UNIVERSITY OF ALBERTA
CENTRE FOR TEACHING AND LEARNING

LEARNING OUTCOMES FOR THESIS-BASED PROGRAMS: A HOW-TO GUIDE

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Personal Preface - Debby Burshtyn

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Adapted from my Consider This piece of 2018
As pet peeves go, one very near the top of my list is when I hear a faculty member say something along the lines of "well, we all agreed after the Candidacy exam the candidate is just not performing at a PhD level, we have no concerns with them completing a master's." When asked to define what the difference is, the response is "Come on, we all know what we mean by that? Right?" Maybe we as faculty do, but the student who receives such an assessment likely does not.

Learning outcomes are simple statements of what the learner knows and is able to do following a lesson, course, training activity or program. Defining learning outcomes for PhD programs has the power to clearly communicate expectations to students and take the apparent subjectivity out of assessment. I became something of a zealot on the topic of articulating learning outcomes for thesis-based programs after encountering them in the course of reviewing a graduate program in Ontario almost 10 years ago. I believe using learning outcomes has great potential to produce the best learning environment and to bridge graduate education to the wider world. I see learning outcomes as a necessary part of any healthy learning environment because they facilitate clear communication with students and provide a scaffold for objective assessment. The knock-on effect of communicating learning outcomes to students is to provide them with a vocabulary to explain to potential employers the skills and attributes they bring and may anchor the differentiation of one program from another.

Definition of program learning outcomes are currently required to propose new programs in Alberta and are used by Advanced Education to determine program differentiation and by CAQC in program review. All University of Alberta programs are expected to have defined learning outcomes when they next undergo program review. Expectations for degrees in Alberta are specified in the recently released Degree Framework and Degree Level Standards, however articulating learning outcomes for doctoral programs presents a unique challenge. Our doctoral programs have been well designed and graduates have developed a broad and deep skill set and knowledge base. Despite the quality of these programs, rarely are explicit learning outcomes written down and, as a result, students are often left unsure of what skills they are developing at different stages of their degree. At the doctoral level, most of the formative activity occurs outside formal coursework guided by the mentor and the outcomes expected are not clearly laid out at the program in many cases or institutional level. Moreover, the guides and tools for developing learning outcomes available focus on programs built on highly structured courses. We also identified a gap in relating FGSR-specified requirements in research programs to learning outcomes and the degree level standards. In fall of 2018, we formed a working group to tackle these problems. I am exceptionally grateful to the team that has worked together to produce this report and the tools that will serve as a practical legacy of their effort and the recommendations to support and facilitate programs to do the work for their own programs.

Sincerely,
Debby Burshtyn
Interim Vice Provost and Dean, Faculty of Graduate Studies and Research

SECTION 1

Background on Learning Outcomes in Thesis-Based Master's and PhD Programs

In this section, we will address the following questions:

Q1: What are Learning Outcomes (LO's)?

Q2: Why should they be articulated in Thesis-based programs?

Q3: How should LO's be used?

Q4: What are the FGSR LO Templates, and how should they be used?

Q1 WHAT ARE LEARNING OUTCOMES?

A

The term *learning outcome* is broadly used to describe the "knowledge, skills, attitudes, competencies and habits of mind" a student would be expected to demonstrate by the end of a program, course, unit, or instructional period (Lesch, 2012). Learning outcomes defined at the program level are intended to describe what a degree candidate should know and be able to do by the end of their program.

Further, well-written learning outcomes are SMART (Greenleaf, 2008):

S pecific.

M easurable (assessable, demonstrable).

A ttainable by students and matched to the purpose of the program.

R elevant for students, course, program and degree.

T ime-bound or can be completed in the time given.

An example of a Thesis-based PhD program-level learning outcome is provided below. Note that both the learning outcome and potential methods of assessment are included, which helps to ensure the learning outcome can be assessed.

☑ Example of an outcome related to Oral Communication Skills:

Students will be able to:
- **deliver** a clear and effective field appropriate doctoral research proposal presentation, using appropriate media, to **explore** complex and/or ambiguous ideas and issues.

Potential Methods of Assessment

Oral indicators:
- Student successfully presented and defended orally their doctoral **research proposal**. Successful completion of the oral defence indicates that the student has the ability to describe the rationale for project plans to knowledgeable groups and to gather buy-in and approval.

  A rubric, list of assessment criteria, or other means of describing the quality of an oral presentation would be beneficial for students and evaluators.

When effectively designed, learning outcomes at the course, unit or instructional period (lesson) level support program level outcomes. At the University of Alberta, program specific outcomes should map to the relevant FGSR template (Master's or PhD), as described in this document. This includes consideration of FGSR requirements (as outlined in the University of Alberta Calendar), provincial expectations (outlined by the Alberta Credential Framework) and accreditation requirements (See Figure 1). As one moves from the program level downwards, learning outcomes become more specific in nature. For more information and resources related to course, unit, and lesson - level learning outcomes (not specific to Master's or PhD programs), please see the Centre for Teaching and Learning Document *A Guide to Learning Outcomes at the University of Alberta*.

This document focuses on *why* and *how* to go about generating learning outcomes for Thesis-based programs at the University of Alberta, using the Faculty of Graduate Studies and Research (FGSR) *PhD Program Learning Outcomes Template* or the *Master's Program Learning Outcomes Template*.

Figure 1. Program - level learning outcomes for thesis-based graduate degrees support requirements both external and internal to the university, and are in turn supported by course and non-course level outcomes.

The Alberta Credential Framework, U of A Calendar, and **Accrediting Bodies** inform program level outcomes.

Program Level learning outcomes support the Alberta Credential Framework, University of Alberta Calendar, and align with external expectations for quality assurance. The FGSR Learning Outcome template (Master's or PhD) provides a basis for drafting program level outcomes and helps support the Alberta Credential Framework and U of A Calendar requirements. *Additional program level outcomes may need to be drafted by individual programs related to requirements of Accrediting Bodies.

Course and non-course outcomes (such as those related to professional development, ethics, research design and data collection, thesis preparation and defence, etc) support program-level outcomes.
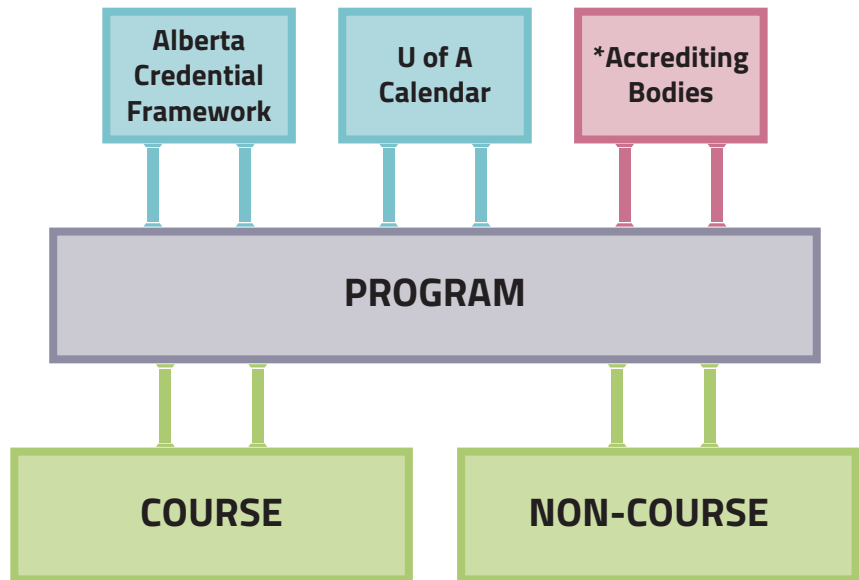
Q2 WHY SHOULD LEARNING OUTCOMES BE ARTICULATED IN THESIS-BASED MASTERS AND PHD PROGRAMS AT THE UNIVERSITY OF ALBERTA?

A *The Value of Learning Outcomes*

There are a number of potential benefits of learning-outcome frameworks being developed for thesis-based graduate programs. It is important to note that these frameworks would not only describe specific learning outcomes that students in a program would be expected to meet, but would also *connect these learning outcomes to assessment*, as in the example above.

In particular, defined learning outcomes and connected assessments in graduate programs could:

- encourage deeper understanding of the knowledge, skills and attributes required to earn a credential (degree), which could support:
    - potential students in making decisions about what program / degree may most suit their goals and expectations;
    - current students by making often implicit expectations more explicit (Denecke, Kent, & McCarthy, 2017);
    - graduates in describing their skills to potential employers;
    - employers in recognizing the skills an applicant would possess, as a graduate of that program; and
    - improved understanding of the value of graduate programs by the general public (Denecke et al., 2017).
- support students and supervisors in determining areas where a student is meeting or has yet to meet learning outcomes required by their program and develop / modify growth plans accordingly;
- help students to take ownership over their learning and recognize how their coursework, professional development, independent work, and other experiences can help them to develop and integrate knowledge and competencies necessary for success in their field as well as meet the requirements of their program;
- increase clarity of how program outcomes and assessment are aligned; and
- clarify assessments (e.g., rubrics, exams, etc).

Meeting Requirements of Degree Frameworks (Alberta Credential Framework)

Programs at the University of Alberta are guided by credential frameworks[1] that describe the general differences between credentials and degree types. However, these frameworks do not provide specific program learning outcomes, nor do they provide guidance on how these learning outcomes could be generated. This document and related resources aim to address this gap and assist programs at the University to draft learning outcomes that support these frameworks and promote program consistency and transparency while also being tailored to the specific context of each program.

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[1]Alberta Credential Framework; Council of Ministers of Education, Canada Ministerial Statement on Quality Assurance of Degree Education in Canada.

Meeting Requirements of The University of Alberta Calendar

The University of Alberta Calendar communicates the academic regulations, standards, and degree requirements that programs must adhere to. Within the calendar, numerous sections speak to program requirements for research-based programs.

Thesis-Based Master's and PhD Learning Outcomes – this will be a new addition to the 2020-21 calendar that explains what each research-based degree is and what students will know and be able to do upon completion.

Research-Based Masters - General Requirements

- *Supervision and Supervisory Committee*
- *The Thesis Requirements or equivalent*
- *The Final Examination*
- *Academic Integrity and Ethics Training Requirement*
- *Professional Development Requirement*
- *Residency Requirements are monitored by the department*
- *Course Requirements, as applicable*

PhD - General Requirements

- *Annual Supervisory Committee Meetings*
- *The Candidacy*
- *The Thesis Requirements or equivalent*
- *The Final Doctoral Examination*
- *Academic Integrity and Ethics Training Requirement*
- *Professional Development Requirement*
- *Residency Requirement*
- *Course Requirements, as applicable*

The Nature of Thesis-based Master's and PhD programs

Research intensive thesis-based graduate degrees differ from undergraduate and course-based degrees in a number of ways related to the intent, transferable skills, and the learning opportunities available within each degree program. In particular, because learning in thesis-based graduate degrees is largely *experiential* and *participatory*, a significant amount of summative evaluation (ex supervisory committee meetings, research presentations, candidacy exam; thesis exam) and formative feedback is provided *outside of formal course structures*. As a result, students may not have a clear sense of what standards they need to meet. For example, a student may struggle to improve upon feedback that their work is "not scholarly at a PhD level" without being given a clear description of what this would look like, or how it would be evaluated. (In this instance, learning outcomes with clear assessment methods as well as well defined criteria and standards may be necessary to help clarify "scholarly work").

At the UofA, most thesis-based programs have yet to articulate or publicly share their learning outcomes. We lack examples that have specificity or the explicit skills, values, attitudes, and knowledge gains that are expected, let alone the particular manner in which such attributes can be demonstrated or how they will be assessed (such as well defined rubrics). For example, critical evaluation of the literature may be part of required course-work, but may be further developed through real review of manuscripts for journals under the mentorship of faculty. Another example is *design of methodology for a study or experimental design*, where skills are further developed and assessed as part of annual committee evaluations or candidacy proposals or even by peer feedback in lab meetings and research group presentations. In short, many thesis-based advanced degrees at the University of Alberta currently lack articulation of SMART outcomes (Greenleaf, 2008), i.e. complete and transparent learning outcomes and evaluation methods. This means that prospective students, current students, graduates, supervisors, faculty, and employers lack a clear reference for understanding what a program will require or deliver aside from general understanding of what Master's and PhD programs aim to develop.

Q3 **HOW SHOULD LEARNING OUTCOMES BE USED?**

A It is the recommendation of the FGSR working group on learning outcomes (2019) that learning outcomes be used:

- for advertisement and program promotion, to inform prospective students, and as a means to differentiate our programs from peers;
- as a key reference document for students, supervisors, and evaluators while a student is enrolled in a program;
- by graduates upon completion of a program; and
- during review of programs / to improve their quality.

Each of these areas will be addressed, briefly, below.

Advertisement, Program Promotion and Differentiation, and Information for Prospective Students

This working group recommends that program-specific learning outcomes should be shared publicly on program websites and / or through other means (information booklets for prospective students, promotional materials, etc). Skills and attributes are translated from the scholarly forms to more accessible terminology for non-academics. For example, *design and execution of a team research project can be redefined for students as project management.*

This encourages transparency and helps to communicate the value of a program to employers, prospective students, and the general public (Denecke, Kent & McCarthy, 2017). All applicants to programs should be encouraged to read and seek clarification on learning outcomes and connected assessment, specific to their program of interest.

Applicants, when considering a program, may also want to consider / seek answers to the following questions:

- do these outcomes represent what I want out of my program?
- do I understand how I will be assessed on particular outcomes?
- how does this program / institution help me meet these outcomes? (e.g., required coursework, research infrastructure, state-of-the-art technologies, performance venues, publication, internship, training, other opportunities)
- how will my prospective supervisor help ensure I meet these outcomes? (e.g., frequency and type of feedback to expect)
- in the case that I or my supervisor(s) is/are concerned I am not / will not meet these outcomes, what courses of action and resources are available?

As a Key Reference for Students and Supervisors

Learning outcomes should be a key reference for students enrolled in a particular program, as well as for their supervisor(s).

When a student is in the initial stages of their program, the student and their supervisor(s) should meet to:

- review the learning outcomes and connected assessments together, clarify any questions the student has about when and how they will be assessed or demonstrate that they have met specific outcomes;
- formulate a plan for how the student will meet specific outcomes (particular courses, experiences, etc);
- determine the supports the student will need from the supervisor(s) and others (e.g., frequency of meetings; written / oral feedback, etc); and
- address any lingering questions or concerns.

As a student continues through their program, they and their supervisor(s) can use the learning outcomes to:

- develop / modify growth plans based on learning outcomes the student has yet to demonstrate;
- track the student's progress through the program by determining areas where a student is meeting or has yet to meet / be evaluated on learning outcomes;
- identify additional learning opportunities or experiences (conferences, internships, self-study, etc) that may support the student in developing the knowledge and skills outlined in the outcomes;
- ensure the student understands when and how they will be assessed and how they will demonstrate mastery of a specific outcome;
- communicate with faculty who are new to the program and may serve as arm's length examiners; and
- communicate with others when engaging in interdisciplinary research and creating individualized interdisciplinary programs to identify core skills within a discipline.

Graduates Upon Completion of a Program

Upon completion of a program, graduates can utilize their program learning outcomes in a number of ways:

- as a means of categorizing and describing their knowledge and skills;
- to identify areas of strength and areas of continued growth;
- to help them inventory the coursework and relevant experiences undertaken during their program in support of the outcomes;
- to support resume writing and job application; to demonstrate their preparedness for a variety of career avenues; and
- to communicate the value of their degree to employers and others.

> ### To Review and Improve Programs
>
> Leadership of departments can use learning outcomes to:
>
> - undertake program planning/ review a current program (at least every 7 years during quality assurance review of the program, but more often as needed). This would require that:
>   - learning outcomes are reviewed by faculty, graduates, and employers of recent graduates (if possible) to ensure they align with what the program aims to achieve / delivers;
>   - learning outcomes are mapped to program requirements (courses, etc); and
>   - course learning outcomes and other program requirements are reviewed for their alignment with program level outcomes.
> - determine which outcomes fall **outside of course offerings** and ensure students are supported to meet these outcomes, either through the department or the institution (for example, participation in research groups, offering PD sessions to meet professional development outcomes or ethics training to meet ethics requirements, communicating to students opportunities available outside their course requirements, such as FGSR PD days);
> - evaluate whether students in a program are meeting or failing to meet specific outcomes to determine where and how the program could be improved. *For example, what percentage of students achieve a high degree of competency in a particular outcome such as abstract writing by the end of their program?*
> - develop supporting documentation for supervisors (background information on learning outcomes, outline roles and responsibilities as a supervisor in helping students meet outcomes);
> - develop or revise supporting documentation for students (background information on learning outcomes, outline student and instructor roles and responsibilities in ensuring students meet outcomes); and
> - develop clear and transparent assessments which are directly tied to program learning outcomes (rubrics for supervisory committee meetings, public presentation evaluations, exams, etc) and share as much information as possible about the nature of these assessments with students in the program (for example, sharing evaluation rubrics or exemplars).

Q4 WHAT ARE THE FGSR LEARNING OUTCOME TEMPLATES, AND HOW SHOULD THEY BE USED?

A **An Overview of the FGSR LO Templates and How to Use Them**

The Faculty of Graduate Studies and Research has developed a *PhD Program Learning Outcomes Template* as well as a *Master's Program Learning Outcomes Template* to support the development of PhD and Master's program learning outcomes at the University of Alberta. These documents were derived from and align with the Alberta Credential Framework, but also expand on this framework and more explicitly identify the knowledge, skills, and attributes that graduates of Thesis-based programs at the U of A should possess. These templates also provide blank spaces for programs to add their own, program-specific learning outcomes as well as identify possible means of assessment.

For those wishing for more information or guidance around developing PhD Program learning outcomes, an additional document: _PhD Program Learning Outcomes Template with suggestions_, was developed. This template has the same content as the _PhD Program Learning Outcomes Template_ in the "University of Alberta PhD Learning Outcomes" sections but also has the "program specific learning outcomes" and "methods of assessment" (forms of evidence) areas filled in with suggested content that departments can modify to best align with their programs.

These templates are organized around five areas:

- Knowlededge;
- Research Competency;
- Communication Skills;
- Professional Capacity and Autonomy; and
- Ethics.

How to use the FGSR LO Templates

As you begin to draft learning outcomes for your program (see Section 2 in this document for more information on how to draft learning outcomes), you may use the FGSR blank template (either _PhD Program Learning Outcomes Template_ or _Master's Program Learning Outcomes Template_) as a starting point and the template with suggested content and example document as sources of inspiration. The PhD template has been endorsed by FGSR Council and has outlined institution-level degree learning outcomes that align closely with the Alberta Credential Framework. These learning outcomes define the minimum standard for all programs to adhere to, and also provide some progressive beneficial options for programs to consider.

Programs are able to build upon the minimum standard by defining program-specific learning outcomes that more explicitly describe the specific expectations of students, and articulate how student competency will be assessed. These areas should be the focus of your working group / work (see Sections 2 and 3).

As mentioned above, the following documents are available for your reference:

- _PhD Program Learning Outcomes Template_ - provides institution-level degree outcome language; has blank space for programs to enter program-specific outcomes and methods of assessment.
- _Master's Program Learning Outcomes Template_ - provides Alberta Credential Framework language and institution-level degree outcome language; has blank space for programs to enter program-specific outcomes and methods of assessment.
- _PhD Program Learning Outcomes Template with suggestions_ - provides:
    - Alberta Credential Framework language;
    - institution-level degree outcomes language: words in black are directly quoted from the Alberta Credential Framework, words in green are U of A enhancements that have been endorsed by FGSR Council; and
    - program-specific outcomes language and suggested forms of assessment - ideas are provided for programs to use as inspiration.
- _PhD Program Learning Outcomes Examples_ - - real examples of populated templates from University of Alberta programs (e.g., Engineering, Medical Microbiology and Immunology).

SECTION 2*

Writing Learning Outcomes for Thesis - Based Programs

In this section, we will address the following questions:

Q1: What makes a good program - level learning outcome?

Q2: How can I write program-level learning outcomes?

Q3: How can I connect program-level learning outcomes to assessment?

This section was drafted and adapted from the Centre for Teaching and Learning document: _A Guide to Learning Outcomes at the University of Alberta_. For more detailed information on writing learning outcomes at all levels (course, program) not specific to thesis based-graduate degrees, please refer to this document.

Q1 WHAT MAKES A GOOD PROGRAM - LEVEL LEARNING OUTCOME?

A Although program level outcomes are similar to course and module level learning outcomes in the way that they are written and structured, they are wider in scope. They reflect broad, conceptual knowledge and adaptive vocational & generic skills, and focus on the enduring understandings within a field or discipline. Program outcomes represent the minimum performance which must be achieved to successfully complete a program. Put simply, well-written program level learning outcomes identify what students will know and be able to do at the end of a program.

In particular, well-written program level learning outcomes:

A. Define what students will be able to do at the end of, or a particular point in their program (time-bound);

B. State the specific behavior that students are expected to demonstrate (using a measurable/assessable verb); and

C. can be assessed.

This is illustrated in the example below (from FGSR Learning Outcome Template):

☑ Example

Written Communication:
By the end of the program, students should be able to:

B demonstrable verb

- **Create** a clear and effective, field appropriate doctoral **research proposal** to explore complex and/or ambiguous ideas, issues and conclusions. **} A** what students do

Potential Methods of Assessment: **C**

- _Communication Skills_ should be assessed and students provided with regular oral and written formative feedback in programs through the appropriate committee meetings, proposal and final thesis defense, and publications, specifically:
- a written doctoral research proposal

  In this instance a rubric or other means of describing the quality of doctoral research proposal would be beneficial for students and evaluators.

Further, well-written learning outcomes are SMART (Greenleaf, 2008):

S pecific.

M easurable (assessable, demonstrable).

A ttainable by students and matched to purpose of the program.

R elevant for students, course, program and degree.

T ime-bound or can be completed in the time given.

This is illustrated in the example below (from FGSR Learning Outcome Template):

☑ Example

Awareness of Limits of Knowledge
Students will:

B demonstrable verb

- **Describe** the limitations of one's own work and discipline, the complexity of knowledge, and of the potential contributions of other interpretations, methods, and disciplines. } **A** what students do

Potential Methods of Assessment: **C**

- *Knowledge Indicators* should be assessed and students provided with regular oral and written formative feedback in programs through the appropriate supervisor meetings, supervisory committee meetings, proposal and final thesis defense, specifically:

    Awareness of Limits of Knowledge
    - conducting [field of research] - appropriate review of the state of the field / discipline (literature, techniques, standards, etc.);
    - written (papers, proposals) and oral (presentations, candidacy, PhD defence) forms: identifying and explaining research pertinent theory, approaches, techniques, and paradigms;
    - defending a PhD proposal by a candidacy examination committee (with a rubric or evaluation criteria); and
    - the PhD defence examination (with a rubric or evaluation criteria).

Q2 **HOW CAN I WRITE PROGRAM - LEVEL LEARNING OUTCOMES?**

A Using the five categories identified by FGSR (Knowledge, Research Competency, Communication Skills, Professional Capacity and Autonomy, and Ethics) and Bloom's Taxonomy, this document will guide you through the process of writing assessable learning outcomes for thesis-based programs.

Background: FGSR Framework

Program level learning outcomes focus on the essential, transferable learning that can be observed and assessed within programs. They support the attributes of an ideal graduate of a program, and are reflective of disciplinary contexts. *It's important to note that these attributes in graduate programs may be acquired **outside of coursework**, including but not limited to participation in professional development or external training (ethics training), individual study, and other contexts.* As such, the FGSR learning outcome framework provides a useful means of thinking about and describing this essential learning.

- **Knowledge** - the types of thinking you want your students to acquire and act upon. In a thesis-based program, this involves the ability to apply of advanced level knowledge in a specialized field and to exercise awareness of the limits of that knowledge. The FGSR framework focuses on knowledge in three areas:
  - Depth and breadth of knowledge;
  - Application of Knowledge; and
  - Awareness of Limits of Knowledge.
- **Research Competency** - the ability to conceptualize, formulate, design and implement research for the generation of new knowledge, and to make informed judgments on complex issues, in a specialized field.
- **Communication Skills** -the ability to demonstrate written communication, oral communication, and listening skills, and to communicate effectively and professionally with a broad audience.
- **Professional Capacity and Autonomy** -the ability to research, reflect upon, and take ownership of the development of skills and career goals.
- **Ethics** - the ability to identify, explain, analyze, and propose solutions to ethical issues.

For more information on alternative frameworks for developing learning outcomes, see the Centre for Teaching and Learning Document: *A Guide to Learning Outcomes at the University of Alberta,* p. 25.

Background: Bloom's Taxonomy

Bloom's taxonomy of learning (Bloom & Krathwol,1956) is a tool commonly used to write learning outcomes and provides a list of measurable verbs. These verbs are measurable in the sense that they can be demonstrated by the learner and indicators can be assessed.

In this taxonomy, verbs are categorized and arranged on a spectrum from simple to complex, concrete to abstract. At the low end of the spectrum students are required to demonstrate low-level, introductory skills At the high end of the spectrum, students are expected to demonstrate critical, creative, and complex thinking skills. For example, students should progress from remembering and understanding to evaluating and creating. The table below provides definitions, verbs, and evaluation examples related to thesis-based programs.

Cognitive Learning Domain - Definititions & Verb List

	Definition:	Example Verbs:	Evaluating example:
CREATING	developing a hypothesis; devising a procedure; inventing a product; creating an original work	build, compose, create, construct, design, develop, devise, formulate, generate, hypothesize, invent, modify, organize, plan, predict, produce	Can the student design and implement a research project of significant scope to complete a thesis?
EVALUATING	distinguishing whether a process / product has internal consistency, inconsistencies or fallacies; detecting appropriateness of a procedure for a given task	appraise, assess, choose, compare, conclude, critique, check, defend, detect, evaluate, hypothesize, judge, justify measure, monitor, rank, rate, recommend, review, score, test, validate	Can the student assess strengths and weaknesses of various methodological approaches relevant to a research question?
ANALYZING	distinguishing relevant from irrelevant, determining fit or function within a structure; determining point of view, bias, and/ or values of presented material	analyze, appraise, attribute, break down, coherence, compare, conclude, contrast, correlate, deconstruct, determine, differentiate, discriminate, dissect, distinguish, extrapolate, find, integrate, investigate, outline, separate	Can the student locate, appraise, and/or generate information/-data relevant to a research question? Can the student organize information/-data to reveal patterns/themes?
APPLYING	applying or demonstrating knowledge in a routine or nonroutine task	apply, calculate, carry out, clarify why, compute, demonstrate, discover, execute, extrapolate, generalize, illustrate, implement, manipulate, make, predict, show, use, utilize	Can the student select, defend, and apply a methodological approach to answer a research question?
UNDERSTANDING	changing from one form of representation to another; illustrating a concept; drawing conclusions, determining cause and effect	choose, cite, clarify, classify, compare, conclude, convert, describe, discuss, exemplify, explain, express, extrapolate, give an example, illustrate, infer, interpret, match, paraphrase, restate, respond, summarize, translate,	Can the student express an appreciation of the limitations of one's own work and discipline, and of the complexity of knowledge?
REMEMBERING	retrieving information from short and long term memory	accumulate, arrange, define, describe, identify, label, list, locate, match, name, recall, recite, recognize, repeat, retrieve, state	Can the student describe foundational works and/or significant advancements / publications in their field of specialization?

Adapted from: https://carleton.ca/edc/wp-content/uploads/TT-Writing-Learning-Out-comes.pdf

EXERCISE

TRY IT: BRAINSTORMING ATTRIBUTES RELATED TO YOUR PROGRAM

Using the FGSR Framework, begin to brainstorm the attributes that learners need in order to meet the overall goals of your program. Answer the following questions:

Knowledge - What types of thinking do you want your students to do or what knowledge do you want them to acquire throughout your program?

a) What knowledge / types of thinking will be developed through coursework?

b) What knowledge / types of thinking will be developed / demonstrated OUTSIDE of coursework? (e.g., candidacy, writing thesis, thesis defense, professional development, ethics training)

Research Competency - what would you want your students to be able to undertake / perform related to research?

a) What knowledge, skills, or attitudes related to **research competency** would you want students to be able to demonstrate upon completion of their coursework? At what level?

b) What knowledge, skills, or attitudes related to **research competency** would you want students to be able to demonstrate as a result of experiences OUTSIDE coursework? (e.g., candidacy, writing thesis, thesis defense, professional development) At what level?

Communication Skills - what knowledge, skills and abilities would you expect your students to be able to demonstrate related to communication?

a) What knowledge, skills and abilities related to **communication** would you want students to be able to demonstrate upon completion of their coursework? At what level?

b) What knowledge, skills, and abilities related to **communication** would you want students to be able to demonstrate as a result of experiences OUTSIDE coursework? (e.g., candidacy, writing thesis, thesis defense, professional development) At what level?

Professional Capacity and Autonomy -what characteristics related to professional capacity and autonomy would you expect students to demonstrate?

a) What characteristics related to **professional capacity and autonomy** would you want students to be able to demonstrate upon completion of their coursework? At what level?

b) What characteristics related to **professional capacity and autonomy** would you want students to be able to demonstrate as a result of experiences OUTSIDE coursework? (e.g., candidacy, writing thesis, thesis defense, professional development) At what level?

Ethics - What knowledge should students possess, related to ethics? What behaviours and values would you want students to demonstrate?

a) What knowledge would you expect students to possess, related to **ethics**, upon completion of their coursework? What behaviours and values would you want students to demonstrate upon completion of their coursework? At what level?

b) What knowledge would you expect students to possess, related to **ethics**, as a result of experiences OUTSIDE coursework? What behaviours and values would you want students to demonstrate as a result of these experiences? At what level?

Writing Learning Outcomes Using Bloom's Taxonomy and the FGSR Framework

The main components of a learning outcome are (1) the measurable verb selected from Bloom's taxonomy and (2) the specific attribute you want students to demonstrate, organized under one of the five FGSR categories.

The general structure of a program level learning outcome is as follows:

By the end of the program, students will be able to (measurable verb) + (the attribute you expect them to acquire related to knowledge, research competency, communication skills, professional capacity/autonomy, or ethics).

OR

By the end of [event / year in their program], students will be able to (measurable verb) + (the attribute you expect them to acquire related to knowledge, research competency, communication skills, professional capacity/autonomy, or ethics) + by (how they will apply their knowledge or skill/how you will assess their learning).

☑ Example of an outcome related to **Research Competency:**

By the end of the program, students will be able to:
- **Assess** strengths and weaknesses of various methodological approaches relevant to a research question.

Attribute you expect them to demonstrate:
- make judgements related to strengths and weaknesses of methodological approaches relevant to a research question.

☑ Example of an outcome related to **Communication Skills:**

Oral Communication Skills
By the end of the program, students will be able to:
- **Deliver** a clear and effective field appropriate doctoral research proposal presentation, using appropriate media, to **explore** complex and/or ambiguous ideas and issues.

Attribute(s) you expect them to demonstrate:
- clearly and effectively present a field appropriate doctoral proposal;
- appropriate use of media; and
- explore complex and/or ambiguous ideas and issues.

> ☑ Example of an outcome related to **Knowledge** (Specifically, the Awareness of Limits of Knowledge):

Awareness of Limits of Knowledge
By the end of the program, students will be able to:
- **Describe** the limitations of one's own work and discipline, of the complexity of knowledge, and of the potential contributions of other interpretations, methods, and disciplines.

Attributes / Knowledge you expect them to demonstrate:
- knowledge of one's own work and discipline is limited;
- knowledge is complex; and
- other interpretations, methods, and disciplines contribute to individual knowledge and knowledge in a discipline.

Q3 HOW CAN I CONNECT PROGRAM-LEVEL LEARNING OUTCOMES TO ASSESSMENT?

A Once you've drafted a program level learning outcome, you'll want to identify potential opportunities for assessment during the program. Outlining assessment opportunities is a critical step toward ensuring that your learning outcomes are SMART (Greenleaf, 2008). In a thesis-based program, learning outcomes may be assessed in a number of ways, for example, through:

- topic presentation and discussion during yearly supervisory committee meetings;
- the review, defence and approval of a PhD proposal by a candidacy examining committee;
- passing the candidacy examination;
- the successful completion of specific course requirements;
- successful completion of external requirements (such as Professional Development Credits or Ethics Training Modules);
- completion of research project;
- creation of creative work;
- completion, as first author, of original archival journal manuscript drafts for peer review as appropriate for the field;
- presentations to field appropriate stakeholders at national and/or international conferences, or other venues;
- completion of an IDP (Individual Development Plan);
- the defense of a Thesis; and
- other means of formative and summative assessment.

Examples

For each of the learning outcomes identified above, examples of potential methods of assessment are provided.

✅ Example of an outcome related to **Research Competency:**

Research Competency

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

- **Assess** strengths and weaknesses of various methodological approaches relevant to a research question.

Potential Methods of Assessment

Research Competency will be <u>assessed</u> and students provided with <u>regular oral and written formative feedback</u> in programs through the appropriate committee meetings, proposal and final thesis defense,specifically:

- topic presentation and discussion during yearly supervisory committee meetings;
- the review, defence and approval of a PhD proposal by a [exam committee name];
- the review, defence and approval of a PhD proposal by a [exam committee name];
- the completion, as first author, of [minimum number] original archival [means of dissemination, manuscripts, books] draft for peer review as appropriate for the field; and
- the completion of [minimum number] presentations to field appropriate stakeholders [local, national and/or international conferences,industry, clinics] in venues appropriate in the field.

  A rubric, list of assessment criteria, or other means of describing the ability to assess the strengths and weaknesses of methodological approaches will be beneficial for students and evaluators. For example lists of assessment criteria, see "Additional Assessment Resources" on page 21.

✅ Example of an outcome related to **Communication Skills:**

Oral Communication Skills

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

- **Deliver** a clear and effective field appropriate doctoral research proposal presentation, using appropriate media, to **explore** complex and/or ambiguous ideas and issues.

Potential Methods of Assessment

Communication Indicators will be <u>assessed</u> and provided <u>regular oral and written formative feedback</u> in the programs through the appropriate committee meetings, proposal and final thesis defense, and publications, specifically by:

Oral indicators:

- student successfully presented and defended orally their doctoral **research proposal**.

  A rubric, list of assessment criteria, or other means of describing the quality of an oral presentation would be beneficial for students and evaluators. For example lists of assessment criteria, see "Additional Assessment Resources" on page 21.

☑ Example of an outcome related to **Knowledge** (Specifically, the Awareness of Limits of Knowledge):

Awareness of Limits of Knowledge
By the end of the program, students will be able to:

- **Describe** the limitations of one's own work and discipline, of the complexity of knowledge, and of the potential contributions of other interpretations, methods, and disciplines.

Potential Methods of Assessment

Attributes / Knowledge you expect them to demonstrate:

- conducting field of research appropriate review of the state of the art / discipline (literature, techniques, standards, etc.);
- written (papers, proposals) and oral (presentations, candidacy, PhD defence) forms: identifying and explaining research pertinent theory, approaches, techniques, and paradigms;
- defending a PhD proposal by a candidacy examination committee; and
- the PhD defence examination.

  A rubric, list of assessment criteria, or other means of evaluating the students' ability to describe the limitations of their work / discipline and complexity of knowledge would be beneficial for students and evaluators. For example lists of assessment criteria, see "Additional Assessment Resources" on page 21.

Additional Assessment Resources: Example Expectations

*Example expectations for **research proposal** (to be integrated into a rubric):*

- the candidate will write a grant proposal that consists of:
    - (1) a one page summary; and
    - (2) a detailed research proposal.
- the proposal should include: pertinent background literature, hypothesis, rationale, and experimental design and significance, potential pitfalls and a short section of future directions;
- the research proposal should stem from the thesis research being conducted by the student. However, more than 50% of the proposal should include experiments that go beyond the current scope of experiments developed in the supervisor's lab, and be of sufficient depth to require the material input of at least two graduate students and one technician; and
- students are required to rigorously establish their ability to identify questions and design appropriate experimental approaches.

*Example expectations for **research practice** (to be integrated into a rubric):*

- students will treat their colleagues in the laboratory with respect;
- throughout their residency, students will attend departmental activities such as the 601 seminar series, other research seminars, journal clubs and other activities recommended by their supervisors;
- students will inform supervisors of if they take on additional commitments such as employment or enrollment in another program as it may constitute a conflict of commitment;
- students will follow all safety regulations imposed by the University and supervisor;
- students will take responsibility for meeting deadlines;
- students are responsible for keeping Laboratory notes according to the following:
    - laboratory notes form the basis for validation of experimental work and must be recorded diligently for experimental results to be submitted as part of a thesis and/or for publication in a scientific journal;
    - failure to keep proper laboratory notes constitutes scientific misconduct;
    - students will keep timely and detailed records of their experimental work in a laboratory notebook;
    - each page must be dated and students are expected to record all pertinent information;
    - the records must be kept for at least seven years following publication of the results;
    - laboratory notebooks remain the property of the Laboratory and all notebooks and data should always remain accessible to the principal investigator. However, with the permission of the supervisor, a student may make photocopies of the book and related electronic data to use for analyzing data and writing up results off site;
    - any confidential information must be stored in a secure manner at all times whether on campus or off;
    - supervisors may have additional requirements if protecting intellectual property is an issue; and

> - failure to keep proper notes on experimental work should be brought up at supervisory committee meetings by the supervisor and is sufficient for a supervisory committee to deem the progress in research unsatisfactory. Once the student has received a warning, if the situation is not rectified in a timely fashion, it will be forwarded to the appropriate authority as a breach of scientific ethics in addition to being cause for the department to recommend termination of the program to FGSR.

*Example expectations for **candidacy exam** (to be integrated into a rubric):*

- the purpose of the candidacy exam is for students to demonstrate to the satisfaction of the examining committee that they possess:
    - an adequate knowledge of the discipline and of the subject matter relevant to the thesis;
    - the ability to pursue and complete original research at an advanced level; and
    - the ability to meet any other requirements found in the department's published policy on candidacy examinations.
- students should not go into the oral portion determined to merely "defend" their proposal, but be open to improving their approaches according to discussions that arise during the candidacy;
- students should be able to identify an important question and formulate a testable hypothesis;
- students should have the ability to assess experimental data. The proposal should be based on solid data and not a single, poorly controlled experiment or published paper. The student should be able to assess the quality of published data referred to in their proposal;
- students should be familiar with the references that they cite in their proposal. For references to methods, as well as unreferenced methods, students should be aware of the technical requirements, strengths and weaknesses, and be able to defend the selection of method(s) in comparison to alternatives. Students should be aware that they should never cite a reference that they have never read;
- students should clearly understand and outline the rationale for their chosen approaches (over alternative possibilities);
- students should demonstrate experimental design capability. The majority of the experiments that they propose should be feasible and lead to interpretable results. The experiments should also address the proposed hypothesis and extend the knowledge of the field;
- students are expected to consider multiple possibilities for their research question, and multiple possible outcomes for their experiments;
- students should be able to analyze data. They should also be able to predict possible outcomes of experiments and identify possible interpretations of these experiments;
- students should be able to describe basic concepts in their field and display breadth of knowledge;
- students should know the value of mixing both "safe/somewhat predictable" and "risky/exploratory" directions;
- students should have effective communication skills;

- examiners always try to find the extent of the students' knowledge to determine if they are able to "think on their feet". It is understood that the student will not know all of the answers to the questions, but they should be able to make predictions based on what they know about other related systems; and
- students should appreciate differences between direct and indirect effects, and correlative vs. causal relationships.

*Example expectations for **oral thesis defence presentation** (to be integrated into a rubric):*

- student does not recite information, but rather thinks "on their feet" calling upon their knowledge base when necessary;
- student is able to answer more general questions in their research area;
- student identifies important questions, generates hypotheses, proposes experiments to test hypotheses, and interprets data, demonstrating basic knowledge to do this effectively without being encyclopedic (memorized); and
- student is able to apply reading about primary research papers, why experiments were done, what experiments might be done to better answer the question, and what next steps might be within the oral defence examination.

*Example expectations for **supervisory committee meeting report** (to be integrated into a rubric):*

- the purpose of the report is to provide the student with practice in writing succinctly about their research, provide the committee with background and a record of the student's progress to date;
- the report should be given to the Supervisory Committee and the Graduate Administrator 7 days before the meeting;
- the report should be a maximum of 4 pages in length and deal succinctly with the following issues:
  - background;
  - project objectives;
  - hypotheses being tested since the last meeting;
  - summary of research progress;
  - difficulties or issues that have impeded progress (if any);
  - hypotheses to be tested in next 6-12 months;
  - append list of courses taken (or being taken) with grade attained; and
  - copies of title page and abstract of any published papers, submitted manuscripts or abstracts written since last meeting.

TRY IT: WRITING PROGRAM LEVEL LEARNING OUTCOMES & CONNECTED METHODS OF ASSESSMENT

Writing Program Level Learning Outcomes & Connected Methods of Assessment
Reflect on your overall program. Identify a knowledge, skill or attitude that graduates of your program will need to demonstrate (draw from the examples you generated in the "TRY IT: Brainstorming Attributes Related to Your Program, above).

1) Using the instructions found above, write one program-level learning outcome which spans the entire program of study. Use the format *By the end of the program, students will be able to* (measurable verb) + (the attribute you expect them to demonstrate related to knowledge, research competency, communication skills, professional capacity/autonomy, or ethics).

2) Next, identify potential ways this would be assessed in your program. These could relate to coursework or formative or summative evaluations outside of coursework. In the table below, list potential methods of assessment (*what* is the form of evidence?), the criteria for assessment (*how* students will be assessed), who will be making the assessment, and *when*.

Learning Outcome	**What** is the form of evidence?	**How** will students be assessed?	**Who** will be making the assessment?	**When** will the assessment take place?
E.g., Oral communication skills: **deliver** a clear and effective field appropriate doctoral **research proposal** presentation, using appropriate media, to **explore** complex and/or ambiguous ideas and issues.	Doctoral research proposal presentation	Candidacy Examination (with developed rubric)	Examination Committee	By the end of the third year of study

EXERCISE

3) Finally, identify if rubrics or other means of clarifying assessment may be needed for this learning outcome. If so, list this here (for development at a later date):

Double check:
- can graduates demonstrate it?
- does it focus on the results of the learning experiences (not the means or the process)?
- does it describe learning which will be common to all graduates of a program?
- does it reflect broad conceptual knowledge or adaptive vocational & generic skills and focus on the enduring understanding within a field or discipline?
- does it represent the minimum performance which must be achieved to successfully complete a program?
- does it demonstrate alignment with external accreditation and university mission?

SECTION 3

The Process of Developing Learning Outcomes in Thesis-Based Programs

Q1 **NOW THAT YOU KNOW WHY YOU WANT TO DEVELOP LEARNING OUTCOMES FOR YOUR PROGRAM, HOW DO YOU GO ABOUT DOING IT?**
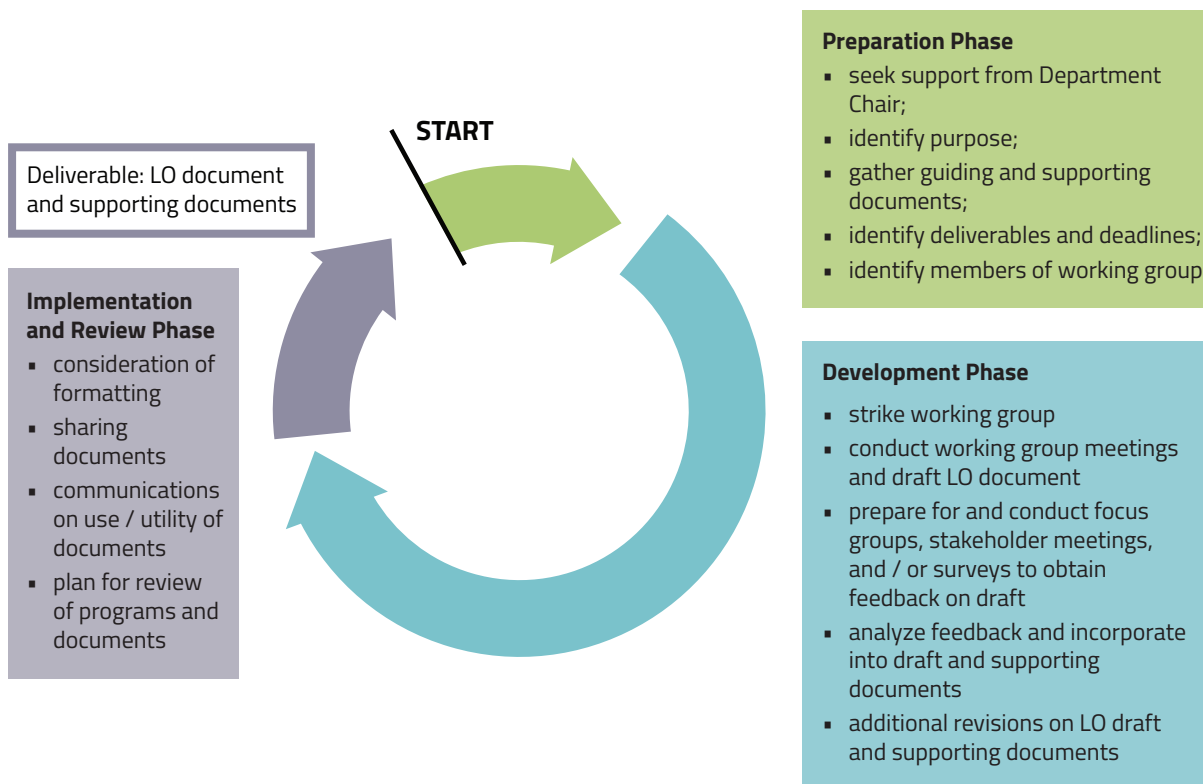
A This section provides you with information and the tools you need to help you undertake this work, from preparation and development to implementation and review. It is based on the experiences and expertise of faculty at the University of Alberta who have undertaken this process with their departments. It is worth noting that different departments and programs work within the context of their own circumstances, timelines, and resources and hence this process will be unique for each program. As such, this section should be considered a guideline for your consideration and reference rather than a strict set of steps to follow. For more information and support in this process, please contact the Centre for Teaching and Learning or the Associate Dean of Teaching and Learning at the Faculty of Graduate Studies and Research.

Overview

In general, you can expect a timeline of approximately six months from initiating this work to finalizing your program learning outcomes and supporting documents (though this depends on a number of factors, some of which are identified below). To be successfully adopted by the faculty and students, you will need to establish support from the beginning: likely through the Chair of the Department endorsing the project and approval of department council or relevant committee. The work might be done as a project for a graduate or education committee or by striking a working group. It would be reasonable to expect that you would require a working group of a minimum of 2 (but ideally 4-8) faculty members and 2 or more students or recent alumni who could commit time to drafting and revising learning outcomes over that six month period. You will need to gather together documentation about your current program (courses, requirements) and any accreditation requirements, as described in more detail below. Remind the committee that while the program should meet the minimum standards set out in the frameworks from FGSR and the Provincial Government, programs may have higher standards or additional outcomes that should be described in the Program Learning Outcomes. Programs that accredit with external bodies may also have other templates available to them and may also wish to demonstrate alignment with the FGSR credential framework differently / using a different template.

You should expect to conduct focus groups or get feedback in another form from faculty, alumni, current graduate students, and stakeholders related to your program or field. Your learning outcome document may go through multiple revisions before it is 'finalized' and shared with students, faculty, and the general public electronically (website) or through other means. We would caution you that no learning outcome document should be considered 'final' as programs should review their learning outcomes on a regular basis (at a minimum, every 7 years). Regular review of program learning outcomes can help to ensure outcomes align with what the program offers as well as the knowledge, skills and attributes that are required for graduates of that program to succeed in their field. More detail on all of these areas are provided in the sections below.

START

Deliverable: LO document and supporting documents

Preparation Phase
- seek support from Department Chair;
- identify purpose;
- gather guiding and supporting documents;
- identify deliverables and deadlines;
- identify members of working group

Implementation and Review Phase
- consideration of formatting
- sharing documents
- communications on use / utility of documents
- plan for review of programs and documents

Development Phase
- strike working group
- conduct working group meetings and draft LO document
- prepare for and conduct focus groups, stakeholder meetings, and / or surveys to obtain feedback on draft
- analyze feedback and incorporate into draft and supporting documents
- additional revisions on LO draft and supporting documents

Preparation

As you begin to prepare for this process, you may find it helpful to consider undertaking the following:

1. Seek support from your Department Chair to undertake work on program learning outcomes and acquire approval to strike a working group or committee.

2. Create a shared drive or document to gather information and relevant links in one place (Note, as you work through the suggestions below, you may find it useful to copy the template provided): *__Template: Preparation for Defining Learning Outcomes__*);

3. Draft a brief but clear description the purpose of developing learning outcomes.

You want to have a clear message about *what* learning outcomes are and *why* defining them for your program is important. (Note that Section 1 of this document can support you in this). You will share this rationale with faculty, students,stakeholders and others as you embark on this process. As one U of A Faculty member advised regarding this process "*...expect resistance and questions; be prepared with reasons why it's important to undertake this work so you can answer these questions. Believe this is important work. Find someone else if you can't convince yourself that this is worthwhile.*"

4. Gather together guiding documents.

In particular, you should consider guidelines for your program outlined by:

- The Government of Alberta (Alberta Credential Framework);
- *PhD Program Learning Outcomes Template* or the *Master's Program Learning Outcomes Template* - these provide Learning Outcomes that support the Alberta Credential Framework as well as blank spaces to indicate program-specific LO's and connected assessments;
- University Calendar FGSR Learning Outcomes Entry;
- University Calendar Description of the Program and other University Calendar Requirements; and
- Other governing or accrediting bodies specific to your area (professional organizations, etc).

5. Gather together supporting documents and exemplars.

Look for documents that can help you answer the questions "What do you know about your program?" "What could a learning outcome document look like?" In particular, you may find the following useful:

- Section 2 of this document (How to write learning outcomes);
- your current program description in the Calendar, as well as goals, and learning outcomes (if any);
- a list of required courses for the program (including titles, descriptions, and course learning outcomes, if possible);
- the list of requirements in addition to courses (ethics, PD, seminar series, exams, teaching experience etc.);
- program specific guidelines for examinations;
- Program Guidelines or Handbook, if available;
- PhD Program Learning Outcomes Template with suggestions (may serve as a source of information / inspiration for wording around program specific learning outcomes);
- exemplars of other U of A program learning outcomes that support the FGSR learning outcomes (e.g., PhD: Engineering, Medical Microbiology and Immunology); and
- learning outcomes from similar programs at other institutions, if available.

6. Outline overall deliverables and deadlines.

- Identify specific deliverables. This would include your learning outcome document but could also include evaluation rubrics, guides for facilitators and students on how to read and use learning outcomes, a spreadsheet or document that maps program requirements (courses, etc) to program learning outcomes, and other documents.
- Set out a reasonable timeline for the completed learning outcome document and supporting documents, based on your timelines (e.g., accreditation requirements, schedules of faculty, etc). As a guideline, others who have conducted this work at the U of A suggest it would be reasonable to complete in six months. (Some programs completed this in less time when required to meet accreditation requirements, but suggested more time would have allowed more consultation and review).

7. Draft a list of faculty in the department / related to the program who could potentially collaborate with you on this work.

- Ideally, you would aim to have over 50% of your faculty involved in some way in the process of drafting / revising your learning outcomes, though this may not always be possible.
- A working group of between 2-8 faculty and 2 or more students and/or recent alumni could be identified who would be willing to take on the bulk of the initial work drafting learning outcomes before seeking input from others (faculty; students, alumni, stakeholders).
- All faculty in the department should be given the opportunity for input before learning outcomes are finalized.

8. Enlist other supports.

- Consider contacting the **Centre for Teaching and Learning (CTL)** for support with this process. CTL can provide assistance with developing wording around learning outcomes, conducting focus groups or surveys to obtain feedback on draft learning outcomes, connecting learning outcomes to assessments, generating rubrics or other evaluation tools that support your learning outcomes, ensuring alignment between program level and course level learning outcomes, and more.
- Consider contacting the **Associate Dean of Teaching and Learning** at the Faculty of Graduate Studies and Research to connect with other faculty who have gone through the process of developing learning outcomes for their programs.

Development

Once you have gathered together necessary documentation, you can move to the development phase. In this phase, you can expect to undertake a number of tasks around drafting, revising, and finalizing your learning outcomes document. This would likely include striking a learning outcomes working group and meeting regularly, additional meetings with broader faculty in your department to seek input and feedback, and conducting focus groups, surveys or seeking another means of feedback on learning outcome drafts from faculty, students, graduates, stakeholders and employers. This section offers some tips and suggestions on how to move through this process. For a sample timeline, please refer to this template (Feel free to copy this timeline and adapt it to suit your needs).

1. Strike a learning outcomes working group and schedule an initial meeting.

Once you have a list of faculty (and ideally several students or recent alumni) who may be interested in participating in drafting learning outcomes, schedule an initial meeting to provide more information and get a better sense of how individuals can / would like to be involved. The objectives of this initial meeting are to familiarize the working group with the project, including deliverables and timeline, determine the level of involvement of members of the group, and schedule future meetings.

Relevant handouts or supporting documents for this meeting include:

- a document providing background information on what learning outcomes are / why you are undertaking this work (*See Template for Programs: Preparation - Defining Learning Outcomes* for example);
- Section 2 of this document (How to Write Learning Outcomes);
- *PhD Program Learning Outcomes Template* or the *Master's Program Learning Outcomes Template* (electronic form and / or paper copies);
- sample content – *PhD Program Learning Outcomes Template with suggestions* and / or;
- exemplars of other U of A program learning outcomes that support the FGSR learning outcomes (e.g., PhD - Engineering, Medical Microbiology and Immunology).
- examples of learning outcomes from programs similar to yours at different institutions; and
- other documentation that describes your particular program (Calendar; course descriptions, course learning outcomes, etc).

During this initial meeting, you may want to::

- provide relevant background information on what learning outcomes are / why you are undertaking this work;
- identify frameworks (e.g., Alberta Credential Framework; FGSR LO's Framework, others) that will guide your work. Explain how you will use the FGSR Framework (Master's or PhD) as your starting point and will add to this document to outline program specific learning outcomes and assessment methods;
- share information gathered that help describe your program ("What do we know about our program?") Seek ideas on other documents that could be added to help describe the program / its aims;
- share one or two examples of learning outcomes frameworks or sample wording;
- identify the proposed timeline for the completion of the learning outcomes document;
- identify other deliverables, if any (e.g., supporting documents, rubrics). This may be an area of discussion among faculty and could also be addressed in more detail in a future meeting;
- answer questions / note questions that come up;
- determine faculty member's availability for involvement, moving forward over the timeline of the project (~6 months);
- if time, have faculty begin to review documentation and consider drafting learning outcomes;
- schedule next meeting (ideally within a few weeks time) and additional meetings, if possible (see sample timeline for example of number and frequency of meetings); and
- suggest working group members familiarize themselves with necessary documentation and come to the next meeting prepared to begin drafting LO's (provide Section 2 of this document for reference).

2. Schedule a second LO working group meeting to begin / continue drafting outcomes.

In this second meeting with your working group, you will review relevant documents and begin drafting learning outcomes for your program. You may find it most effective to schedule a longer meeting (2 - 3 hours). The goal of this meeting would be to develop an initial draft of your program specific learning outcomes (or complete as much work on this as possible).

Relevant handouts or supporting documents for this meeting include:

- FGSR LO template: _PhD Program Learning Outcomes Template_ or the _Master's Program Learning Outcomes Template_ (electronic form and / or paper copies);
- Section 2 of this document (Writing Learning Outcomes);
- sample content - _PhD Program Learning Outcomes Template with suggestions_ and / or;
- exemplars of other U of A program learning outcomes that support the FGSR learning outcomes (e.g., PhD - Engineering, Medical Microbiology and Immunology).;
- examples of learning outcomes from programs similar to yours at different institutions; and
- other documentation that describes your particular program (Calendar; course descriptions, course learning outcomes, existing rubrics for candidacy exams or thesis defense, etc).

During this meeting you may want to:

- brainstorm, as a group, the key knowledge, skills or attributes you would expect graduates of your program to possess. At this stage, the exact phrasing isn't as important as generating ideas and starting discussion. You may want to work through Section 2 in this document (Writing Learning Outcomes) or pose questions such as:
    - what characteristics would describe a graduate of this program?
    - what knowledge would they possess? What skills? What attitudes?
    - what type of work would a graduate of our program to be able to do?
    - at what stage of the program are the skills expected and assessed?
    - how is feedback provided to students for each program requirement?
    - what are the key knowledge, skills, or attitudes that should be demonstrated in a candidacy exam?
    - what are the key knowledge, skills, or attitudes that should be demonstrated in a thesis? (written work)
    - what are the key knowledge, skills, or attitudes that should be demonstrated in a thesis defense?
- briefly review:
    - what a learning outcome is and how learning outcomes are typically written (see Section 2 of this document);
    - the FGSR LO template that you will be using / modifying (Master's or PhD); and
    - relevant documentation that helps describe your program (calendar description, course descriptions, etc - from previous meeting).
- additional questions you may want to pose during this meeting:
    - are there any outcomes from the template that do not 'fit' or make sense in the context of our program, as they are currently written? (highlight these in the template);
    - what is 'missing' from the FGSR LO template that encapsulates our program? (i.e. what needs to be added)?
    - what wording from the template needs to be modified to suit our program? How might you phrase it?
- depending on the size of your group, you may want to break into smaller sub-groups to work on learning outcomes in the five specific areas defined in the FGSR LO template (Knowledge, Research Competency, Communication Skills, Professional Capacity / Autonomy, and Ethics), or you may want to work through the entire document together.

- compile a draft document at the end of the meeting (if people are working on multiple documents at once or hand writing their outcomes) or keep a single draft document that you can edit (perhaps a google document, which allows multiple people to edit the document in real-time).

- schedule your third LO Working Group Meeting (ideally within the next few weeks) to continue working on drafting your program specific learning outcomes and prepare for focus groups / stakeholder meetings.

3. Schedule a third LO working group meeting to finish a draft of outcomes and prepare for focus groups / stakeholder meetings.

In this meeting with your working group, you will finalize your initial draft of your LO document and make a plan for obtaining feedback on your draft. You may find it most effective to schedule a longer meeting (2 - 3 hours). By the end of this meeting, you would want to have a draft of your LO document that is ready to print/ share with others (focus groups, surveys, etc) and have a plan / assigned tasks to your group regarding obtaining feedback from students / graduates / stakeholders / employers.

Relevant handouts or supporting documents for this meeting include:
- your Program LO Draft, developed in the previous meeting (adapted from FGSR LO Template, either Master's or PhD) - in electronic form and / or paper copies;
- supporting documents from the previous meeting, as needed;
- a document or template to outline the consultation plan and identify timelines / assigned tasks (See Template: *Student Consultation Plan*);
- *Faculty Consultation - Questions*
- *Employer / Stakeholder Consultation - Questions*

During this meeting you may want to:
- review your progress on your LO Draft document; continue drafting or revising as needed / based on discussion;
- finalize your 'draft' document and prepare a copy to share with focus groups / stakeholder meetings;
- formulate a plan for obtaining feedback on your draft document. This will likely include consideration of:
  - who you want to obtain feedback from (students, graduates, stakeholders, employers, others?);
  - how you would want to obtain feedback from each of these groups (surveys, focus groups, meetings, other methods, or some combination of these)? *Note you may want to conduct meetings / focus groups with each of these groups separately (i.e. a students only session, a graduates only session, etc);
  - how many participants you would like to recruit from each group?
  - how will you go about connecting with / recruiting participants for feedback?
  - what questions do you want to ask each group?;
  - who will organize and run focus groups / surveys etc. How will you divide the work? What other sources / supports can you leverage? (i.e administratie support in booking rooms, etc). Who will provide summaries of focus groups / survey results to the group?

- *who will be responsible for drafting a summary of the feedback to provide to the working group?*
- assign tasks related to feedback process and schedule next meeting.

> **Deliverable: Draft #1**
> Prior to conducting meetings /focus groups / surveys, you will need your first draft of the learning outcomes document in a format that will be easy to share (electronically, print, or both).

4. Conduct meetings / focus groups / surveys with stakeholders, employers, graduates and students.

Depending on what your working group decides, this process could involve a number of means of data collection with a variety of groups. Some general tips to consider:

- if you generate a survey, you may want to look for feedback on a selection of learning outcomes only (rather than the entire document), in order to ensure the length of the survey is reasonable;
- you will likely need to connect with student groups / listservs to help distribute a survey to as many students in the program as possible (graduate student associations, etc);
- conduct meetings / focus groups with different groups (students, graduates, employers) separately, at least initially. Students may be more comfortable discussing their feelings / thoughts among their peers than in front of faculty or others;
- it may be helpful to have two individuals from the working group conduct each of the focus groups. This allows one person to facilitate discussion and the other to take notes;
- ensure feedback is anonymous. Surveys should be anonymous. Notes from meetings/ focus groups could identify the number of participants and general characteristics, if relevant (e.g., graduated from program 5 years ago) but should not identify individuals specifically;
- do not assume that participants will know what a learning outcome is. Expect to provide some background on what learning outcomes are, and the benefits of having them clearly outlined; and
- explain that the purpose of the meeting / focus group / survey is to get their feedback on the program specific learning outcomes / assessment methods that are being drafted.

Documents or supports you may find useful in planning / preparing for feedback:
- *Student Consultation Plan - Template*
- *Faculty Consultation - Questions*
- *Employer / Stakeholder Consultation - Questions*

5. Summarize feedback and share with working group members.

After meetings / focus groups / surveys have been completed, you will want to provide a concise summary of this feedback for your working group, so that feedback can be taken into consideration, discussed, and your draft can be revised. The way in which you present information to your working group is entirely up to you, however you may find the following general tips useful:

- keep your summary document / documents concise. Highlight and emphasize the major themes of the feedback and provide a few relevant examples or quotes, if you feel they help to illustrate or clarify the theme. You can take more time to discuss or elaborate on the feedback during a meeting.

- you may want to separate feedback from each group (stakeholders, employers, graduates and students) in to separate documents or combine feedback from all groups and organize it around themes, with relevant points from each group under each theme.

- when summarizing survey results, you may find images (pie charts, graphs, etc) useful to convey information while minimizing reading time.

- after providing a summary of the feedback, highlight the implications for the working group / draft LO document. I.e. *"What does this feedback mean?" "What changes to the document might be necessary in response to this feedback?"*

- if possible, propose changes on a new copy/version of the LO document / supporting documents in preparation for the working group meeting.

6. Schedule LO working group meeting (or meetings) to incorporate feedback and revise LO's / supporting documents.

In this meeting or meetings with your working group, you will aim to incorporate feedback into Draft #2 of your LO document and work on revising drafts of supporting documents (if any). You may find it most effective to schedule a long meeting (2 - 3 hours) to provide enough time to review feedback and discuss changes to the document. If additional meetings are necessary, they could then be scheduled. The aim of this meeting/series of meetings would be to have a Draft #2 of your LO document and supporting documents ready to present to faculty (and others, if desired) for review, and to plan how you will seek faculty feedback.

Relevant handouts or supporting documents for this meeting include:
- summary documents that describe feedback on Draft #1 from meetings / focus groups / surveys with stakeholders, employers, graduates and students; draft #1 of LO document and suggestions / revisions for the draft, based on feedback; and
- drafts of supporting documents, as applicable.

During this meeting / meetings you may want to:
- have the working group members who summarized feedback from the surveys, meetings or focus group present on this feedback and the key implications for the learning outcome document / supporting documents;
- allocate time for discussion and clarification of this feedback;
- work as a large group (or in smaller sub-groups) on incorporating the feedback in to the LO draft;
- work as a large group (or in smaller sub-groups) on incorporating the feedback in to supporting documents, as applicable;
- have the working group agree upon and finalize the LO Draft (Draft #2);
- discuss next steps for the LO Draft and supporting documents (Is an additional meeting necessary to complete revisions?); and
- discuss how you will obtain feedback on Draft #2 (as applicable - with faculty or others).

Deliverables: Draft #2 and Supporting Document Drafts

This Learning Outcome draft incorporates feedback from focus groups / meetings / stakeholders and will be presented to faculty (and potentially others) for another review prior to being finalized.

Supporting documents could include faculty or student guides, example rubrics, etc.

7. Share Draft #2 / Supporting Documents with Faculty (and potentially others) for their input and review.

Once the LO Draft has been revised by the working group to incorporate feedback, it is important to seek additional feedback on this new draft (Draft #2) from faculty in your department / program prior to finalizing the LO document and preparing it to be shared widely. You may also want to seek feedback from stakeholders, employers, graduates and students, depending on how much your LO document was revised and other factors such as time and availability of the working group members to organize additional feedback opportunities.

The focus of review at this stage would be around *clarity* (are outcomes and connected assessments clear?) rather than on specific content (wording) of outcomes. You could use a number of means to seek this feedback (meetings / focus groups / surveys), depending on your timeline and the particular questions you have. See above **(#4)** for some tips related to seeking feedback.

8. Schedule a LO working group meeting to incorporate any additional feedback and revise draft.

The aim of this working group meeting would be to finalize your draft LO document and make decisions around how your document will be formatted and shared.

During this meeting you may want to:
- set aside the first portion of the meeting for revisions on the LO document draft;
- undertake discussion around how you might like the final document to look (layout, fonts, graphics);
- perhaps create one or more format mock-ups with portions of the document; and
- decide where you might go for support with formatting, if needed.

Deliverables: Draft #3 (Finalized Draft) and Supporting Documents

This Learning Outcome draft (while perhaps yet to undergo formatting changes) has the finalized learning outcomes and connected assessment identified.

Supporting documents could include faculty or student guides, example rubrics, etc.

Implementation & Review

In this final phase, you will implement and share your LO document and supporting documents with faculty, students, prospective students, and others, as appropriate. You will also want to put a plan in place for regular review of your learning outcomes document and supporting documents (such as student or faculty guides, assessment rubrics, etc). Some considerations during this phase are described below.

1. Implementation

Related to formatting your final documents, you will want to consider:

- will you want both digital and printed copies?
- how should documents be formatted to support this? (PDF, word files, other format?)

Where and how will your final documents be shared?

- for prospective students, we encourage the creation of a summarized and visually appealing version of the learning outcome information. This version could be shared as a handout during recruitment events and on your program webpage for prospective students.
- for faculty and current students, we suggest documents, at a minimum, are shared on your department webpage where program details are detailed.
- if possible, the University Calendar description of your program could link to the webpage containing the LO document and other supporting documents.
- documents should be shared widely with faculty in your program and faculty should be encouraged to become familiar with the LO document and accompanying faculty guide (if developed). In particular, faculty would be encouraged to use the document to:
    - support students they are supervising by frequently reviewing the learning outcomes document with their students to ensure students are progressing through the program, understand expectations, and understand how they will be assessed (for more on this, see Section 1 of this document);
    - ensure the learning outcomes for the graduate level courses they instruct support broader program outcomes;
    - communicate with faculty who are new to the program and / or may serve as arm's length examiners about the expectations of the program; and
    - communicate with others when graduate students are engaging in interdisciplinary research and creating individualized interdisciplinary programs.
- the LO document and supporting documents (rubrics, student guides, etc) should be easily accessible to students (online) and the importance / utility of these documents should be described during orientation sessions, supervisor meetings, etc. Students should have a clear sense of what the learning outcome document means to them and how they can use it to support their success in the program (For more information on this, see Section 1 of this document).

2. Program Review and Improvement

As described in greater detail in Section 1, graduate student supervisors, evaluators (instructors and committee members), and departments can use learning outcomes to:

- undertake program planning/ review a current program (at least every 7 years during quality assurance review of the program, but more often as needed);
- determine which outcomes fall outside of course offerings and ensure students are supported to meet these outcomes, either through the department or the institution;
- evaluate whether students in a program are meeting or failing to meet specific outcomes to determine where and how the program could be improved;
- develop or revise supporting documentation for supervisors (background information on learning outcomes, outline roles and responsibilities as a supervisor in helping students meet outcomes);
- develop or revise supporting documentation for students (background information on learning outcomes, outline student and instructor roles and responsibilities in ensuring students meet outcomes); and
- develop or revise clear and transparent assessments which are directly tied to program learning outcomes (rubrics for supervisory committee meetings, exams, etc) and ensure as much information as possible about the nature of these assessments is shared with students in the program (for example, sharing evaluation rubrics or exemplars).

SECTION 4

Reference Documents and Supports

Reference Documents and Supports

- **Guiding Documents for Developing LO's in PhD Programs at the University of Alberta**
    - Government of Alberta - Alberta Credential Framework
    - Calendar Description of your program
    - *PhD Program Learning Outcomes Template* or the *Master's Program Learning Outcomes Template*
    - Sample content - *PhD Program Learning Outcomes Template with suggestions*
    - U of A Example LO documents
        - *PhD: Mechanical Engineering*
        - *PhD: Medical Microbiology and Immunology*
    - CAQC site https://caqc.alberta.ca/

- **Additional University of Alberta Calendar Links / Requirements:**

    Masters
    - *Supervision and Supervisory Committee*
    - The *Thesis Requirements* or equivalent
    - *The Final Examination*
    - *Academic Integrity and Ethics Training Requirement*
    - *Professional Development Requirement*
    - *Residency Requirements are monitored by the department*
    - *Course Requirements, as applicable*

    PhD
    - *Annual Supervisory Committee Meetings*
    - *The Candidacy*
    - The *Thesis Requirements* or equivalent
    - *The Final Doctoral Examination*
    - *Academic Integrity and Ethics Training Requirement*
    - *Professional Development Requirement*
    - *Residency Requirement*
    - *Course Requirements, as applicable*

- **Additional Documents**
    - *Template: Preparation for Defining Learning Outcomes*
    - *Potential Timeline for Drafting Learning Outcomes*
    - *Student Consultation Plan Template*
    - *Faculty Consultation - Questions*
    - *Employer / Stakeholder Consultation - Questions*

- **Supports and Contacts:**
    - FGSR Associate Dean Teaching and Learning
    - Centre for Teaching and Learning

Acknowledgements

Glossary

Formative assessment

Formative assessment occurs throughout a course, may be informal or formal, is considered low-stakes, and provides learners with opportunities to receive feedback in order to make improvements.

Summative assessment

Summative assessment occurs at the end of a period of instruction, may be cumulative, considered high-stakes (e.g. final exam) and is used to evaluate student learning and to assign a grade.

KSAs or Knowledge, Skills, and Attitudes

KSAs refer to the specific knowledge, skills and attitudes that an instructor would like students to learn and demonstrate. Knowledge refers to the types of thinking that an instructor wants their students to do or the knowledge that they want them to acquire. Skills refers to abilities instructors want students to be able to perform at a given level. Attitudes refer to the feelings, values, appreciations, motivations, or priorities an instructor wants to stimulate in their students.

Learning Outcomes (LO's)

Learning outcomes are clear statements that indicate "what a learner is expected to know, understand and/or be able to demonstrate after the completion of a process of learning" (Kennedy, 2006, p. 5). They are statements that focus on the learners achievements. Because they are tied to assessment, they only describe the essential learning that students need to demonstrate at the end of a program, course, unit/module, or lesson. With each level, the learning outcomes that students are expected to meet becomes more and more specific. Learning outcomes support the overall goals or objectives of the course/program.

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