and demonstrated at an introductory level. Instruction and learning activities focus on basic knowledge, skills and/or competencies and entry-level complexity.

Developing: The course outcome is reinforced with feedback; students demonstrate the outcome at an increasing level of proficiency. Instruction and learning activities concentrate on enhancing and strengthening existing knowledge and skills, as well as expanding complexity.

Mapping Instructions:

Advanced: Students demonstrate the learning outcome with an increasing level of independence, expertise and sophistication expected upon graduation.

Instructional and learning activities focus on and integrate the use of content or skills in multiple levels of complexity.

N/A: Not addressed in this course. Please note that your course outcomes probably won't align to all PLOs. This is normal and expected.

Complete program-level learning outcomes (PLOs) are listed below:

By the end of the program, students will be expected to:

- Develop a knowledge base of theories and concepts within their primary area of study.
- Use different approaches to solving problems using well established ideas and techniques within the discipline.
- Locate and critically evaluate qualitative and quantitative information.
- Formulate and communicate orally and in writing arguments based on information, theories, and concepts.
- Apply knowledge and skills in a variety of contexts, including situations that are new to the student.
- Conceptualize, design, and implement research for the generation of new knowledge or understanding within the discipline (Council of Ministers of Education, 2007).

For assistance please contact your Review Lead or support person (names and contact information here).

Questions to Include in an Online Curriculum Mapping Survey

This section offers some suggestions and starting points for questions you might consider asking instructors as they map their courses. If you do not need the information for your program analysis it can be deleted.

Course demographic information:

3. Your name: (text box)
4. Email address: (text box)
5. Course code and number (eg. UNIV 201) (text box)
6. Course level: (radio buttons)
 - 200
 - 300
 - 400
 - 500
 - 600
7. When was the last time you taught this course?
8. Course requirement status (check all that apply):
 - Required for degree
 - Required for Honours degree
 - Can fulfill a requirement
 - Optional course
9. Does this course have labs?
 - Yes
 - No
10. Is this a seminar course?
 - Yes
 - No
11. In general, do students have the prerequisite knowledge and skills to be successful in this course? Please comment. (text entry)
12. What learning technologies are used in this course? (text entry)
13. How do you incorporate Indigenous perspectives into the course? (text entry)
14. Which of the following high-impact educational practices (Kuh, 2008) are emphasized in this course? (check all that apply)
 - First-year seminars and experiences
 - Common intellectual experiences
 - Learning communities
 - Writing-intensive courses
 - Collaborative assignments and projects
 - Undergraduate research
 - Diversity/ global learning

- Service learning
- Community based learning
- Internships
- Capstone courses and projects

15. Please add any additional information that may be helpful in the curriculum review. (text entry)

Student Assessments and Teaching and Learning Activities

Mapping student assessments and teaching and learning activities is required as part of the curriculum mapping process. With both student assessments and teaching and learning activities, you have the choice of mapping them to specific course outcomes, or to the course as a whole. Both have benefits so you can pick the way that works best for your review. By mapping them to each course outcome, faculty members are prompted to think about whether or not they are including learning experiences for each course outcome, and how they are assessed. Through the mapping process they might make minor tweaks to the course to bring it into alignment. However, it requires more work on the part of the instructor. By mapping student assessments and teaching and learning activities to the course as a whole, the process is streamlined.

Student Assessments

Two common question types for identifying student assessments are check boxes and text entry:

Indicate the ways in which you assess student learning of the course (or course outcome). Check all that apply:

- Final exam
- Quiz or midterm
- Paper, essay or written assignment
- Problem set
- Project
- Portfolio
- Reflection
- Presentation or oral assignment
- Skill demonstration
- Performance
- Authentic assessment
- Other (please specify) (text entry)

Alternatively:

How do you assess student learning in the course (or of this course outcome)? (text entry)

Teaching and Learning Activities

Indicate the teaching and learning activities associated with this course (or course outcome). Check all that apply:

- Lecture or presentation
- Readings
- Discussion
- Lab
- Problem solving
- Tutorial groups
- Group work/ group project
- Online discussions
- Online tutorials
- Writing activities
- Homework
- Research projects
- Field trip
- Conducting an experiment
- Simulations
- Observations
- Research
- Internship or practicum
- Peer evaluation
- Other (please specify) (text entry)

Alternatively:

Indicate the teaching and learning activities associated with this course outcome: (text box)

Mapping Course Content

You may want to add additional questions related to the survey, relating to your guiding questions for the review, institutional or faculty priorities, or other things relating to courses in the program. The following questions are meant to provide some suggestions.

16. What are the major concepts and theories in this course? (text entry, form)

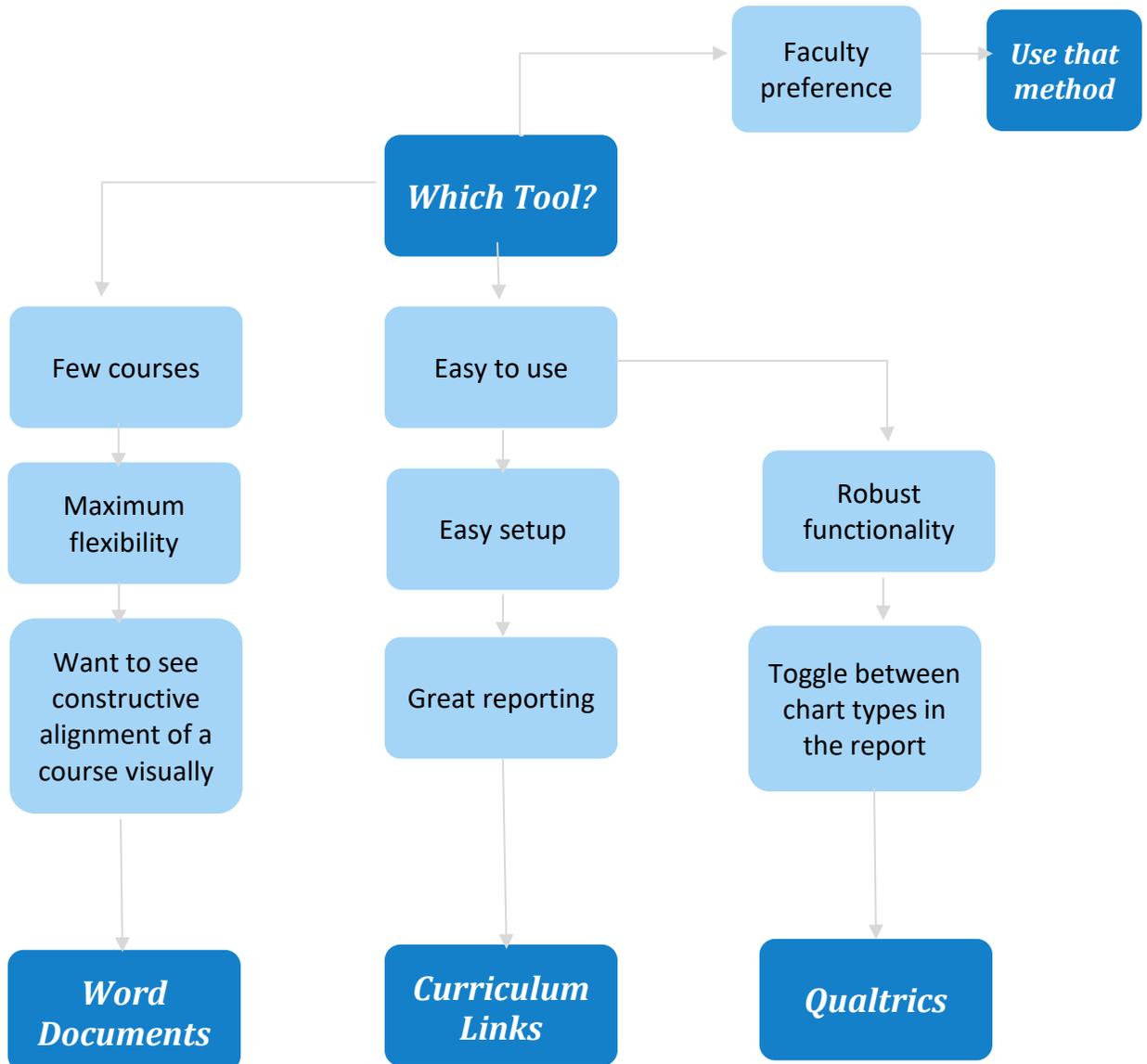
What are the major concepts and theories in this course?

Major concept/ theory #1	<input type="text"/>
Major concept/ theory #2	<input type="text"/>
Major concept/ theory #3	<input type="text"/>
Major concept/ theory #4	<input type="text"/>
Major concept/ theory #5	<input type="text"/>

The needs of your faculty or department might require you to map course content in a more granular way; for example, you may need to show more detail as part of accreditation requirements. In that case, you might decide to map concepts, theories, topics, and so on to each course outcome.

Deciding Which Method to Use when Mapping Courses

This chart represents some of the considerations to think about when selecting a method for curriculum mapping. One important issue to consider is whether or not your faculty members have a preference for a specific method, tool or application. If so, it could be much easier getting buy-in if you are using a familiar method.



Recommendations for Curriculum Mapping

Regardless of the method:

- Clear and ongoing communication are critical. Your group needs to know what the expectations are, what they are mapping for which courses, and due dates.
- Have the instructor of the course do the mapping if at all possible.
- Discuss the mapping scale with the entire team prior to mapping so that people are using it in a consistent way.
- Have a strategy for mapping support. Some groups provide support in more than one way. For example, they schedule a drop-in session for those who have questions as well as providing one-on-one support.
- Mapping a course is very challenging when the course outcomes are poorly written. Have a strategy for support regarding course outcomes. The Learning and Instructional Design Group at the Taylor Institute provides support on course outcomes across campus and may be able to facilitate a session for your instructors or provide one-on-one support.
- Identify who will be responsible for data representation and analysis.

Features of the Curriculum Mapping Process

- The process of making associations or connections
- Must align with the needs of the program or faculty
- Easily accessible and portray a clear picture of what information should be recorded in the map
- Can be done in various ways
- Program-level learning outcomes must be written before a department/ faculty can do curriculum mapping
- Course outcomes must be written before an individual can map his/ her course
- Other things can be mapped as well

Examples of Scales to Map Course Outcomes to PLOs

There are a variety of scales that can be used to indicate the degree to which a program-level learning outcome is addressed by a particular course outcome. The following are examples that can be used or adapted. It is critical that all instructors are using the same scale when completing their maps, and that they are on the same page regarding the meaning of the terms used in the scale. Therefore, it is recommended that a definition of the terms is provided to instructors and that they have the opportunity to discuss and work with the scale prior to using it to map their courses.

Examples of Potential Scales:

- Introduced (I)** Key ideas and concepts concentrate on knowledge or skills at a basic level. Instructional and learning activities address basic knowledge or skills at an entry-level complexity.
- Developing (D)** Students demonstrate learning at an increasing level of proficiency. Instructional and learning activities concentrate on enhancing and strengthening existing knowledge and skills, as well as expanding complexity.
- Advanced (A)** Students demonstrate the learning with an increasing level of independence, expertise and sophistication expected upon graduation. Instructional and learning activities focus on and integrate the use of content or skills in multiple levels of complexity.

(Adapted from Veltri, Webb, Matveev & Zapatero, 2011).

- Introduced (I)** Concepts are introduced in the course but not assessed.
- Competency (C)** Students are expected to reach a level of competency regarding the outcome. Students are assessed on the learning outcome.
- Advanced (A)** Students are expected to reach a level of proficiency regarding the outcome.

- Novice (N)** Beginning level of understanding or performance.
- Competent (C)** Adequate level of understanding or performance.
- Proficient (P)** Advanced level of understanding or performance.

Introductory (I)	Beginning level of understanding; not assessed in the course.
Comprehension (C)	The learning outcome is assessed for mental understanding.
Applied (A)	Concepts are applied by the student and assessed. Examples: project work, problems, calculations, and demonstrations.

Introduced (I)	Concepts are introduced in the course but not assessed.
Practiced (P)	Students practice their ability and understanding of the learning outcome.
Demonstrated (D)	Students demonstrate their ability and understanding of the learning outcome.

Comprehension (C)	Students comprehend concepts or topics. Student assessment focuses on knowledge and comprehension of material.
Application (A)	Students are asked to analyze or apply concepts or topics. Student assessment focuses on analysis or application; for example, problem-solving or essays.
Evaluation (E)	Students used concepts or ideas to evaluate within the discipline or create something new. Examples include project work or generating plans for a client.

Another approach would be to use the ICE (Ideas, Connections, Extensions) model developed at Queen's University by Fostaty, Young and Wilson (2000), based on Bloom's Taxonomy:

Ideas	Ideas represent the building blocks of learning. They can be discrete 'chunks' of information; facts, definitions, vocabulary, steps in a process; or discrete skills. Assessed by tasks requiring (or allowing) recall and repetition of information from books or from lectures.
Connections	At the subject or topic level, connections are made by making appropriate links between ideas (or chunks of information). At the personal or broader level, connections are made by relating new knowledge to what is already known, in a course, in other courses, or in a student's personal or professional experience.
Extensions	Extensions involve re-working students' knowledge and understanding by extrapolating, predicting outcomes or working out implications.

Inquiry Learning Scale:

This scale can be used or modified to capture the level of inquiry learning being used across the program in courses that include labs:

Confirmation	Students replicate results using predetermined processes.
Structured	The question and methods are predetermined for students, who investigate for a solution.
Guided	Students select an inquiry question from a predetermined list. They decide on the methods to be used in the investigation. An answer has not been predetermined.
Open	Students select the question to be investigated, and the methods they will use to study it. The results have not been predetermined.

(Adapted from Arslan, 2013, and Bell, Smetana, & Binns, 2005)

Two-Step Scale for Non-credit Learning Opportunities

Foundations	Foundational knowledge is emphasized, including information, discrete facts, concepts, or basic skills. There may or may not be evidence of learning from participants.
Extensions	Learning goes beyond the foundational level to make connections between facts or ideas, relating knowledge to personal experience, understanding multiple perspectives, and/or analyzing information. Participants evidence their learning in one or more ways.

Mapping Other Characteristics of a Program

While it is extremely beneficial to map learning outcomes across a program of study, you may also want to capture other characteristics of a program. To do so you will create a customized mapping strategy which will likely require a different mapping scale than those suggested in this manual.

Example: Level of Inquiry in Lab Courses

Year and Course	Labs	Confirmation	Structured	Guided	Open Inquiry	Notes
Year 1: 201	Lab 1	x				Required course
	Lab 2	x				
	Lab 3	x				
	Lab 4	x				
Year 2: 301	Lab 1	x				Required course
	Lab 2	x				
	Lab 3		x			
Year 3: 401	Lab 1	x				Required course
	Lab 2		x			
	Lab 3		x			
	Lab 4			x		
Year 4: 501	Lab 1		x			Required course
	Lab 2			x		
	Lab 3			x		
Year 4: 550	Lab 1		x			Optional course
	Lab 2			x		
	Lab 3				x	
	Lab 4				x	

Scale:

Confirmation: Students replicate results using predetermined processes.

Structured: The question and methods are predetermined for students, who investigate for a solution.

Guided: Students select an inquiry question from a predetermined list. They decide on the methods to be used in the investigation. An answer has not been predetermined.

Open: Students select the question to be investigated, and the methods they will use to study it. The results have not been predetermined.

(Adapted from Arslan, 2013, and Bell, Smetana, & Binns, 2005)

By mapping the level of inquiry in each of the labs, instructors can see how inquiry-based learning is developed in students across the lab components of a program.

Example: Mapping the Graduate Attribute Life-long Learning

You may want to investigate a specific learning outcome deeply. In this example, the graduate attribute 'life-long learning' is being mapped to discover what assignments and activities contribute to student learning in required courses in the program, where feedback is provided, and how life-long learning is being assessed.

Rather than mapping to program-level learning outcomes (PLOs), in this example we are mapping to characteristics of life-long learning. The characteristics were determined by using the definition of life-long learning provided by the Canadian Engineering Accreditation Board and an environmental scan. Another source could be literature in the field.

Activity/ Assignment	Characteristics of Life-long Learning			
	Identify & Address One's Own Educational Needs	Maintain Competence	Reflection	Metacognition
UNIV 201				
Research paper		G		
Accuracy check		I		
In-class small group debrief of exam results				I
UNIV 301				
Project		G		
Research paper		G		
UNIV 311				
None				
UNIV 401				
Professional development plan	G			
Process analysis			G	
UNIV 430				
Journal review	G			
UNIV 450				
Interest/knowledge/ skills pre/post checklist	I			

Mapping Scale:

I: Informal activity

An activity done in class, out of class or online that is not graded. Students may or may not receive feedback on the activity.

G: Graded assignment

An assignment for which students receive a mark that contributes to their final grade in the course.

Decisions to be made for all Curriculum Mapping Approaches

Decision	Notes
Method or Tool	
Who selects the tool?	
What are the needs of faculty?	
What method would work best considering your guiding questions?	
Mapping Scale	
Two, three, or four-point scale?	
How will the scale be determined?	
How will you test the scale and revise wording to suit your group?	
How will you work with faculty to calibrate the scale and ensure the data are valid?	
Communication Plan	
How will instructors be informed about the mapping process?	
What gets mapped	
Course outcomes to PLOs, teaching and learning activities, student assessments (required)	
Will student assessments be mapped at the course level, or at the level of course outcomes? Will teaching and learning activities be specified for each course outcome, or articulated for the course?	
Other aspects of the course? For example, high-impact practices, labs, faculty or institutional initiatives?	
Which courses? Required, fulfill a requirement, all?	
All sections or one?	
Timeline and Deadlines	
How much time will be needed to pilot the mapping process and make necessary revisions?	

How much time will instructors need to map their courses? Will it be done in a retreat or on their own time?	
Recommendation: build in a second deadline to complete the courses that have not been mapped	
Support for Instructors	
How will tech support be provided?	
Who else will support the process, curriculum terms, due dates, etc.?	
What to do if an instructor does not map his/ her course?	
Who is responsible for aggregating the data?	
How will data be presented?	
Who analyzes the data?	

Analyzing Curriculum Mapping Data

The success of the curriculum review process is not about collecting perfect sets of data, but about using the data collected to inform meaningful, collaborative discussions to inform decisions made about the program (Kenny, 2014).

During the analysis phase of the curriculum review process, data collected from the curriculum mapping process, OIA, NSSE, and students' survey/interviews, are discussed. These discussions guide decisions on what direction the faculty or department would take to address findings from the data.

Presenting Curriculum Mapping Data

There are numerous ways in which curriculum mapping data can be presented. Please do not feel limited to the examples and suggestions found in this handout as they are meant to be starting points. Other ways of presenting data that are applicable to your discipline may be used as well. The goal is to present data in a format that makes them clear and easy to understand.

The number and variety of charts you create will depend on your guiding questions, as well as time and interest. Using your guiding questions as a starting point will help you to narrow down the charts that will be most informative for your curriculum review.

In addition to individual course maps, aggregate charts that we have found to be particularly useful for most groups are the bar chart summarizing the number and depth of course outcomes per program-level learning outcome (PLO) for required courses (found on p. 14), a similar chart showing course outcomes to PLOs for all courses (p. 16), a chart showing the required courses in a program and depth of PLO (p. 18), and a chart showing all courses in a program and depth of PLO (p. 19). We have included a table on page 30 to help you with your planning.

Analyzing an Individual Course

First Level of Analysis

The chart below is an example of how an introductory interdisciplinary course for instance can be mapped to the program-level learning outcomes (PLOs) of a program using a paper-based method of curriculum mapping. Data is presented in a chart showing the alignment of the course outcomes for this course to the PLOs.

Introductory course in Interdisciplinary Studies: Technology and Society (full-year course)

 PLOs	Knowledge of theories and concepts	Apply knowledge & skills in different contexts	Evaluate qualitative info	Evaluate quantitative info	Communicate orally and in writing	Critical thinking	Design and implement research	Ethical understanding
Understand the foundations of interdisciplinary studies and its methods	D	I				I		
Understand a range of disciplinary perspectives that influence how we think about, talk about, and use technology		I						
Develop competence in reading and interpreting research			I	I				
Develop competence in oral and written expression					I			
Reflect critically on how knowledge is produced about technology.	D	I			I	I		



Course outcomes

I = Introduced: Key ideas, concepts or skills related to the learning outcome are introduced and demonstrated at an introductory level. Instruction and learning activities focus on basic knowledge, skills and/or competencies and entry-level complexity.

D = Developing: Learning outcome is reinforced with feedback; students demonstrate the outcome at an increasing level of proficiency. Instruction and learning activities concentrate on enhancing and strengthening existing knowledge and skills, as well as expanding complexity

A = Advanced: Students demonstrate the learning outcome with a high level of independence, expertise and sophistication expected upon graduation. Instructional and learning activities focus on and integrate the use of content or skills in multiple levels of complexity.

Adapted from California State University, Long Beach (n.d.) and Veltri, Webb, Matveev & Zapatero (2011).

Description:

The map is a matrix showing the alignment of course outcomes from one course to program-level learning outcomes (PLOs). The PLOs are listed across the top. Often they are abbreviated or summarized in a few words, as shown in the example, and then listed in full elsewhere in the document. The course outcomes are listed down the left-hand side, and can also be abbreviated and then listed in full below.

The instructor for the course has looked at each course outcome, and determined which of the PLOs it is associated with. Where there is alignment, the instructor has decided what the expectation is regarding the level of student learning.

The resulting map shows the alignment of course outcomes to PLOs at a glance.

Teaching and Learning Activities:

Lectures, readings, discussions, individual study, group activities, active learning strategies

Student Assessments:

First term: Participation, research assignment, first draft of essay, essay, presentation

Second term: Participation, research assignment, first draft of essay, essay, presentation, final exam

Program-level Learning Outcomes:

By the end of the program, students will be expected to:

1. Develop a knowledge base of theories and concepts within their primary area of study.
2. Apply knowledge and skills in a variety of contexts, including situations that are new to the student.
3. Locate and critically evaluate qualitative information.
4. Locate and critically evaluate quantitative information.
5. Formulate and communicate orally and in writing arguments based on information, theories, and concepts.
6. Use different approaches to solving problems using well established ideas and techniques within the discipline.
7. Conceptualize, design, and implement research for the generation of new knowledge or understanding within the discipline
8. Demonstrate an ethical understanding of the discipline (Adapted from Council of Ministers of Education, 2007).

Questions to Analyze Individual Course Maps

The first level of analysis occurs when individual instructors map their courses. At this stage instructors have the opportunity to examine their course outcomes to ensure they are accurate, and the extent to which teaching and learning activities and student assessments support student learning of the outcomes (Dyjur & Lock, 2016; Fraser, Crook & Park, 2007). The following questions could be used to guide reflection.

Course outcomes and expectations of student learning:

- Are course outcomes clearly articulated?
- Do they articulate what the course is actually about? Do they state what is important about the course? Are revisions needed? Is anything missing?
- How well do course outcomes align with PLOs?
- Is the scope of the course reasonable given the time constraints (number of credits)?

Teaching and learning activities (TLAs):

- To what extent do teaching and learning activities (TLAs) facilitate student learning of the course outcomes?
- Do TLAs emphasize factual recall only, or are students also challenged with activities that include critical thinking, application and/or analysis?
- Is there sufficient variety in the course or does it rely heavily on one approach?

Student assessments:

- To what extent do assessments facilitate student learning of the course outcomes?
- To what extent do student assessments measure what students know regarding course outcomes? In other words, how valid are the student assessments?
- Do the assessments emphasize factual recall only, or are students also challenged with assignments that include critical thinking, application and/or analysis?
- Do the assessment weightings reflect the degree of work required and the importance of the work?
- Is there sufficient variety in the assessments to allow students to demonstrate their understanding in different ways, or does the course rely heavily on one approach?
- How and when are you providing feedback to students?

General:

- What changes need to be made to the course?
- Does the course focus on what is important?
- What is memorable about the course?
- Is the content accurate and up to date?
- In what ways have you incorporated mental health and wellness in the course design? For example, is the amount of work in the course reasonable for students? For the instructor?

In context with other courses:

- Does the course fit within the context of the program? How well does it fit in with the sequence of other courses in the program?
- Are expectations of student learning progressing with subsequent courses?

Analyzing Aggregate Charts

Second Level of Analysis

The second level of analysis occurs at the program level once the aggregate charts have been created. They prompt you to think about curriculum from a program perspective, rather than on a course by course basis. By examining how the courses fit together you can begin to see trends, gaps, and overlap. They can be used as an important source of evidence to inform curriculum discussions and decisions.

Presenting and Analyzing Different Types of Curriculum Mapping Data

The charts in this section demonstrate different ways to aggregate, present and analyze curriculum mapping data. They are not exhaustive but meant to provide starting points in your analysis.

Analyzing Course Streams

Once the courses in a program have been mapped, you can select certain ones and compile them in a chart to examine trends. The following example could be used to examine how course outcomes relate to PLOs for three courses in a stream, such as an introductory, intermediate, and advanced course on a specific topic. We will assume that #202 is a prerequisite for #302, and #302 is a prerequisite for #402. A header is used to separate the course outcomes for the three courses, which are listed down the left side.

This map is used to tell at a glance the extent to which program-level learning outcomes (PLOs) are being emphasized and where within a stream of courses. It also demonstrates how student learning progresses and is scaffolded within the stream.

	Disciplinary Knowledge	Apply knowledge & skills in different contexts	Evaluate qualitative info	Evaluate quantitative info	Communicate orally and in writing	Critical thinking	Design and implement research	Ethical understanding
COURSE #202								
Course Outcome #1	D	I	D					I
Course Outcome #2	D		A			D		
Course Outcome #3	D		D		D			
Course Outcome #4								
Course Outcome #5	A	D	A			A		
COURSE #302								
Course Outcome #1	I	I	I			I		
Course Outcome #2	I	I			D			
Course Outcome #3	I	I	I					
Course Outcome #4	I	I			D	I		
COURSE #402								
Course Outcome #1	D		D			D		
Course Outcome #2		D			D	D		
Course Outcome #3	A		A		D	A		
Course Outcome #4	D	A	D		D	A		D
Course Outcome #5	D		D			D		

Analyzing Multiple Sections of a Course

	Disciplinary Knowledge	Apply knowledge & skills in different contexts	Evaluate qualitative info	Evaluate quantitative info	Communicate orally and in writing	Critical thinking	Design and implement research	Ethical understanding
COURSE #201 Section 1								
Course Outcome #1	I	D			D	D		
Course Outcome #2	I		D		D	D		
Course Outcome #3	I	I			I	I		
Course Outcome #4	I	I	D		D	D		
Course Outcome #5	I				D	D		
COURSE #201 Section 2								
Course Outcome #1	I		I			D		
Course Outcome #2	I		I			D		
Course Outcome #3					D			
Course Outcome #4	I	D			D			
COURSE #201 Section 3								
Course Outcomes	No Data							
COURSE #201 Section 4								
Course Outcome #1	D	D						I
Course Outcome #2	I	I		I	I			
Course Outcome #3	D	I						
Course Outcome #4	D	I						I
Course Outcome #5	D	D						
Course Outcome #6				I	I			
Course Outcome #7	A	D						I
Course Outcome #8	D	D		I	I			D

Description:

There may be times when you want to analyze multiple sections of a course to evaluate consistency in expectations of student learning across sections, particularly salient for courses that are a prerequisite for subsequent courses in the program. Large discrepancies of expectations for student learning between sections could be a factor for student success within the course itself and/or future courses in the program.

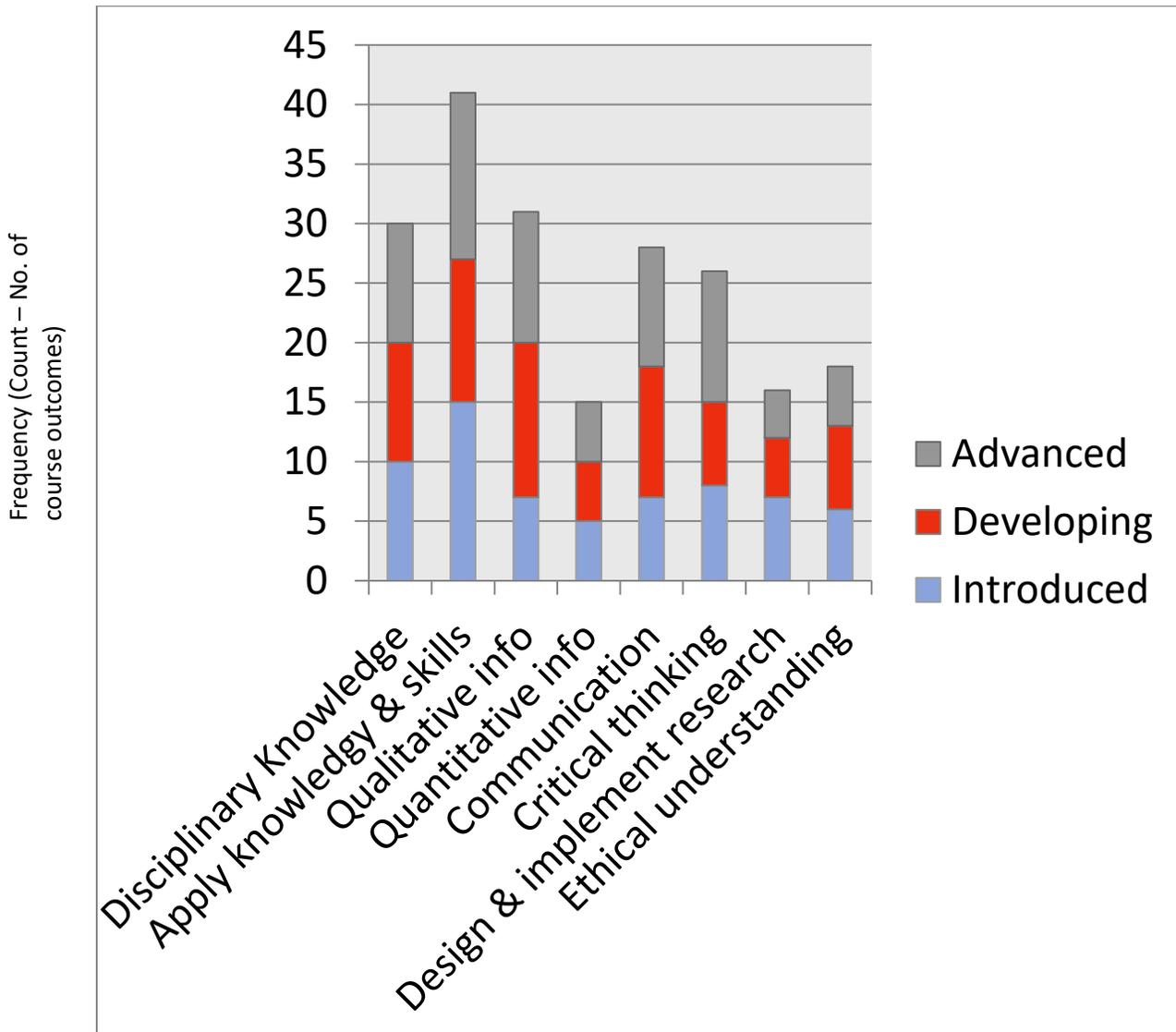
This chart demonstrates the alignment between course outcomes for multiple sections of a course, and the PLOs. While it may be unrealistic for courses to be exactly the same, this representation will tell you if there are large discrepancies between expectations for student learning in different sections of a course. If the course instructors examined the data as a group it could foster discussions about the

intentions for a course, different approaches used, and potentially lead to greater consistency of expectations of students. The instructors might also discover that they have fairly similar approaches to the course but had a different understanding of the mapping scale when they mapped their section. An examination of the specific course outcomes used in each section would be helpful here.

Questions to Analyze the Chart:

1. In what ways do the different sections of the course show general consistency between sections?
2. Where are there substantial differences between sections of the course?
3. How might you foster productive discussions between section instructors to promote consistency of expectations of student learning?
4. Are there any courses in your program that you think might benefit from creating this type of data representation?

Bar Chart Summarizing the Number and Depth of Course Outcomes per PLO for All Courses



Notes: No data for 320, 350, 406, 441, 502

Description:

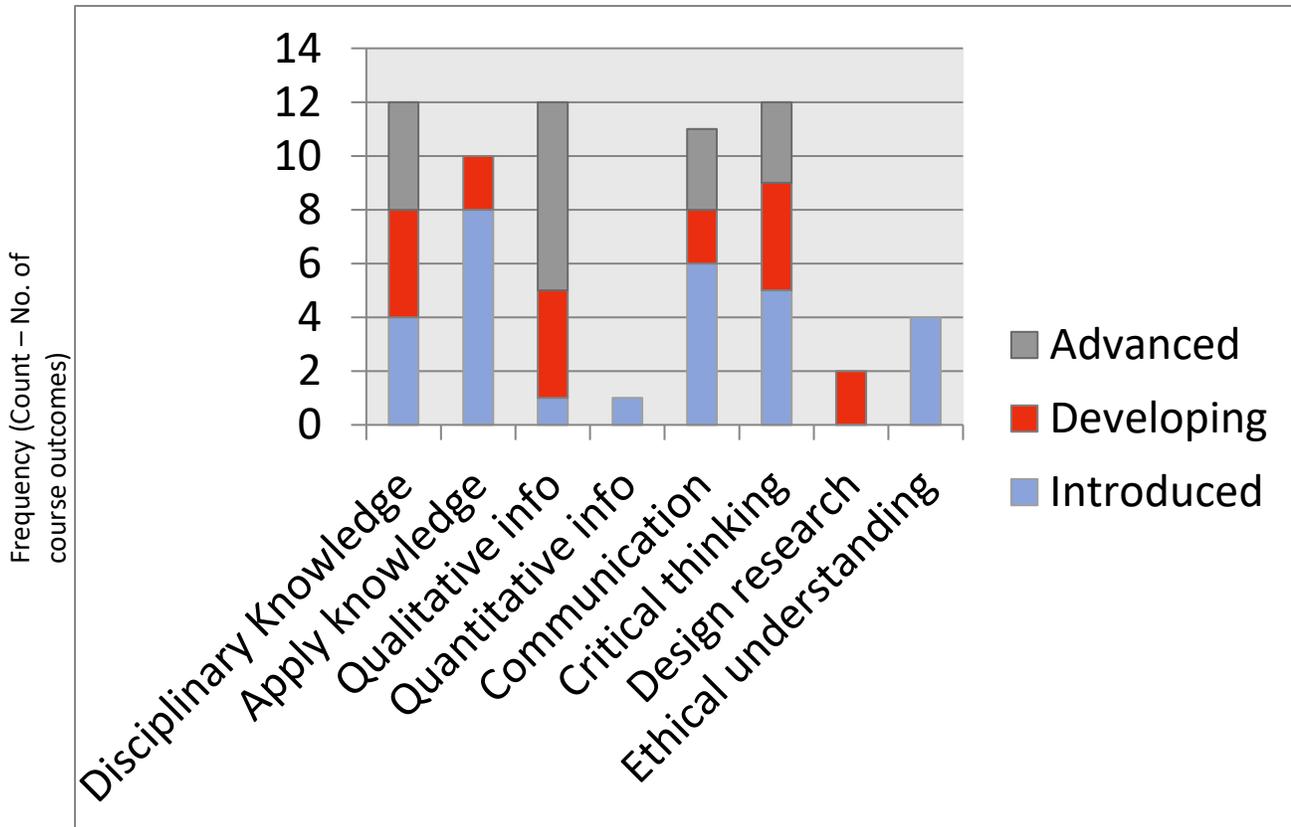
This bar chart summarizes the number of course outcomes related to each of the program-level learning outcomes (PLOs) for all courses in the program. It makes a great companion chart to the previous one. Please note that the data can look falsely robust when representing all courses in a program as students likely do not take all courses within a program – there is usually some student choice.

Bars indicate the number of course outcomes that contribute to each PLO, added up from all courses in the program. Each bar is broken into three sections, representing the number of course outcomes at the Introductory, Developing, and Advanced levels. Looking at program-level learning outcome #1, ten course outcomes address it at the 'Introductory' level, ten address it at the level of 'Developing', and ten address it to an 'Advanced' degree.

Questions to Analyze the Data

1. What are the strengths of the program?
2. Which PLOs are being least emphasized? Looking at our priorities for the program (PLOs), what are we collectively not doing well enough?
3. Is it necessary or even desirable to emphasize PLOs equally? Are some PLOs more important than others? Who decides what emphasis should be given to the different PLOs? How will such decisions be made?
4. What might be problematic if your group used this chart only as a source of discussion? What questions do you have that are not answered by this chart?

Bar Chart Summarizing the Number and Depth of Course Outcomes per PLO for Required Courses



Notes: No data for 320

Description:

This bar chart summarizes the number of course outcomes related to each of the program-level learning outcomes (PLOs) for required courses in the program. It tells you at a glance which PLOs are being emphasized, and to what degree, for all majors in the program. At this point the conversation shifts from focusing on what one course contributes to the program, to a collective view of the effectiveness of the program.

Bars indicate the number of course outcomes that contribute to each PLO, added up from all courses in the program. Each bar is broken into three sections, representing the number of course outcomes at the Introductory, Developing, and Advanced levels. Looking at PLO #1, four course outcomes address it at the 'Introductory' level, four address it at the level of 'Developing', and four address it to an 'Advanced' degree.

Questions to Analyze the Data

1. What can this chart convey that is different from the previous chart?

2. What are the strengths of the program?

3. Which PLOs are being least emphasized? Looking at our priorities for the program (PLOs), what are we collectively not doing well enough?

4. What strategies do you have for presenting such data to your faculty and facilitating discussion around:
 - What the data mean
 - How to analyze the chart
 - Recommendations based on the evidence

All Courses in a Program and Depth of PLO

Course No.	Disciplinary Knowledge	Apply knowledge & skills in different contexts	Evaluate qualitative info	Evaluate quantitative info	Communicate orally and in writing	Critical thinking	Design and implement research	Ethical understanding
COURSE 201	I		I		I	I		
COURSE 203	I		D			I		
COURSE 220	D	I	D			I	I	I
COURSE 230	D	I			I	D		
COURSE 240	D	I				I		I
COURSE 301	A	D	D		D	A	D	
COURSE 303	I	I	D		D	I		D
COURSE 321	D	D	D	D		I		D
COURSE 330	No data							
COURSE 340	D	A			D	A		D
COURSE 401	A	D	D		D	D	D	
COURSE 403	I	D	D	D			A	
COURSE 430	No data							
COURSE 440	A							
COURSE 450	A	A	A	A	A	A	A	A
COURSE 460	A				A			
COURSE 520	D	D	I		D	D	I	
COURSE 550	A	A	D		A	D	D	

Description:

This chart has PLOs listed across the top. All courses in the program are listed down the left-hand side. The most frequently indicated alignment is captured in each cell. For example, in Course 201, course outcomes related to Disciplinary Knowledge most frequently at the Introductory level. Where course outcomes related equally at two levels (for example, one course outcome aligned at an Introductory level and one at a Developing level), the higher alignment was indicated on the chart.

Please note that students rarely take all courses that are offered, which can make a program appear falsely robust. However the information here can help when examining required courses and prerequisites, and evaluating how certain courses might be able to address gaps in the program.

Required Courses in a Program and Depth of PLO

Course No.	Disciplinary Knowledge	Apply knowledge & skills in different contexts	Evaluate qualitative info	Evaluate quantitative info	Communicate orally and in writing	Critical thinking	Design and implement research	Ethical understanding
COURSE 201	I		I		I	I		
COURSE 203	I		D			I		
COURSE 220	D	I	D			I	I	I
COURSE 230	D	I			I	D		
COURSE 301	A	D	D		D	A	D	
COURSE 303	I	I	D		D	I		D
COURSE 330	No data							
COURSE 401	A	D	D		D	D	D	
COURSE 403	I	D	D	D			A	

I = Introduced: Key ideas, concepts or skills related to the learning outcome are introduced and demonstrated at an introductory level. Instruction and learning activities focus on basic knowledge, skills and/or competencies and entry-level complexity.

D = Developing: Learning outcome is reinforced with feedback; students demonstrate the outcome at an increasing level of proficiency. Instruction and learning activities concentrate on enhancing and strengthening existing knowledge and skills, as well as expanding complexity

A = Advanced: Students demonstrate the learning outcome with a high level of independence, expertise and sophistication expected upon graduation. Instructional and learning activities focus on and integrate the use of content or skills in multiple levels of complexity. Adapted from California State University, Long Beach (n.d.) and Veltri, Webb, Matveev & Zapatero (2011).

Description:

Like the previous chart, this chart has PLOs listed across the top, with required courses in the program are listed down the left-hand side. The most frequently indicated alignment is captured in each cell. For example, in Course 201, course outcomes related to Disciplinary Knowledge most frequently at the Introductory level. Where course outcomes related equally at two levels (for example, one course outcome aligned at an Introductory level and one at a Developing level), the higher alignment was indicated on the chart.

This chart makes a great companion to the previous one. Instead of all courses, just required course are listed. Presenting the data in this way is helpful to view the program from a student perspective because required courses are the only ones that students are guaranteed to take.

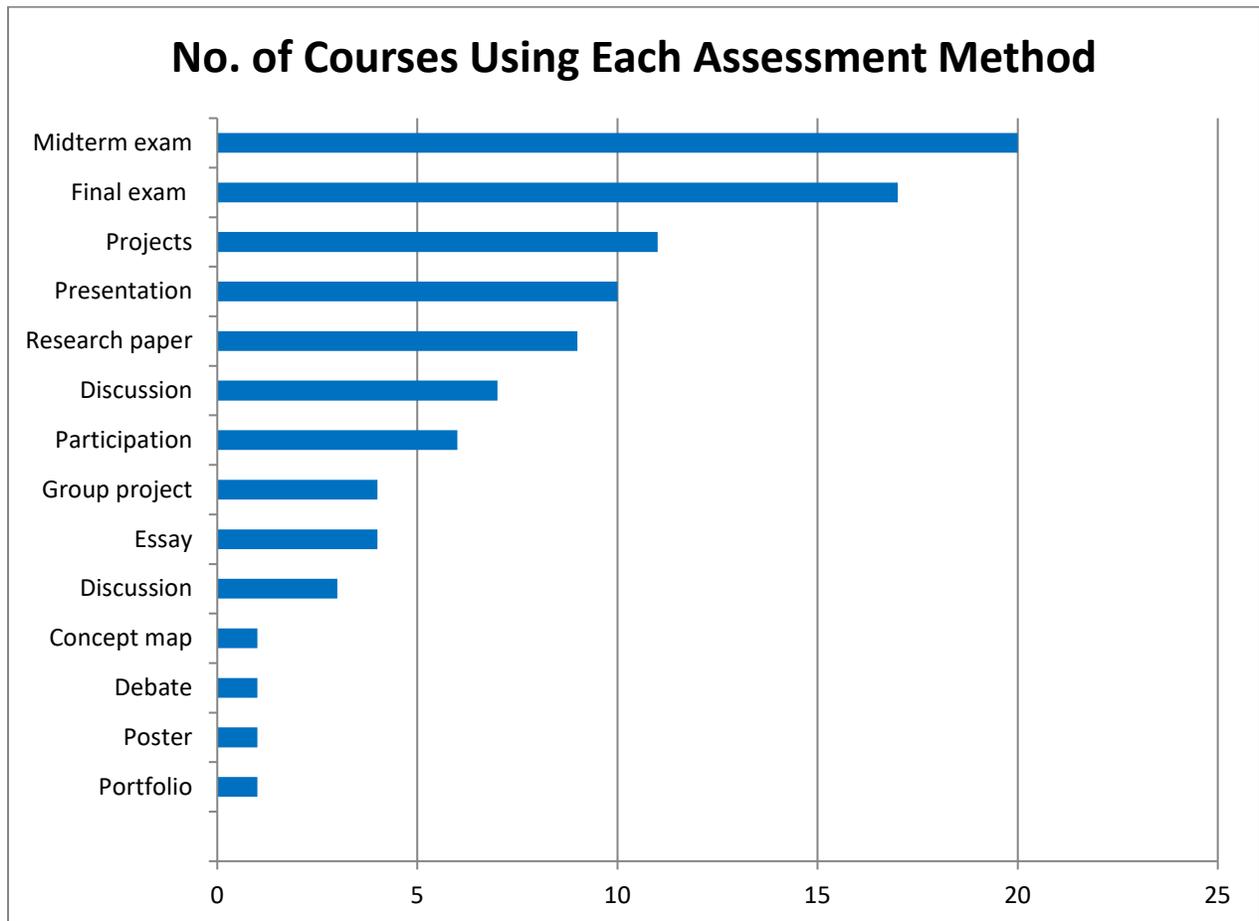
Discussion questions:

Three questions you might use with any of the charts:

1. What trends do you see in the data?
 2. What does this mean within the context of the program?
 3. What are our next steps?
-
4. What curriculum questions might be better informed by the first chart? By the second chart?
-
5. What strategies would you use to engage instructors in the process of analyzing the data? How would you guide them through a process to analyze the charts and make recommendations based on the evidence?

Student Assessment Methods Across a Program

This chart summarizes the number and types of student assessments across a program of study. You could also create a chart showing the frequency distribution of teaching and learning activities used across a program of study.



Notes: No data for 320, 350, 406, 441, 502

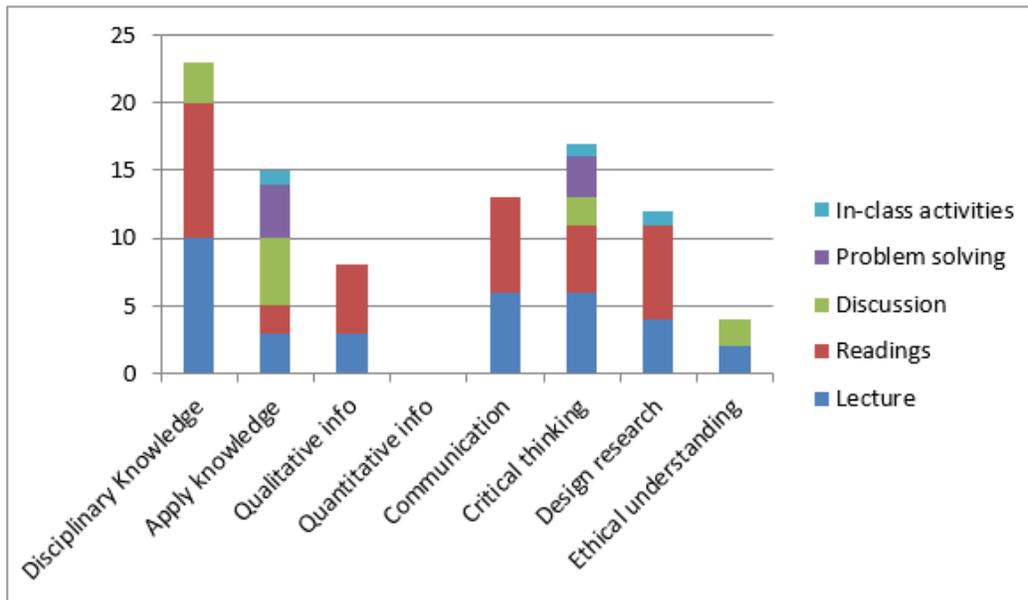
Example discussion questions to engage instructors:

1. What student assessment methods are we most/ least using? Is there enough variety?
2. How congruent is our assessment approach with the discipline? With our faculty and institutional strategic priorities?
3. How effective are the assessment methods in providing student feedback and supporting student learning?

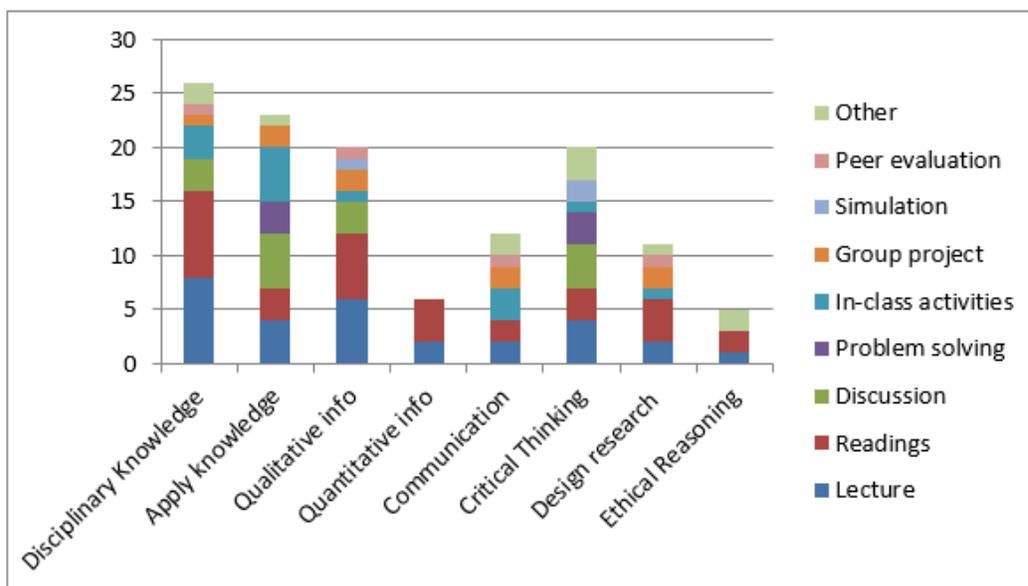
Teaching and Learning Activities per PLO

Depending on how you structure your curriculum mapping, you could construct charts such as these that show the teaching and learning activities for each PLO. The following charts allow you to compare 200-level and 400-level courses, but you do other comparisons as you'd like.

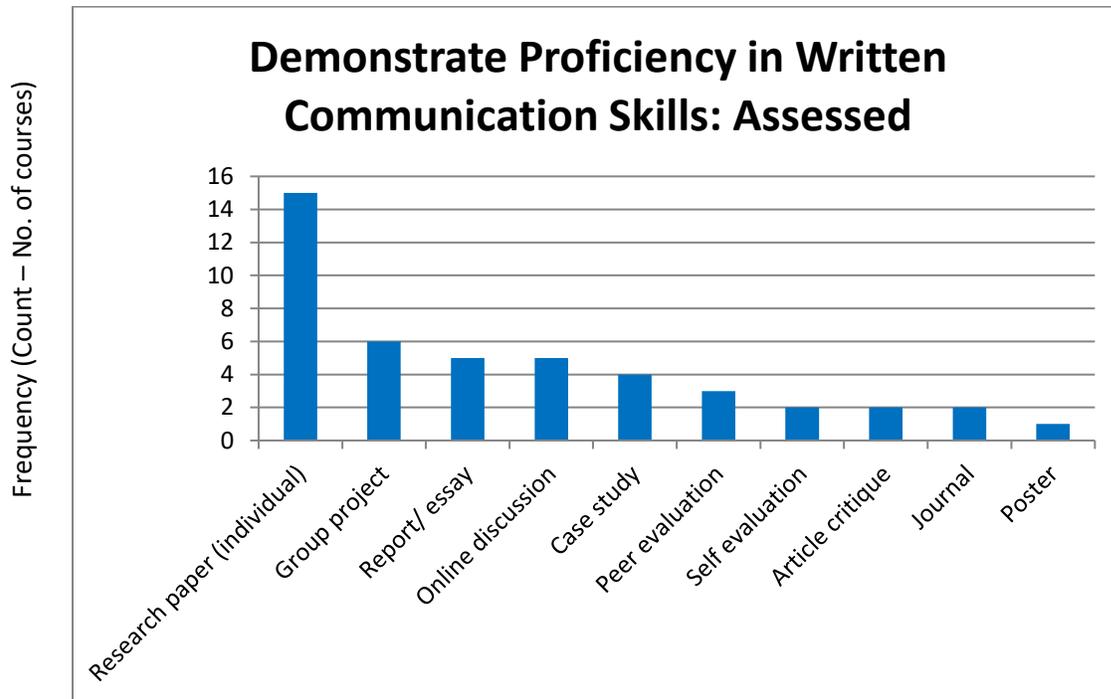
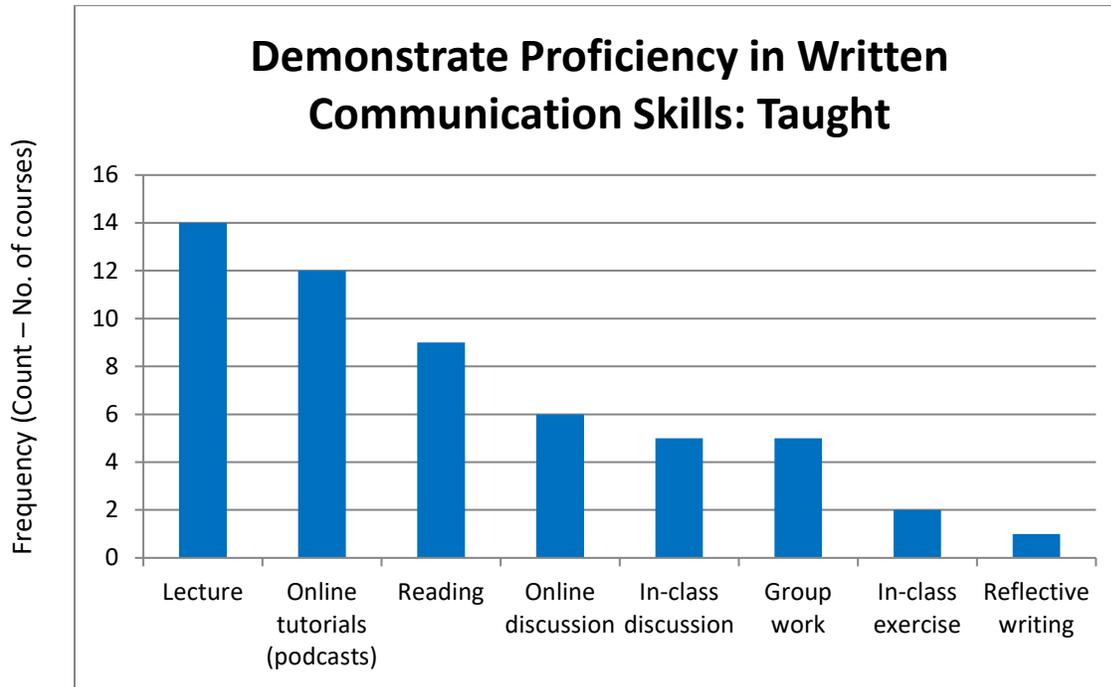
a) How PLOs are taught in required 200-level courses (10 200-level courses)



b) How PLOs are taught in required 400-level courses (8 400-level courses; no data for 406, 441)



How PLOs are Taught and Assessed



Notes: No data for 320, 350, 406, 441, 502

These bar charts show how one of the PLOs (By the end of the program, students will be expected to demonstrate proficiency in written communication) is being taught and assessed in the program. Different methods of teaching and assessing written communication are listed across the bottom. The bars indicate the frequency, or number of courses that include the method.

Consider creating charts such as these for PLOs in which you want to delve a bit deeper. In this fictitious example, a group was wondering about how written communication was being taught and assessed across the program because they identified writing as an area of challenge for students.

Discussion questions:

1. What are the strengths in how written communication is being taught and assessed in the program?
2. What opportunities do you see to enhance student success regarding demonstrating proficiency in written communication?
3. How might you approach a discussion with instructors on the topic of how written communication is taught and assessed in the program?

Matrix of Teaching and Learning Activities Across a Program

Presenting data in a matrix such as this is helpful when you need to pinpoint the exact courses where certain things occur. A matrix could also be created for student assessments or content/ major concepts (see next chart).

TLA by Course	201	215	230	245	267	301	311	324	340	355	360	401	403	405	410	445
Lecture	x	x	x	x	x	x	x	x	x	x		x	x	x		x
Readings	x	x	x	x	x	x	x	x	x	x		x	x	x		x
Written assignment	x		x			x		x	x			x	x	x		x
Midterm/ quiz	x	x	x	x	x	x	x	x	x	x		x	x	x		x
Portfolio			x			x			x				x			
In-class writing activities		x						x								
Reflection				x						x						x
Presentation													x	x		
Group project							x									x
Demonstrations	x			x	x		x	x				x		x		
Peer feedback									x							

Notes: No data for 360, 410

Matrix of Content Relating to Writing Skills in Required Courses

This matrix is an example of displaying content relating to writing skills in required courses in a program.

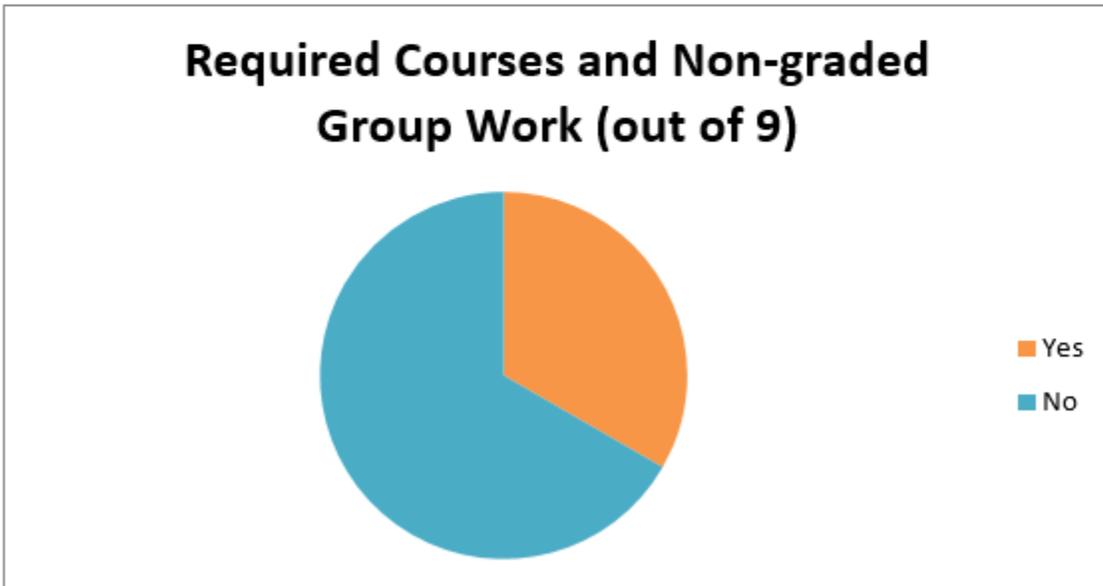
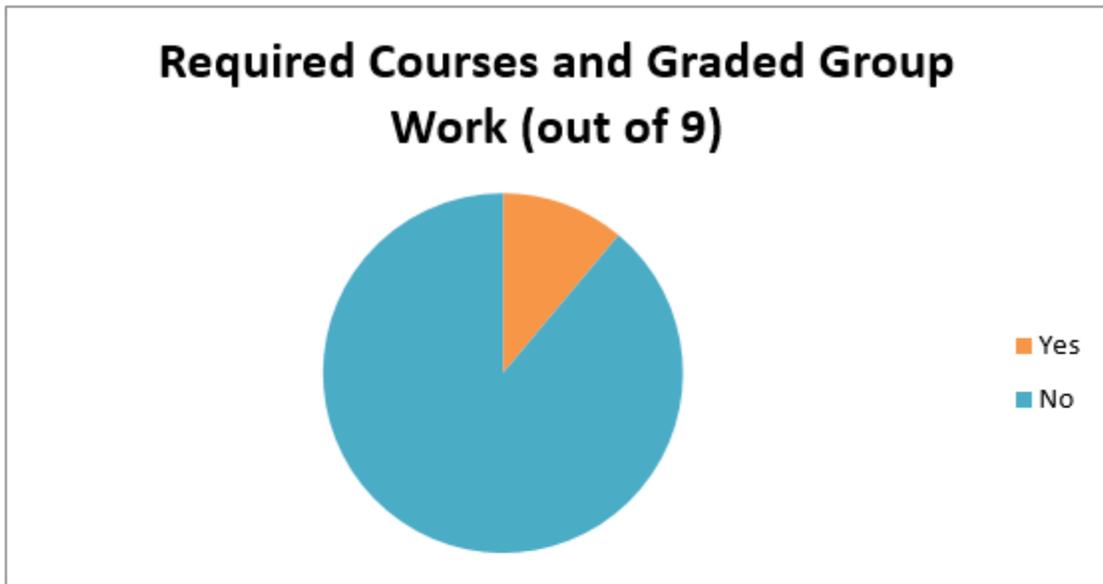
TLA by Course	201	215	230	245	267	301	311	324	340	355	360	401	403	405	410	445
Referencing and citations	X	X	X	X	X	X	X		X			X				
Locating references			X				X									
Using primary sources						X			X				X			X
Evaluating references	X	X		X		X										
Avoiding plagiarism	X	X	X	X	X											
Making an outline					X											
Style and tone													X			
Thesis statements	X			X					X							
Writing an introduction	X	X	X													
Writing a conclusion	X	X	X													
Making an argument	X					X	X					X				
Editing																
Where to get help	X	X	X	X	X	X	X	X	X	X		X	X	X		X
Audience													X			
Paraphrasing and note taking																

Notes: No data for 360, 410

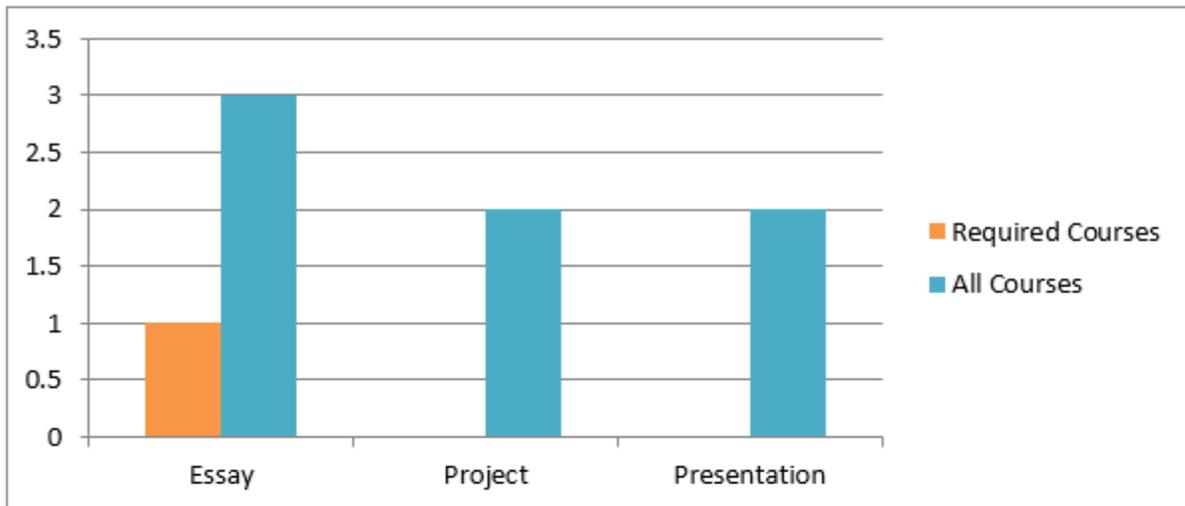
Creating Charts on Special Topics

Special Topics

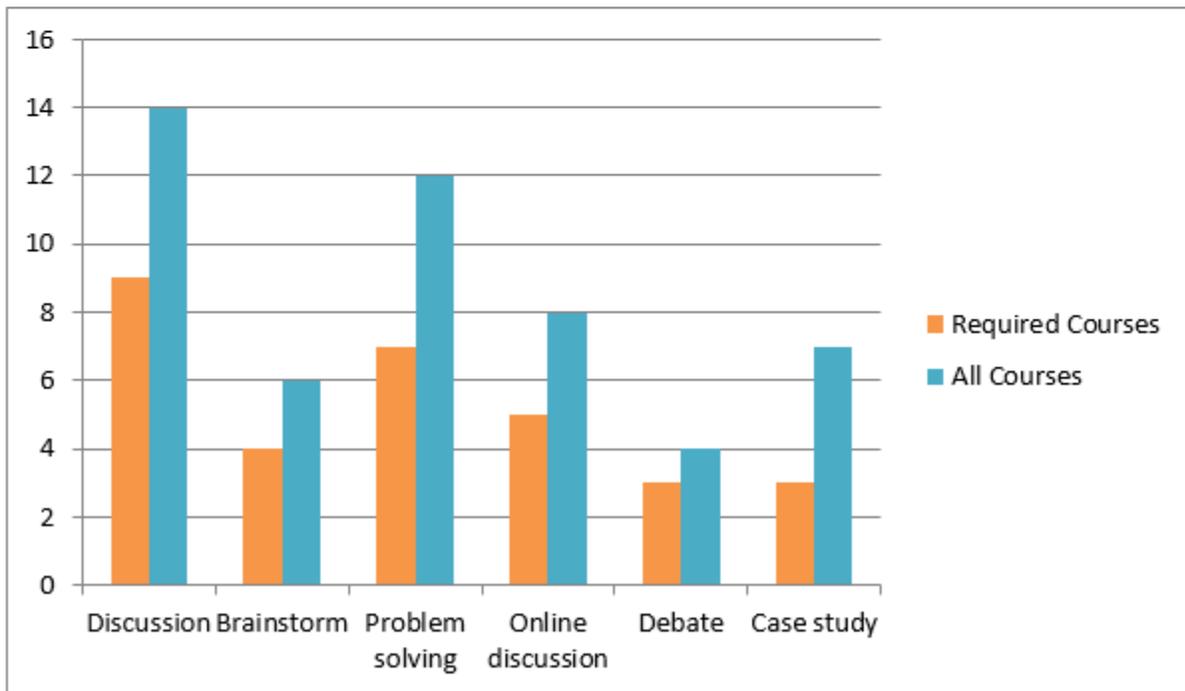
It is possible to represent other types of curriculum data on topics of special interest to your review, as long as you have collected that data. For example, your group may be interested in an in-depth study of how and where students do group work. To find out more about this you could add a question or two to the course mapping survey. The following charts could be created to inform discussion:



Types of Graded Group Work in the Program



Types of Non-graded Group Work in the Program



Planning Chart

Use this chart to help you plan how to present your curriculum mapping data.

Y/N	Type of Chart	Notes
	Course streams (p. 10)	
	Multiple sections of a course (p. 12)	
Y	Bar chart summarizing the number and depth of course outcomes per PLO – all courses (p. 14)	
Y	Bar chart summarizing the number and depth of course outcomes per PLO – required courses (p. 16)	
Y	Chart with all courses in a program and depth of PLO (p. 18)	
Y	Chart with required courses in a program and depth of PLO (p. 19)	
	Student assessment methods used in required courses (p. 21)	
	Teaching and learning activities per PLO (p. 22)	
	Bar charts summarizing how specific PLOs are taught and assessed (p.24)	
	Matrix of TLAs in courses across the program or required courses (p. 26)	
	Matrix of content on a special topic (p. 27)	
	Charts on a special topic (p. 28 – 29)	
	List of course outcomes for all courses	
	Answers to open-ended questions (complete text)	
Individual Courses		
	Course outcomes to PLOs if mapping was conducted using paper-based approach – one course (p. 5)	

Additional charts:

Notes:

Analyzing Curriculum Maps at the Program Level

Questions for Collaborative Discussion and Engagement

(Adapted from Banta and Blaich, 2011, p. 23)

The following questions can be used to guide discussions related to data gathered through curriculum mapping processes. Questions will be adapted based on each specific project.

General

- What general trends do you see in the data?
- What data presented most surprised you? Why?
- Where are our strengths? What are we doing well?
- Where are some areas for improvement?
- How do these results align or conflict with other curriculum assessment results (eg. student/faculty/ employee feedback) or past program reviews? Where are areas of congruency and divergence?
- What next steps might be taken to improve and align our curriculum?

Instructional and Assessment Methods

- What instructional/ assessment strategies are we most/ least using?
- How are the instructional and assessment methods used in the courses congruent with the discipline?
- How are the instructional and assessment methods used in the courses congruent with our program's/faculty's/institution's mission and vision?
- How are high impact educational practices embedded throughout the curriculum?
- In terms of supporting student learning, how well are the instructional and assessment methods that we use working?

Learning Outcomes

- What learning outcomes are we most/ least emphasizing?
- Where are the strengths and gaps in the teaching and assessment of these learning outcomes?
- How do our instructional and assessment strategies align with the intended learning outcomes?
- Which learning outcomes resonated (i.e. were clearly stated, and easily interpreted)? Which ones were confusing? How could the learning outcomes be further clarified?

Workload and Progression

- How does student learning progress across the program for each of the learning outcomes? How could student achievement of the learning outcomes be better supported through this progression?
- How is student workload distributed across the semester?
- When have students and instructors expressed concern over workload during the semester? How could workload be more evenly distributed?

Questions for Review Leads

- How will you encourage instructors to take a thoughtful, reflective approach to mapping their courses?
- What types of aggregate charts will best inform your guiding questions?
- What strategies might you use to engage instructors in the process of analyzing the data? How might you help them make sense of the data? How might you guide them through a process of analyzing data (including other sources) and making recommendations based on the evidence?
- How might you approach a discussion with instructors on curriculum topics? What strategies do you have to keep the discussion productive, focused and positive?

Ways to Involve People in Data Analysis

This section includes some strategies to involve all faculty in the process of analyzing different data sources. Again, these suggestions are just a starting point and not an exhaustive list:

- All-faculty retreat (and provide food)
 - Invite some student reps as well, perhaps from your student council
- Discussion at a department meeting
- Add data to a Desire2Learn discussion board, allowing all to access the data and comment when it fits into their schedule
- Ask for volunteers to form a working group to take on the work of data analysis
 - Consider student volunteers for this working group
- Invite sessional instructors in on the conversation (a great professional development opportunity for them)
- Prepare an initial analysis and send it to all faculty for feedback and recommendations
- Involve your Undergraduate Curriculum Committee in the analysis and report writing

Making Meaning of the OIA Data for Your Curriculum Review

Some points to keep in mind:

- The same data sets are drawn for each curriculum review committee. It is up to your committee to determine which data sets are of interest/importance for your context. OIA uses a standard data template designed by the VP Teaching and Learning.
- Different types of data are collected on different time frames, so remember to check the dates on each page of the report. Some of the data may not be as current as you'd like, but the OIA will report on the most current data they have.

OIA reports data based on snapshots:

1. Student enrolments reflect the December 1st snapshot.
 2. Course grades are run mid-June.
 3. Course data including section enrollees, sections, and course enrollees reflect snapshots as following: June 1st for Spring term, August 1st for Summer term, December 1st for Fall term, and April 1st for Winter term.
- The data can be used to respond to some of your guiding questions OR it may be used to generate some guiding questions.
 - Data are neither good nor bad, but surprising results can be good conversation starters.
 - Context is everything. You are the best people to interpret your data.
 - NSSE data are collected every three years and reports on the experiences of first year students and fourth year students in your program (if applicable).

Questions you may want to pose based on:

Program-based Data

- How are our retention rates? Are there any noticeable trends in that data?
- How are our graduation and time-to-completion rates? Any surprises or concerns?
- How are the overall numbers of degrees granted by our program? What are the trends?

NSSE Survey Data

- What are we doing well?
- What stands out to us? Any surprises? Could these surprises help shape our guiding questions and/or data collection?
- How do our NSSE results compare to our overall faculty results (if applicable)?
- What trends are evident in our department's NSSE scores?
- If our NSSE scores are based on low numbers of respondents, how much do we think that these trends reflect the overall program?
- Where do we see the biggest changes in NSSE results over time?
- What 2-3 areas do we want to work on over the next few years?

Alberta Graduate Outcomes Survey Report

- Given that this data is designed to provide institutional-level information, is there anything significant that we can infer about our program?
- What do the data tell us about our program?

Student Data

- What trends do we notice in our total number of undergraduate students by year?
- Does the comparison of full-time and part-time student numbers provide us with any food for thought?
- Does the comparison of enrolment by gender raise any questions?
- Does the information about numbers of international students provide any insights into our current program?
- What do we notice about our grade distribution trends? Are there any possible guiding questions raised by this information? Is there anything we need to discuss as a faculty or department?
- What trends do we see in our grade distribution data (by numbers and/or by percentages)?
- What do we notice about our DFW (grades of D and F, and W - withdrawals) rates? What trends do we see in this information? Are there any surprises in this information?
- As this is a program-level review, are there any important observations from our course level DFW information? For example, are students able to succeed in courses that have pre-requisites?

Whole Report

- Based on the data in the report, what are we doing well in this program?
- What do we want to know more about, and how do we find out? For example, if we want to know more about high attrition rates, we might want to interview students who have transferred to other programs.
- What data should we take back to all faculty for discussion/interpretation?

Action Plan and Final Report

While analyzing your data you will generate many ideas for improving the program under investigation. Those ideas can form the basis of your action planning, which will be included in your final report.

Action Plan

What is an action plan?

A concise summary of how, over the period between curriculum reviews, the faculty in a program will address findings emerging from the Curriculum Review process. The Action Plan will be referenced in the midterm report and subsequent curriculum review processes (University of Calgary, 2015, p. 8).

Context of the Action Plan

- The action plan is a mandatory element in your review
- It is part of both the Internal and Public Report
- It is your accountability piece: What are you doing to improve the program?
- There is little guidance in the QA Handbook about how to structure your action plan
- The VP of Teaching and Learning is very interested in your action plan

Parts of an Action Plan

Although there is no standard format for the action plan, it is recommended that you include enough detail to guide curriculum work. The following components have been used by others in the past:

- Recommendation: The suggestion to be addressed.
- Action items: Specific details about how the recommendation will be implemented. There can be more than one action item per recommendation.
- Timeline: Length of time needed to implement the action items. One possible way to approach this would be to have short-term (one year or less), medium-term (2-3 years), long-term (4-5 years) and ongoing action items.
- Rationale: Offers a reason for providing the recommendation. The rationale section can also point to the data that support the recommendation.
- Responsibility: Outlines who is responsible for implementing each action item, usually stated by role rather than by name.
- Alignment with strategic plan: If the recommendation supports a specific institutional, faculty or department strategic priority, it can be stated here.
- Comments: Add other relevant information.
- Evaluation: Outline how a recommendation will be evaluated in future.

How the Action Plan will be Used

This curriculum review process will generate an action plan for improving the program, and the impact of the review will be determined by evidence of implementation success (University of Calgary, 2015, p. 2)

Some of the uses of the action plan:

- Guide curriculum work for the next few years
- Inform students, staff and faculty of the enhancements taking place
- Outline who will take responsibility for the work
- Provide accountability to the Provost's Office

Some Categories for Action Items

Many of your action items will be related to curriculum, at both the course and program level. However, they may not be restricted to curriculum. They may also relate to things such as:

- Administration
- Student advising
- Marketing
- Faculty and staff professional development
- Other categories

How Many Recommendations and Action Items?

The Quality Assurance Handbook Curriculum Reviews (University of Calgary, 2015) does not specify how many recommendations or action items to include in your report. In general, the larger your recommendations, the fewer you will include in your report. If your curriculum review results in major program changes, you might want to concentrate on just one or two recommendations. For example, if you are adding a new minor to the degree, you are looking at a long timeline and many different action items. In this case, any other recommendations would likely be quick and easy to implement.

Regardless, we suggest including a couple of 'easy wins' in your action plan so that your team can experience some quick success.

Another suggestion is to include at least one action item that is shared between all instructors. This will allow your entire faculty or department to share in the responsibility of implementing the action plan. For example, all instructors could be responsible for the following action items:

- Each term, instructors will review their course outcomes for accuracy, currency and relevancy
- Collect real examples of the high-impact practice 'Collaborative Assignments and Projects' within the discipline to provide strategies and ideas so that instructors can use/ adapt them within their own courses
- Hold a brown bag lunch series highlighting a different pedagogical approach in each session, hosted by different instructors who have used that approach within their course

Examples of Action Plan Items

Example 1: Chart Format

Recommendations – Program Level				
Recommendation	Action Item	Timeline for Implementn.	Lead Responsibility	Evaluation
Increase emphasis on Ethics (PLO #7), especially at the Developing and Advanced levels	Incorporate learning on Ethics (PLO #7) into the following required courses at a minimum level of developing: 301, 305, 309	1 year	Program Coordinator, Instructors	Examine course outlines, Student learning
	Determine which 300-level and 400-level courses to include a component of Ethics (PLO #7) at an advanced level	2 years	Undergraduate Curriculum Committee	Examine course outlines, Student learning

Recommendations – Administration				
Recommendation	Action Item	Timeline for Implementn.	Lead Responsibility	Evaluation
Develop a process for ongoing student feedback on the program	Implement an exit survey for graduating students	1 year	Department Head, Evaluation subcommittee	Has it been implemented or not?
	Implement an exit survey for students who leave the program	1 year	Department Head, Evaluation subcommittee	Has it been implemented or not?

1. What do you like about this format? How is it effective?

2. What information is missing?

Example 2: Rationale Included

Item: Offer 201 as a block week course in both fall and winter in addition to regular term offerings.
Timeline: Short term
Responsibility: Department Head
Rationale: Several students noted in survey responses that they had difficulty registering for 201 because sections fill quickly. OIA data confirmed high enrollment. Instructors added that typically students from various faculties are registered in the course.

Item: Maintain a listing of undergraduate research opportunities on the faculty website.
Timeline: Short term and ongoing
Responsibility: Associate Dean of Teaching and Learning
Rationale: Students stated that they would like more research opportunities for career development and to enhance their skills prior to entering graduate studies. Additionally, undergraduate research is a focus area for the University of Calgary.

1. What do you like about this format? How is it effective?

2. What information is missing?

Example 3: References to Data

1. Create a flyer on program requirements to have available in the department office.

Target Date: August 2019	Data Sources: NSSE results, student survey (Q8)
Responsibility: Communications Team	
Comments: This will provide basic information to students on program structure, required courses, etc.	
Alignment with Strategic Plan: Aligns with the goal of providing better student advising.	

2. Schedule a faculty development series on student assessment.

Target Date: October 2019	Data Sources: NSSE results, student survey (Q10), faculty survey (Q7)
Responsibility: Associate Dean of Teaching and Learning	
Comments: Students are not always sure how they received their grades. NSSE results show that formative feedback is an area for improvement in the faculty. Also, we have several new faculty members who may benefit from presentations and discussions about student assessment.	
Alignment with Strategic Plan: Aligns with the goal of improving assessment practices.	

1. What do you like about this format? How is it effective?

2. What information is missing?

Final Report

Definitions from the Quality Assurance Handbook – Curriculum Reviews

Curriculum Review Internal Report:

Written by the Review Lead in consultation with the review team, the internal report will include a brief summary of the program context, a checklist of the process followed, and the findings and action plan emerging from the Curriculum Review, including points of alignment with the University of Calgary Academic Plan (University of Calgary, 2015, p. 3).

Curriculum Review Public Report:

The Curriculum Review Public Report will include a brief summary of the program context, the guiding questions, and the action plan emerging from the Curriculum Review (University of Calgary, 2015, p. 3).

So, essentially you are doing two versions of the same report, with the internal report being much more comprehensive than the public report.

Mandatory Sections of the Reports

Internal Report		Public Report
Context Overview a) PLOs b) Program Structure c) Alignment with Academic Plan	→	Context
Guiding Questions Curriculum Mapping (CM) Data Analysis of CM Data Student-provided Data Integration of Evidence from Other Sources	→	Guiding Questions
Findings Action Plan Communication Plan	→	Action Plan

Description of Mandatory Sections

- 1. Context:** A one-page summary created by the Review Lead and shared with the review team, to set the context in which the program is offered (history, how it is situated in the field of study, particular strengths, accreditation requirements, etc.)
 - Can be taken from a Unit Review or other documents – in many cases it is already written and may need minimal or no revisions
- 2. Overview:** Consists of three sections
 - Program-level learning outcomes: What are the overarching areas of knowledge, skills and abilities that a graduate of this program is intended to acquire?
 - Program structure: how is the program organized in terms of required and elective courses? Majors, minors, concentrations, embedded Certificates? Horizontal and vertical integration? Course structures (labs, tutorials, projects, etc.)? Experiential learning? Integrating teaching and research? Internationalization? Special features of the learning experience? Links to other programs? In what ways do courses service other academic programs?
 - Highlight points of alignment with priorities of the University of Calgary's Academic Plan
- 3. Guiding questions:** The critical questions or concerns that guided the curriculum review
 - List them in this section
- 4. Curriculum mapping:** The data from the CM process
 - Approaches vary here – you can include the raw data (course maps), aggregate data, or both. What would be most helpful for future groups examining the data?
 - May want to include aggregate data in the body of the report and course maps in the appendices
 - Recommended: Include a description of the methods used to collect the data for reference, as well as suggestions to conduct the mapping process next time
- 5. Analysis of the curriculum mapping output:** Are there gaps or unintended redundancies in content across courses and/or years? Is there evidence of alignment across intended outcomes, instructional methods and assessment strategies? Is there evidence of relevance/ meaningfulness/ alignment with the Academic Plan?
 - Also general trends, program strengths, emphasis and coverage of PLOs
 - Some include recommendations along with the analysis
- 6. Student-provided data:** Results from student surveys, interviews or focus groups. You can include a summary of the data rather than raw data.
- 7. Integration of evidence from other sources:** The Office of Institutional Analysis (OIA) will create a standard report for Curriculum Reviews. The standard report will include information relevant to curriculum reviews such as enrolment numbers, attrition, retention, DFW statistics, completion rates and times, and relevant survey results. Programs may choose to collect further information from students and/or other stakeholders.
 - List your data sources and give a brief analysis of the data from each

8. **Findings:** The Review Team will identify findings based on an analysis of data from the curriculum mapping process and other sources. The findings will form the basis of an action plan.
 - Use your guiding questions to structure this section of the report
 - Use different data sources as appropriate as you address each one
 - Include recommendations for your action plan

9. **Action Plan:** A concise summary of how, over the period between curriculum reviews, the faculty in a program will address findings emerging from the Curriculum Review process. The Action Plan will be referenced in the midterm report and subsequent curriculum review processes (University of Calgary, 2015).
 - In 2.5 and 5 years you will report on how successful you were in implementing your action plan
 - Action Plan is part of the Public Report
 - Reviewed and approved by the Vice-Provost of Teaching and Learning
 - Action plan items can refer to curriculum at the program and course level, administration, student advising, marketing, faculty development, and other areas that impact on the program

10. **Communication Plan:** Identification of the strategies that will be used to convey to students, faculty and staff the findings of the review and progress made at regular intervals.

Optional Sections of the Report

You may want to include one or more of the following in your internal report. Including detailed information about the process, timeline, and data collected could be useful down the road during the next cycle of the review.

1. **Title page:** Include the faculty logo, title of the document and date. Include an image on the title page if desired.
2. **Table of contents**
3. **Curriculum Review Team:** Near the front of the document you might want to include the names of people who were instrumental in the review. During the next review cycle the team could be quite different, and they may be able to get advice from people who were involved in the review the last time around.
4. **Executive summary:** A high-level overview of the review, including highlights of the process, findings, and action plan. A suggested maximum for the executive summary is 2-3 pages.
 - One paragraph describing the program.
 - Context for the review: How many years since the last one? Coordinated with an accreditation process, unit review, or strategic priorities process? How long did it take and who was involved?
 - A few sentences on the process of the review: When did it start and how long did it take? Did you write your program-level learning outcomes, were they revised from a previous set, or provided from an accrediting body? What data were collected? How were all faculty involved? How were students involved in the process? Include the details that are salient to your review process.
 - Highlight a few of the major findings. I would suggest including both positive results and aspects of the curriculum that you will work on.
 - Highlight perhaps three major action plan items that you will work on in the next five years.
 - Take the opportunity to brag about a couple of things. What went particularly well about your review? What would you like to emphasize about your program to the Provost's office?
 - If you'd like you could close the executive summary with a couple of reflections on the process and how it will inform discussions in your faculty or department.
5. **Timeline:** A list of the review steps, when they occurred, and who was involved. The timeline might be helpful for planning purposes for the next review.
6. **Appendices:** Appendices can include any reference material or sections that are not included in the body of the report. While some groups want to include all data (aggregate or not) in the appendices, others opt for a more streamlined report. Possibilities include:
 - Survey questions (student, alumni, and/or other groups)
 - Interview and/or focus group questions
 - Curriculum mapping templates or survey questions

- Aggregate survey, interview, and focus group data
- Aggregate curriculum mapping data, and data for individual courses if required for accreditation purposes
- Selected NSSE data from faculty/ department reports
- Agendas from meetings and/or curriculum retreats
- List of course outcomes for all courses

Approval and Reporting Process

The standard recommended process is outlined below. Your faculty might have a slightly different process. For example, if you are required to submit proposed changes to the Curriculum and Academic Review Committee (CARC), you may need to add steps to the process. Check with your Associate Dean of Teaching and Learning for guidance.

1. Review of Draft Curriculum Review **Internal Report** by the review team
 - Revisions to the report based on feedback received
2. Review of Draft Curriculum Review **Internal Report** by all faculty, if desired
 - Revisions to the report based on feedback received
3. Submission of CR **Public Report** to Dean/ Director (or designate) and the Associate Dean of Teaching and Learning for discussion and signature of approval, and in the case of course-based Master's programs, also to the Dean, Faculty of Graduate Studies, for review and signature of approval.
 - Depending on the faculty, you might meet with your dean and/or designate to discuss the report
 - Revisions to the report based on feedback received
4. CR **Public Report and signed approval form** submitted to Heather Smith-Watkins, Review Coordinator, Provost's Office
5. CR **Public Report** is reviewed and discussed with the Vice-Provost of Teaching and Learning
6. Submission of CR **Public Report** for information to:
 - The Academic Program Subcommittee for undergraduate programs
 - The Graduate Academic Program Subcommittee for course-based Master's programs
 - The Curriculum Review Coordinator for posting on the Curriculum Review website
7. Interim **Progress Report** is submitted to the Provost's Office at mid-cycle and copied to the Academic Program Subcommittee or Graduate Academic Program Subcommittee as appropriate (University of Calgary, 2015, p. 5-6)

Interim Reports

Interim reports are completed half way through the cycle. Most groups are on a 5-year cycle, which means they will complete their report two and a half years after submitting their final report.

The interim report serves a variety of purposes, including the following:

- The curriculum review team evaluates whether or not they are on track to meeting their goals, and what steps to take to ensure they are met.
- The curriculum review team decides which action items need to be revised or deleted as circumstances have changed regarding the program.
- The curriculum review team has the option of adding new action items if their action plan has been completed or is nearly complete.
- The curriculum review team conveys progress made to date to the Provost's Office.

There is currently no standard format for the interim report. Other groups have added a column to their action plan chart to report on progress to date and next steps in addressing each action item. If you have any questions please contact Heather Smith-Watkins in the Provost's Office.

Electronic Records

Each unit is responsible for saving their own electronic records. According to the QA Handbook (University of Calgary, 2015), "an electronic record of all of the raw data used to generate the Curriculum Review Summary Report will be archived by each program for reference in mid-term reports and in future curriculum reviews (p. 8)."

Glossary

Term	Definition	For more information (title of section in this document)
action plan	concise summary of how, over the period between curriculum reviews, the faculty in a program will address findings emerging from the Curriculum Review process. Based on recommendations from the analysis phase in the process, action plans identify specific action items including timelines for implementation, who is responsible for the implementation, and when/how the action will be evaluated	See <i>Introduction to Curriculum Review and Action Plan and Final Report</i>
assessment tasks and methods	the types of activities/assignments which are used to collect evidence of student learning and often to provide feedback to students examples: research papers, tests, quizzes, projects, oral presentations, etc.	see <i>Curriculum Mapping and Analyzing Curriculum Mapping Data</i>
Bloom’s Taxonomy	The 2001 Revised version is titled A Taxonomy for Teaching, Learning, and Assessment. It is a way of organizing learning activities and outcomes according to types of cognitive processes, i.e., recalling, understanding, applying, analyzing, evaluating, and creating	https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/ see <i>Curriculum Mapping</i>
constructive alignment	refers to the logical coherence of learning outcomes with teaching and learning activities (TLAs) example: for the learning outcome ‘students will be able to critically evaluate an academic article,’ an aligned teaching strategy would involve modeling how academics in the field read and evaluate an article and the aligned assessment task would provide an opportunity for students to articulate their critical evaluation of an article	Biggs, 2014 see <i>Curriculum Mapping</i>
course outcomes (COs)	state the knowledge, skills, and attitudes that students should be able to attain by the end of the course. example: By the end of the course, students should be able to find appropriate peer-reviewed academic articles to use in their written work.	see <i>Introduction to Curriculum Review</i>

curriculum map	a matrix showing the alignment of course outcomes from one course to program level learning outcomes (PLOs).	see <i>Analyzing Curriculum Mapping Data</i>
curriculum mapping	the process of associating course outcomes with program-level learning outcomes and aligning elements of courses with a program, to ensure that it is structured in a strategic, thoughtful way that enhances student learning (Adapted from Harden, 2001)	see <i>Introduction to Curriculum Review</i> and <i>Curriculum Mapping</i>
curriculum review (CR)	an academic, staff-led critical examination of each undergraduate and course-based master's program for the purpose of optimizing the learning outcomes of that program (University of Calgary, 2015, p. 3).	see <i>Introduction to Curriculum Mapping</i> and University of Calgary Quality Assurance Handbook
curriculum review final report	written by the review lead in consultation with the review team for use within the program and submitted to the Provost's Office, includes summary of the program context, guiding questions, and the action plan. These items are also posted online (public report). In addition to the above, an internal report will also include a checklist of the process followed and the findings of the review process	For examples, see http://www.ucalgary.ca/provost/activities/reviews see <i>Introduction to Curriculum Review</i> and <i>Action Plan and Final Report</i>
data sources	various sets of information that can be used to inform decisions made during the curriculum review process i.e., NSSE engagement indicators, student surveys, alumni questionnaires, faculty focus groups, etc.	see <i>Introduction to Curriculum Review, Data Sources to Inform Your Review, and Action Plan and Final Report</i>
educational development consultants	Taylor Institute faculty members who are able to provide consultative expertise on the curriculum review process (i.e., provides resources and templates, facilitative leadership for working sessions or retreats as time permits)	see <i>Introduction to Curriculum Review</i>
graduate attributes	broad and long-term descriptions of learning expectations of students who attend a particular institution/ faculty (Driscoll & Wood, 2007).	see <i>Learning Outcomes</i>
guiding questions	critical questions or concerns that guide the curriculum review process	see <i>Introduction to Curriculum Review</i> and <i>Guiding Questions</i>

High impact educational practices (HIPs)	activities positively associated with student learning and retention that share several traits: they demand considerable time and effort, facilitate learning outside of the classroom, require meaningful interactions between faculty and students, encourage collaboration with diverse others, and provide frequent and substantive feedback examples: learning communities, community-based projects, working with faculty member on a research project, internships	see http://www.aacu.org/leap/hip.cfm and <i>Curriculum Mapping</i>
IDA	Introduced, developing, advanced one method of distinguishing the degree to which program learning outcomes are used in a given course	see <i>Curriculum Mapping</i> for other scales
Inquiry based learning	“a range of pedagogical approaches that are united by the central place they give to students’ investigative work (addressing questions and solving problems)” (Aditomo, Goodyear, Bluc,& Ellis, 2013, p. 1239).	see <i>Curriculum Mapping</i>
instructional method	predominant approach instructor uses to promote learning examples: Direct instruction (lectures, presentations, demonstrations), Experiential (practicum, internships, observations)	see <i>Curriculum Mapping</i>
Interim Progress Report	Completed halfway through the Curriculum Review cycle and submitted to the Provost’s Office at mid-cycle and copied to the Academic Program Subcommittee or Graduate Academic Program Subcommittee as appropriate.	see <i>Action Plan and Final Report</i>
KSAs	Knowledge, skills and attitudes/values – these are the domains often used when forming learning outcomes at both the course and program levels	
learning outcomes	“an intended effect of the program educational experience that has been stated in terms of specific, observable, and measurable student performance” (Veltri, Webb, Matveev & Zapatero, 2011). The knowledge, skills, and values/ attitudes that students are expected to attain by the end of a unit of study.	see <i>Introduction to Curriculum Review</i> and <i>Learning Outcomes</i>
lesson objectives	state the knowledge, skills, and attitudes that students should be able to attain by the end of an individual lesson example: By the end of today’s lesson, students should be able to describe the difference between structure x and structure y	

mapping scale	indicates the degree to which a program-level learning outcome is addressed by a particular course outcome (i.e., IDA - Introduced, developing, advanced)	see <i>Curriculum Mapping and Analyzing Curriculum Mapping Data</i>
paper-based curriculum mapping	Using a word processor or hard copy paper forms to create curriculum maps	see <i>Analyzing Curriculum Mapping Data</i>
program level outcomes (PLOs)	state the intended knowledge, skills, and abilities that students are expected to meet by the end of a program. example: By the end of the program, students will be expected to write a paper that incorporates academic literature.	see <i>Introduction to Curriculum Review</i> and <i>Learning Outcomes</i>
Quality Assurance Handbook	The University of Calgary's guide to the curriculum review process	https://www.ucalgary.ca/provost/files/provost/curriculum_review_handbook_gfc_dec_2015.pdf
retreat	half-day or full-day focused session to learn more about and/or gather input for a particular stage in the curriculum review process	see <i>Introduction to Curriculum Review</i>
review lead	the faculty member tasked with overseeing the curriculum review process, acts as a project manager and makes decisions about the process (including delegation)	See <i>Introduction to Curriculum Review</i>
review team	includes all full-time faculty teaching in the program; sessional instructors are invited to participate	see <i>Introduction to Curriculum Review</i>
scaffolding	"In education, scaffolding refers to a variety of instructional techniques used to move students progressively toward stronger understanding and, ultimately, greater independence in the learning process." (https://www.edglossary.org/scaffolding/)	see <i>Introduction to Curriculum Review</i> , <i>Guiding Questions</i> , and <i>Analyzing Curriculum Mapping Data</i>
teaching and learning activities (TLAs)	the strategies and activities used to promote and assess learning in a course, including both graded and non-graded activities examples: readings, group projects, lectures, labs, etc.	See <i>Curriculum Mapping and Analyzing Curriculum Mapping Data</i>

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For more information:

Provost and Vice-President (Academic): Quality Assurance Reviews

<http://www.ucalgary.ca/provost/activities/reviews>

Council of Ministers of Education, Canada. (2007). *Ministerial statement on quality assurance of degree education in Canada*. Retrieved from

<http://www.cmec.ca/Publications/Lists/Publications/Attachments/95/QA-Statement-2007.en.pdf>

Articles, resources and curriculum mapping templates:

<http://curriculummapping.weebly.com/>

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