

This version contains only Sections 1 & 2
including Final Thoughts, Acknowledgements, Glossary and Bibliography

A Guide to Learning Outcomes at the University of Alberta

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FOREWORD

by Steven Dew, Ph.D.
Provost and Vice-President (Acad)

I am pleased to see this resource coming from the Centre for Teaching and Learning. The work to develop and implement learning outcomes is ongoing at the University of Alberta. I have seen a strong desire to learn more about the advantages of learning outcomes for students, faculty and administrators from across the University. The tools in this document will support the work to develop learning outcomes at the course and program level, and the assessment of learning outcomes.

As Provost and Vice-President (Academic), I see much value in the transparency that learning outcomes provide. This transparency is valued by students, who appreciate the understanding of what their program and what their degree will allow them to do. Learning outcomes are also useful for course design and delivery, providing a rational approach to lesson and activity design, sequencing and evaluation. Finally, learning outcomes are important for our external stakeholders, they let potential students, employers, government and community members see and understand the knowledge, skills and attitudes our graduates will possess.

At the University of Alberta, proposals for new programs are already required to articulate Program Learning Outcomes for Ministerial and Quality Assurance purposes. Our provincial context and the national and international move towards implementing learning outcomes are important factors for us to consider.

In closing, using learning outcomes represents a change to education but only if they are used and assessed in an authentic manner and seen as a valuable process. I hope this tool will serve you well and I'd like to thank CTL for their leadership in this area.

STUDENTS' UNION PREFACE

by Shane Scott
VP Academic, Students' Union (Fall 2017)

As a representative of University of Alberta Undergraduate Students I will be the first to express my excitement about the creation of a document on learning outcomes. These outcomes are ultimately a tool for both instructors and students alike to use when navigating a course. At their core, learning outcomes are intended to improve the learning experience of students through a clear description of the competencies and skills that students are supposed to take away from a course. Put simply, helping us understand how courses complement our degree, what skills we are supposed to be learning and what the end goals are, will not only improve our experience but also help us learn.

To those of you who are exploring learning outcomes - be it as beginners or veterans - I applaud you. Thank you for taking the time to guide students on their learning journey in a transparent, succinct way.

EDITOR'S PREFACE

by Janice Miller-Young, Ph.D.
Academic Director, Centre for Teaching and Learning

Learning outcomes are direct statements that describe the essential knowledge and abilities that students should possess, and the depth of learning that is expected upon completion of a course or program. For instructors, defining outcomes requires a shift in thinking away from the topics and content they want to cover, to the things they want learners to be able to *do* with that content. This is an important shift since learners don't automatically do the same thing with new information that experts do. Therefore, well-written learning outcomes are a useful guide for students to help them understand the learning goals and self-monitor their own learning in a course or program. Having clarity on what they want students to *do* can also help instructors to design an appropriate variety of activities, assessment methods and criteria, which is especially useful when they are designing a course which is quite different from what they have taken or taught in the past. Note that pre-written learning outcomes statements are only meant to describe the essential learning in a course - they do NOT prevent an instructor from teaching in a way they think is appropriate for them and their students, nor do they prevent them from having flexibility in their courses or even co-developing additional learning outcomes with their students. As this document demonstrates, well articulated learning outcomes at the course level are useful for program planning and review as well.

It is true that a learning outcome, no matter how well written, is a simplistic way to describe the messy, nonlinear, and challenging learning process that we as teachers attempt to guide our students through. Reducing complex, messy things to simplistic models is not an approach that all disciplines like to use, I realize. My own engineering-influenced perspective is that the models we use to describe the ways of the universe are necessarily more simplistic than reality. But if we acknowledge their limitations and use them appropriately, they can be extremely useful.

So for those who are writing or revising learning outcomes, we offer this guide as a helpful first step. CTL staff are also available to consult with individual instructors who wish to write/review their course learning outcomes. Further, should a department or faculty wish to review their curriculum for alignment and coherence, sequencing and continuity of student learning outcomes across a program, and the like, CTL's faculty and staff are able to provide counsel to guide the process.



GETTING STARTED

HOW TO USE THIS GUIDE

This introductory guide has been designed to be used flexibly to meet a wide variety of needs. We recognize that not everyone is at the same stage in their thinking about learning outcomes nor may they need to approach learning outcomes in the same way. You may find that certain approaches, suggestions, and ideas resonate and work for you or you may wish to modify them to meet your specific needs.

The document is comprised of the following sections. Each section corresponds to a possible action that you can take with respect to learning outcomes.

Do you want to:

1. Get an introduction to learning outcomes; learn what they are, and why and when you might use them.
2. Consider learner needs and characteristics, course level, and program structure before writing learning outcomes.
3. Learn how to write learning outcomes well.
4. Write course and unit level learning outcomes starting with knowledge, skills, and attitudes.
5. Revise or evaluate your course using learning outcomes.
6. Write program level outcomes.
7. Assess program level outcomes and create a curricular map.

GIVE IT A TRY

For each action you can:

- Read a scenario and learn from others' experiences;
- Get answers to key questions, and suggestions to consider for your own context and needs.

SECTION 1

DEFINITIONS AND CONSIDERATIONS

- 1. Introduction to Learning outcomes**
- 2. Before You Begin**

DEFINITIONS AND CONSIDERATIONS

1

Introduction to learning outcomes

SCENARIO



IDENTIFYING ENDURING UNDERSTANDINGS

Tanya has been assigned to work with an educational developer to design a new course titled “Coaching and Mentoring” with the Faculty of Extension at the University of Alberta. The course will be one out of a total of 6 courses for a new certificate program in Leadership. The course is primarily intended to focus on coaching, while providing a brief introduction to mentoring.

Tanya has been asked to submit a list of learning outcomes along with her course syllabus. The educational developer helping to design the course sent an email requesting a list of learning outcomes that Tanya would like students to meet upon completion of the course so they could review them at their first meeting.

New to writing learning outcomes, Tanya is open to all of the guidance that she can get.

Attached to the email, Tanya finds a brief set of instructions on how to write learning outcomes along with a list of suggested verbs. Tanya brainstorms a comprehensive list of skills someone hoping to become a coach or mentor would need and writes a total of 47 learning outcomes.

At their first meeting, the educational developer reviews Tanya’s learning outcomes, sets them aside and asks two questions:

Ultimately, once the course is over, what is the most essential thing you want learners to be able to know or do? What is the single most important enduring understanding?

GETTING CLEAR ON THE DESTINATION

Learning outcomes are 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 et al. 2006, p. 5). Put another way, learning outcomes specify the “knowledge, skills, attitudes, competencies and habits of mind” (Lesch, 2012) that students need to demonstrate by the end of a program, course, or unit. With each level, the learning outcomes that students are expected to meet become more and more specific.

As instructors and mentors, our goal in articulating learning outcomes is to create significant or meaningful learning experiences (Fink, 2013). Meaningful learning experiences are those in which the instructor has a clear understanding of the desired results they want students to achieve and how they can be achieved. In turn, well-written learning outcomes can help learners understand and achieve these goals. Although learning outcomes by definition must be assessed, this does not mean that we are limited to teaching only what can be assessed directly or easily. However, as (Fink, 2013) argues, if you want students to “find a lifetime of joy in continued learning about your subject, you need to translate those dreams into explicit goals for the course you teach” (p. 81).

Meaningful learning experiences engage and impact learners long after the course or program has ended. To do so, learning outcomes need to focus on building “enduring understandings” and what is “important to know, think, or do” in a field or discipline (Wiggins & McTighe, 2005).

NOTE The terms “learning outcomes” and “learning objectives” are often used interchangeably but are not synonymous. The essential notion of learning outcomes is to provide clear statements describing what students will be expected to learn, articulated in a way that allows that learning to be assessed. To better understand the distinction between learning outcomes and learning objectives, please refer to the Glossary of Terms. (p. 71).

EXAMPLES - Course level learning outcomes

By the end of the course students will be able to:

- **Describe** the nature of Indigenous struggles to protect and preserve their lands, culture, and sovereignty against environmental destruction (Indigenous Studies);
- **Recognize**, and individually produce, writing appropriate to the genres and formats of professional communication (Technical writing);
- **Contrast** features and limitations of various sampling procedures and research methodologies (Statistics);
- **Act** in dramatic productions from the contemporary repertoire (Drama);
- **Use** appropriate sociolinguistic registers in written and oral modalities (Spanish);
- **Select** and **evaluate** reference materials by incorporating them appropriately into written assignments (Renewable Resources).

IDENTIFY WHAT'S MOST IMPORTANT

EXERCISE

In making decisions about what to include and how to structure your course, ask yourself:

- What are the enduring understandings I want students to remember many years from now?
- What is most important for students to know, think, and do at the end of the course?
- What is most important for students to know, think, and do at the end of the program?

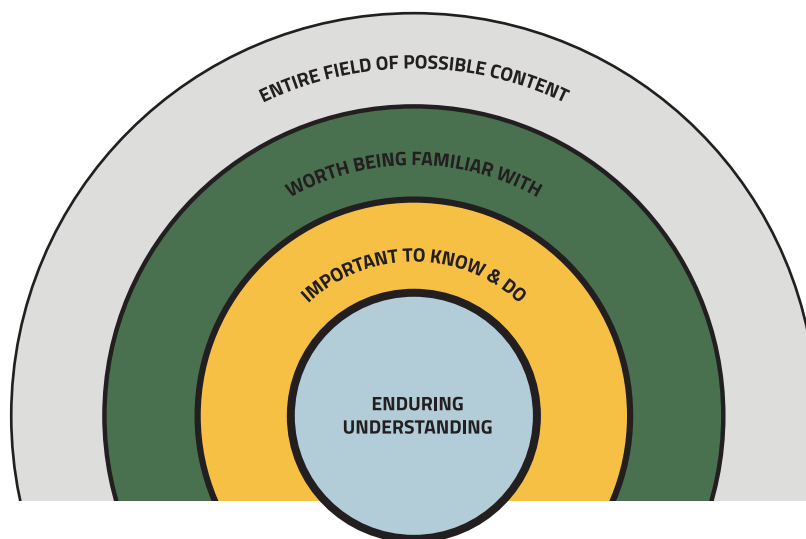


Figure 1. Focus on building “enduring understandings” (Wiggins and McTighe, 2005).

Worth being familiar with

Things we want student to “hear, read, view, encounter, research or otherwise encounter” (p. 9).

“Broad-brush knowledge” (p. 9).

Important to know and do

“important knowledge (facts, concepts and principles) and skills (processes, strategies and methods)” (p.9).

“student learning is incomplete if the unit or course is completed without the mastery of these essentials” (p. 9).

Enduring understandings

“understandings that will anchor the unit or course” (p. 10).

“refers to big ideas, the important understandings, that we want students to ‘get inside of’ and retain after they’ve forgotten many of the details” (p. 10).

Adapted from Wiggins and McTighe, (2005).

It can initially be tempting for instructors to want students to learn, or at least be exposed to, too much, especially when designing a new course. We may try to fit 20 years worth of knowledge and experience into a single course. This can be overwhelming for learners and instructors, alike.

Learning outcomes, therefore can:

- Provide a way for instructors to clarify their destination by identifying the "enduring understandings" and what is critical for students to know, think, or do given the level of the course and the goals of the program, and
- Form a map that instructors and students can follow to ultimately achieve their desired results.

SCENARIO - Coaching and Mentoring continued

Think back to Tanya and her course on Coaching and Mentoring (p. 5). In her first meeting with the educational developer, Tanya admitted that she had difficulty narrowing down the focus of her course given the depth and breadth of her experience. She had therefore included almost every skill someone hoping to become a coach or mentor would need, resulting in 47 learning outcomes! There was also the added uncertainty of how to write learning outcomes.

When she was asked what the single most important "thing" students needed to be able to do as a result of taking her course, Tanya reflected and said "I just really want students to be able to coach someone through a conversation."

When rephrased, this learning outcome became:

By the end of this course, students will be able to engage in a coaching conversation; including establishing a relationship, eliciting coachee needs, creating an action plan and following-up.

This became the single most important learning outcome that guided all Tanya's other decisions including her unit-level learning outcomes, selection of classroom activities, content and learning resources, and assessment strategies.

Tanya provided a comprehensive list of learning outcomes to her students at the start of the course. The learning outcomes formed a "map" for Tanya and her students to follow throughout the course.

QUESTIONS & ANSWERS

Q1 WHY ARE LEARNING OUTCOMES IMPORTANT AND WHEN DO YOU USE THEM?

A Mapping your Destination

Similar to using a map when traveling to a new destination, learning outcomes can form a road map for the learner and instructor to follow. Imagine you are trying to get a learner from point A to point B. Point B represents the course level learning outcomes. There may be multiple paths students can follow to get from A to B. However, along the way there are milestones that a learner will likely need to meet in order to make it to the next stop on their journey. These milestones are module or unit level objectives and lead ultimately to the destination.

NOTE Similar thinking can be applied when designing an entire program of studies; where Point B represents program level learning outcomes and individual courses represent the major stops on the journey. See Chapter 7 of this document for a discussion of curriculum mapping.

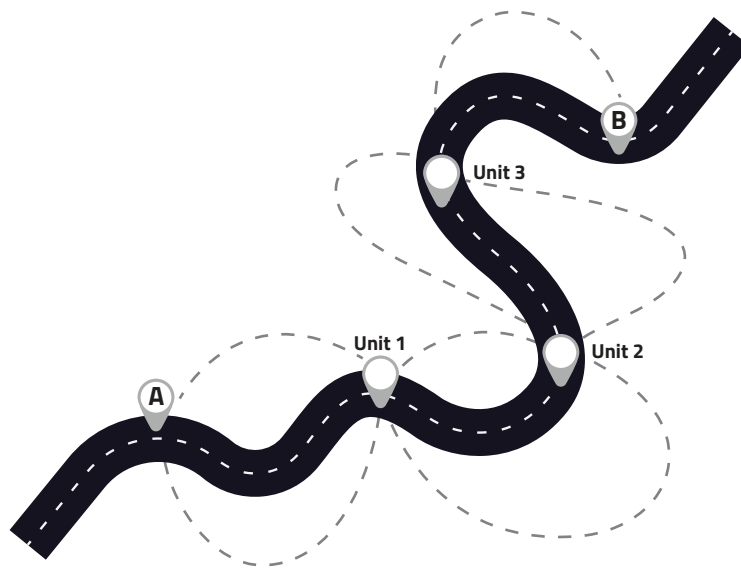


Figure 2. Learning outcomes form a road map to the final learning destination, with milestones along the way.

Similar to a road map, learning outcomes are used:

- **Before the learning** to plan in order for instructors and learners know where they are going and how to get there;
- **During the learning** to ensure that instructors and learners are on the right track; and
- **At the end of the learning experience** so learners can recall, demonstrate, and assess their learning and instructors can review and assess students' learning.

For Instructors

Articulating learning outcomes requires instructors to define what the course *is* and what it is *not*. Through the process of writing learning outcomes, and considering how to help students achieve them, instructors clarify:

- What they want students to be able to do by the end of a period of instruction;
- The content that needs to be covered;
- The learning resources that need to be provided;
- The order and purpose of specific activities;
- The most effective methods to assess student learning.

For Students

For the students, learning outcomes indicate:

- What they are required to know or do by the end of a period of instruction;
- What they will be assessed on and how; and
- How to gauge, reflect upon, and self-direct their own learning.

For Administrators

For the administrator, learning outcomes can provide a curricular map for an entire program of studies. Articulating learning outcomes for each major and discussing them at faculty meetings, creates structure for important discussions about what and how students should learn and helps ensure that individual courses in a program are organized to construct meaningful learning experiences for students. Administrators can use a comprehensive map of learning outcomes to:

- Better align their courses with their overall program goals;
- Eliminate redundancies or plan for purposeful duplication to emphasize critical knowledge areas;
- Improve employers' and the public's understanding of the value of the program;
- Evaluate whether program meets accreditation requirements; and
- Demonstrate that students meet their program level learning outcomes.

Instructors and administrators alike can use learning outcomes to structure and organize an entire course or program of studies.

Q2

HOW DO PROGRAM LEVEL OUTCOMES DIFFER FROM COURSE, UNIT, AND LESSON LEVEL OUTCOMES?

A

Put simply:

NOTE A unit or module of instruction focuses on a particular topic, theme, or stage in a process. A unit or module can vary in length and depends entirely on the time required by the learner to achieve the unit's learning outcomes.

Lesson level learning outcomes support unit/module level learning outcomes,

Unit/module level learning outcomes support course level outcomes,

Course level outcomes support program level outcomes, and

Program level outcomes support the university mission and align with external accreditation.

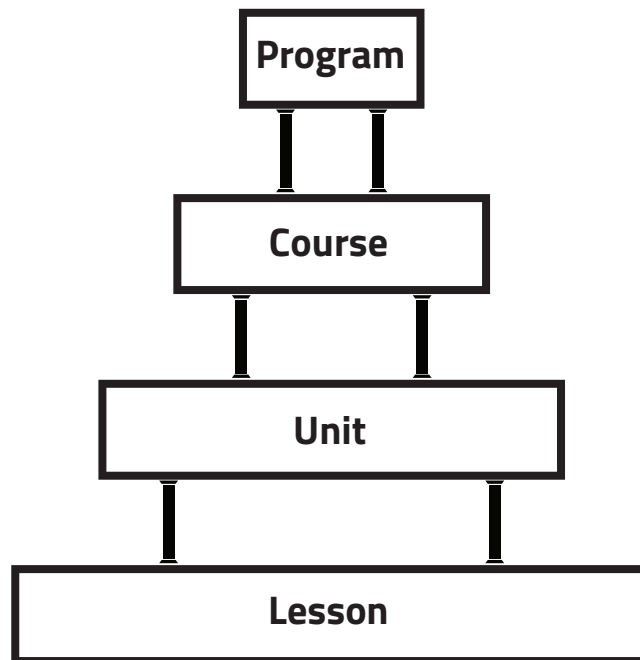


Figure 3. Lesson, unit, and course-level outcomes should all align with and support program-level outcomes.

More specifically:

BROAD



SPECIFIC

Program Level	Course Level	Unit/Module/Topic Level
<p>Purpose: Describe what the learner is expected to know, think and/or be able to demonstrate by the end of a program.</p> <p>Describe learning that will be common to all graduates of a program.</p> <p>Promote consistency across a program.</p>	<p>Purpose: Describe what the learner is expected to know, think and/or be able to demonstrate by the end of a course.</p>	<p>Purpose: Describe what the learner is expected to know, think, and/or be able to demonstrate by the end of module/unit/topic.</p>
<p>Focus: Enduring understandings.</p>	<p>Focus: Enduring understandings and what is important to know, think, and do.</p>	<p>Focus: Enduring understandings and what is important to know, think, and do.</p>
	<p>Build on knowledge, skills, and attitudes from previous courses.</p> <p>Provide learners with: The prerequisite knowledge and skills for courses that follow in their overall program;</p> <p>A learning path students will follow throughout the course.</p>	<p>Build on knowledge, skills, and attitudes from previous units or modules.</p> <p>Provide learners with: the prerequisite knowledge and skills for units or modules that follow.</p>
<p>Provide framework for determining more specific learning outcomes in courses.</p>	<p>Provide framework for determining more specific learning outcomes in specific unit of learning.</p>	<p>Provide framework for determining more specific learning outcomes in specific lessons.</p>
<p>Identify: The purpose of the program and its relevance.</p>	<p>Can help students understand: Why they are taking the course.</p> <p>The learning path they will follow for the duration of the course.</p> <p>What they will be assessed on and how.</p>	<p>Can help students understand: What they will be assessed on and how.</p>
<p>Characteristics: Reflect broad conceptual knowledge and adaptive vocational and generic skills.</p> <p>Reflect essential knowledge, skills, or attitudes.</p> <p>Represent the minimum performances that must be achieved to successfully complete a program.</p> <p>Align with institutional graduate attributes.</p>	<p>Characteristics: Reflect the culmination of knowledge, skills, and attitudes acquired through the entire course.</p> <p>Support program level outcomes.</p>	<p>Characteristics: List the specific knowledge, skills, and attitudes acquired in that particular module/unit/topic.</p> <p>Support course level outcomes.</p>

Q3

HOW ARE PROGRAM, COURSE, AND UNIT LEVEL OUTCOMES THE SAME?

A

Program, course, and unit level outcomes share the following common characteristics:

- A focus on building enduring understandings and what is important for students to be able to know, think, and do.
- They can be reliably demonstrated by students. Demonstration of learning is key – it is how students show “significant learning” (Spady, 1994).
- A focus on results of the learning experiences. They reflect the desired end of the learning experience, not the means or the process.
- They demonstrate alignment with external accreditation and university mission.

DEFINITIONS AND CONSIDERATIONS

2

Before you begin

Before writing learning outcomes for a course, it is important to give some thought to your learner and where the course fits within the overall program, in part because learning outcomes need to be:

- Attainable by students at their current level and matched to the purpose of the course;
- Relevant and realistic for students, course, program, and degree; and
- Timed appropriately.

Learner Characteristics

Learners bring their own unique temperaments and lived experiences to the classroom informed by prior learning experience, knowledge, and skills. Learners also have varying degrees of tolerance for ambiguity and complexity within the learning process itself, which you may want to address with your outcomes, course design, and teaching strategies (Svinicki 2004).

Course Level and Program Structure

It is important to consider where your course fits within the overall program and the goals of your program. If the learner is relatively new to a program of studies, learners may be encountering concepts and knowledge for the first time, or even have misconceptions that need to be addressed. If a learner is taking a course at the end of their program they may be drawing upon and making connections between concepts, prior learning, and lived experience.

External Expectations

Professional accreditation boards as well as faculty and department curricular goals need to be taken into account in determining what students should learn in a particular course.

CONSIDER THE LEARNERS, COURSE LEVEL, AND PROGRAM STRUCTURE

EXERCISE

Take a few moments to consider your learners and your course. Answer the following questions:

Who are your learners?

What are their characteristics? Are they undergraduate or graduate? What prior knowledge and experience do the learners bring to the course? How might the characteristics of your learners impact the learning outcomes you expect them to achieve?

Where does your course fit within the overall program of studies?

Is it an introductory course or does it build upon knowledge gained in previous courses? How might the position of your course relative to the entire program impact the type of learning outcomes you expect the learners to achieve? What do you expect students should already be able to do when they start your course?

What do you want learners know/think/do by the end of the course?

TYING IT ALL TOGETHER

When writing learning outcomes, it is helpful to keep the following recommendations and guidelines in mind:

Keep it simple.

While there is no magic number - we recommend limiting the number of learning outcomes. Create no more than 3–5 learning outcomes per unit of learning. Ask yourself, “What are the 3-5 most important things that learners need to come away with at the end of this course? at the end of this unit of learning?”

Keep it doable.

If you are having trouble narrowing down the number of outcomes you are requiring students to fulfill, ask yourself, “Am I trying to do too much in this unit? Am I trying to do too much in this course?”

Keep it realistic.

Ask yourself, “Are the outcomes achievable and realistic? In other words, will learners realistically be able to meet the outcomes in the time given?”

Keep it authentic.

Ask yourself, “What do I really want the students to leave with at the end of this course/ unit of learning and do the learning outcomes, as they are currently stated, accurately reflect this?”

Keep the big picture in mind.

Ask yourself, “Do the learning outcomes support the overall goals of the course and program?”

Be specific.

Learning outcomes should help make expectations transparent and explicit to students. Ask yourself, “what is the specific behaviour students should demonstrate and have I described it in a way that is clear to students?”

Be prepared.

If you are expecting students to meet the learning outcomes you have specified, be prepared to provide them with the resources, strategies and activities that will enable them to meet these outcomes. Most importantly, be prepared to assess them!

Also see:

SECTION 2. Writing Learning Outcomes

SECTION 3. Making Learning Outcomes Matter: Designing and Revising Courses Using Learning Outcomes

SECTION 4. Program Level Outcomes

SECTION 2

WRITING LEARNING OUTCOMES

3. Well-written Learning Outcomes

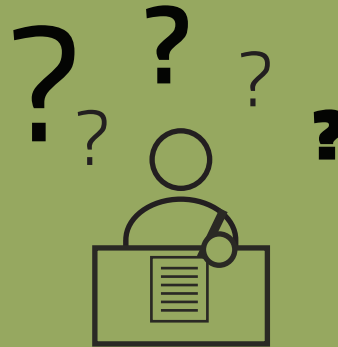
4. Writing Learning Outcomes Using KSAs

WRITING LEARNING OUTCOMES

3

Well-written learning outcomes

SCENARIO



SPECIFIC AND ASSESSABLE LEARNING OUTCOMES

Helen had been periodically working with an educational developer to design a course. She had been asked to submit learning outcomes and the deadline was fast approaching. It was her 4th consultation with the educational developer and their conversation returned once again to the subject of learning outcomes. Exasperated, Helen said, “Why do we keep discussing and revising the learning outcomes? We have to hurry and create the course assignment.”

The educational developer replied: “When I look at your learning outcomes from a student’s perspective, I don’t know what it is that you are going to assess me on or how. I am uncertain of what you want me to do.”

The educational developer suggested that Helen begin developing her main assignment so that they could get a better sense of what Helen actually wanted the students to do.

The next day, Helen returned. She brought in a course assignment that she had used in the past and had intended to adapt for this course. The assignment was going to account for 60 percent of the student grade. It clearly communicated what the students were required to know and do and was broken down into logical sections and sequenced accordingly.

Together, they then began working backwards to write the learning outcomes and align them to the assignment.

Well-written learning outcomes communicate important messages about what students will be able to know, think, and do at the end of a course or program. The focus of this section is how to write specific and assessable learning outcomes at the course level: for instructors, they are a tool for thoughtful and deliberate course planning (Fink 2013); for students, they provide clarity and focus about what students are expected to learn and how they will be required to demonstrate it.

While this section focuses on learning outcomes that are assessable within a course, using the Knowledge, Skills and Attitudes (KSAs) framework and Bloom's Taxonomy to write and sequence learning outcomes is also applicable at the program level, including thesis-based programs. Making expectations explicit can help instructors, mentors, and students better understand the learning destination and thus plan and monitor strategies for getting there (Denecke et al., 2017).

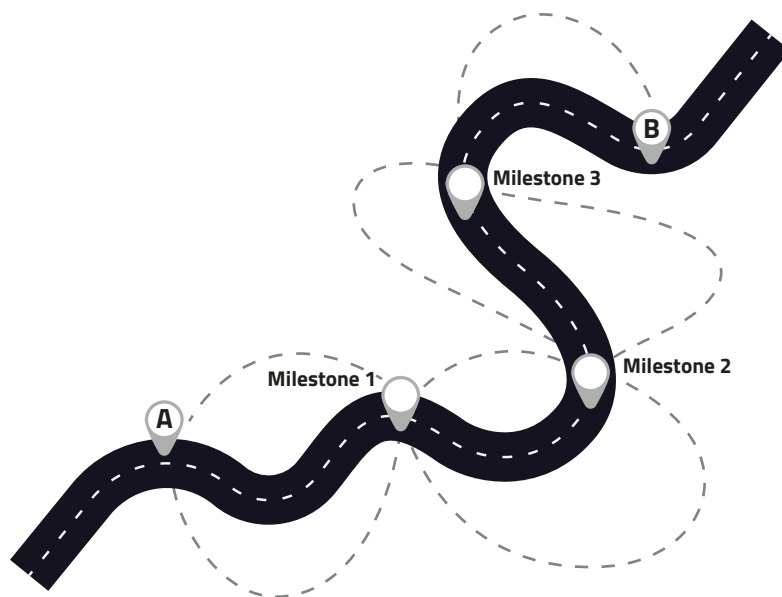



Figure 4. Learning outcomes form a road map to the final learning destination, with milestones along the way.

See section 1 of this guide for an introduction to learning outcomes, their definition, and important situational factors.

Well-written learning outcomes:

- A.** Define what students will be able to do in the time given (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:

 **EXAMPLE**

Learning Outcome:
Select and **evaluate** reference materials and **incorporate** them } **A** what students do
 appropriately into written assignments. **B** demonstrable verbs

C Some potential evidence could be:

- Students provide an annotated reference list including both academic and credible non-academic sources;
- Students incorporate appropriate citations within their written assignments;
- Students use citation formats correctly.

TIP An outcome describes what you want students to DO with what they learn and implies how they will show you what they have learned.

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

Specific.

Measurable (assessable, demonstrable).

Attainable by students at current level and matched to purpose of the course.

Relevant for students, course, program and degree.

Time-bound or can be completed in the time given.

COMPARING LEARNING OUTCOMES

EXERCISE

For the outcomes listed below, ask yourself:

- Does it define what students will be able to do in the time given?
- Does it state the specific behavior that students are expected to demonstrate (using an assessable verb)
- Can it be assessed?

Learning Outcome 1

Upon completion of this unit, students will be able to critically assess the factors influencing physical activity and nutrition (environment, community, habits, underlying thinking, lifestyle and time allocation), and analyze how these factors shape their current choices.

Learning Outcome 2

Upon completion of this unit, students will be able to understand how factors such as the environment and community impact their physical activity and nutrition choices.

Which outcome is more effectively written?

If you answered #1 you are correct!!!!

The verb "to understand" is not a measurable verb. It is not specific enough to tell students how they must **demonstrate** their "understanding" of the factors that shape choices related to physical activity and nutrition. Outcome 1 is more specific and measurable in stating that students must demonstrate their ability to critically **assess** each individual factor and **analyze** how it shapes their current choices.

Q1 WHAT ACTION VERBS SHOULD I AVOID USING?

A

The Centre for Teaching and Learning at the University of Windsor recommends avoiding the use of “THE SINISTER SIXTEEN: Verbs that are passive, internal and/or otherwise unobservable” (Potter & Kustra, 2012).

The sinister sixteen are as follows:

Understand	Be aware of
Appreciate	Be conscious of
Comprehend	Learn
Grasp	Perceive
Know	Value
See	Get
Accept	Apprehend
Have a knowledge of	Be familiar with

<http://www1.uwindsor.ca/ctl/system/files/PRIMER-on-Learning-Outcomes.pdf>

WRITING LEARNING OUTCOMES

4

Writing learning outcomes using KSAs

Learning outcomes focus on the essential, transferable learning that can be observed and assessed in courses and programs. They support the attributes of an ideal graduate of a course program, and are reflective of disciplinary contexts. KSAs provide a useful framework for thinking about and describing this essential learning.

Knowledge - the types of thinking you want your students to act upon or the concepts, facts, and theories you want them to acquire.

Skills - the skills you want your students to be able to perform at a given level.

Attitudes - the feelings, values, appreciations, motivations, or priorities of your discipline or profession you want to stimulate in your students.

This framework maps better onto some disciplines and professions than others. It may also be helpful to consider Fink's (2003) taxonomy of significant learning, which represents a more holistic view of learning including domains such as metacognition (learning how to learn), and the human dimension (learning about oneself and others).



Figure 5. Taxonomy of Significant Learning (Fink 2003).

Other frameworks include "Ideas, Connections, and Extensions" (ICE) (Fostaty, Young, & Wilson, 2000) and the "Structure of Observed Learning Outcomes" (SOLO) (Biggs & Tang, 2007). Instructors and administrators can use aspects of each framework or taxonomy to plan and sequence intended learning outcomes, teaching and learning activities, assessments, and/or courses. Bloom's (1956) levels provide a useful vocabulary to articulate learning outcomes in terms of demonstrable verbs, and also describe a progression in levels of complexity.

Q1

WHAT IS BLOOM'S TAXONOMY OF LEARNING?

A

Bloom's taxonomy of learning has evolved over time (Anderson & Krathwohl, 2001) and is a tool commonly used to write learning outcomes. Dr. Benjamin Bloom (1913 - 1999) was an educational psychologist who in 1956, along with his team, developed a taxonomy of learning that classifies learning outcomes according to the following 3 domains:

NOTE There are a variety of taxonomies that can be used to classify student learning. Bloom's taxonomy is the most common and is therefore the one we have chosen to focus on.

Cognitive (Knowledge) - knowledge and intellectual development in your course.

Psychomotor (Skills) - physical movement and motor skills necessary to learn in your course.

Affective (Attitudes) - values, attitudes, appreciations, motivations, and priorities of the discipline or profession in your course.

For each domain, you can select from a list of measurable verbs. These verbs are measurable in the sense that they can be demonstrated by the learner and therefore they can be assessed. For each domain, measurable 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, in the cognitive domain, students should progress from remembering and understanding to evaluating and creating.

The following table illustrates how learning outcomes are categorized according to the newly updated Bloom's Taxonomy.

	Cognitive (KNOWLEDGE)	Psychomotor (SKILLS)	Affective (ATTITUDES)
COMPLEX ↑	Creating Evaluating Analyzing Applying Understanding Remembering	Naturalizing Articulating Fine Tuning Manipulating Imitating	Characterizing Organizing Valuing Responding Receiving
SIMPLE			

For a breakdown of each domain, including a definition of each category, corresponding verbs, and examples go to (p. 29).

BRAINSTORMING KSAs

EXERCISE

Brainstorm the knowledge, skills and attitudes that learners need in order to meet the overall goals of your course. Answer the following questions:

Knowledge (Cognitive) - *What types of thinking do you want your students to do or the knowledge you want them to acquire throughout your course?*

Skills (Psychomotor) - *What skills do you want your students to be able to perform and at what level?*

Attitudes (Affective) - *What feelings, values, appreciations, motivations, or priorities of your discipline or profession do you want to stimulate in your students?*

KSAs directly correspond to the 3 domains used to classify learning outcomes in Bloom's taxonomy of learning.

Q2

HOW DO I USE BLOOM'S TAXONOMY OF LEARNING TO WRITE A LEARNING OUTCOME FOR A SPECIFIC KSA?

A

The main components of a learning outcome are (1) the measurable verb selected from Bloom's taxonomy and (2) the specific KSA you want students to demonstrate. The general structure of a learning outcome is as follows:

By the end of the course, students will be able to (measurable verb) + (the knowledge, skill, or attitude you expect them to acquire).

OR

By the end of the module/unit/lesson, students will be able to (measurable verb) + (the knowledge, skill, or attitude you expect them to acquire) + **by** (how they will apply their knowledge or skill/how you will assess their learning).

In analyzing the example from p. 22,

TIP As a program progresses, support student learning from simple to complex, concrete to abstract. Select a range of verbs from across the spectrum, exercising both simple and complex skills. As courses increase in difficulty and complexity throughout a program, select verbs from the high end of the spectrum in order to build higher order thinking skills. Similarly, learning should be assessed in progressively more challenging ways. Similarly, assessments should be designed to capture progressively more challenging learning outcomes.

✓ EXAMPLE

Upon completion of this unit, students will be able to critically assess the factors influencing physical activity and nutrition (environment, community, habits, underlying thinking, lifestyle and time allocation), and analyze how these factors shape their current choices.

we can find all the pieces of a well written learning outcome.

✓ STEM

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

✓ DOMAIN AND MEASURABLE VERB

Domain - Cognitive

Verbs - Assess and Analyze

✓ SPECIFIC KNOWLEDGE, SKILL OR ATTITUDE YOU EXPECT THEM TO DEMONSTRATE

(1) the factors (environment, community, habits, underlying thinking, lifestyle & time allocation).

(2) how these factors shape their current choices related to physical activity and nutrition.

Cognitive Learning Domain - Definitions & Verb List

	Definition:	Output Verbs:	Evaluating example:
CREATING	developing a hypothesis; devising a procedure; inventing a product	build, compose, create, construct, design, develop, devise, formulate, generate, hypothesize, invent, modify, organize, plan, predict, produce	Can the student generate new products or ideas?
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 justify a decision or course of action?
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 differentiate between fundamental parts?
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 use the new knowledge in another situation?
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 explain ideas or concepts?
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 recall information?

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

Cognitive Learning Domain - Example

Course Objective	Student Learning Outcome	Levels of Cognition (See Bloom's Learning Domains: The Cognitive Domain)		
		Low	Med	High
		Remembering and Understanding	Applying and Analyzing	Evaluating and Creating
Example: The purpose of Food Microbiology 361 is to acquaint students with pre and pro-biotics in the food industry	Example: Students will be able to explain the principles underlying the application of pre and pro-biotics in the food industry.	X Explain is a verb at the Understanding level of the Cognitive Domain		

Psychomotor Learning Domain - Definitions & Verb List

	Definition:	Output Verbs:	Evaluating example:
NATURALIZING	Automated, unconscious mastery of activity and related skills at strategic level	compose, delegate, design, devise, specify, manage, invent, plan, supervise, troubleshoot	Can the student design elements to meet strategic needs?
ARTICULATING	Adapting and integrating expertise to satisfy a non-standard objective	adapt, calculate, coordinate, combine, compile, construct, develop, edit, formulate, integrate, manipulate, modify, replace, repair, solve	Can the student relate and combine activities for the purpose of developing methods to meet novel requirements?
FINE TUNING	Making minor adjustments in the physical activity in order to perfect it.	adjust, calibrate, conduct, control, complete, demonstrate, install, operate, show, perfect, practice, present, simulate	Can the student perform or demonstrate with expertise?
MANIPULATING	Reproducing activity from instruction or memory	administer, apply, assist, assemble, build, carry out, collect, configure, contribute, draw, execute, fabricate, graph, implement, locate, measure, perform, re-create, select	Can the student carry out the task from instruction?
IMITATING	Attempted copying of a physical behavior	adhere, copy, duplicate, follow, replicate, repeat, trace	Can the student repeat the action/process/activity?

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

Psychomotor Learning Domain - Example

Course Objective	Student Learning Outcome	Level of Psychomotor Skills (See Bloom's Learning Domains: Psychomotor Domain)		
		Low	Med	High
		Imitating and Manipulating	Precision and Articulation	Naturalizing
Example: Food Microbiology 361 engages students in the group processes of food scientists.	Example: By the end of the unit, students will be able to accurately measure quantities using scientific instruments such as the Vernier caliper, Geiger meter, and various scales.	X Measure is a verb used at the Manipulating level of the Psychomotor Domain.		

Affective Learning Domain - Definitions & Verb List

	Definition:	Output Verbs:	Evaluating example:
CHARACTERIZING	Acting consistently with the new value.	act, display, influence, internalize, integrate, relate, resolve, qualify, practice, verify	Does the student practice in accordance with their beliefs?
ORGANIZING	Integrating a new value into one's general set of values, giving it some ranking among one's general priorities.	alter, arrange, build, codify, construct, compare, develop, discriminate, display, generalize, modify, order, organize, prioritize, reconcile	Does the student state beliefs and reasons?
VALUING	Showing some definite involvement or commitment.	argue, criticize, debate, decide worth, defend, devote, explain, join, justify, persuade, present, propose, pursue, refute, share	Does the student express opinions?
RESPONDING	Showing some new behaviors as a result of experience.	complete, contribute, comply, conform, cooperate, discuss, describe, examine, formulate, perform, provide other references/examples, react, respond, seek, use	Does the student participate actively?
RECEIVING	Being aware of or attending to something in the environment.	ask, accept, attend, acknowledge, concentrate, follow, give, identify, select, recognize, retain	Does the student identify ideas or concepts from an experience?

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

Affective Learning Domain - Example

Course Objective	Student Learning Outcome	Levels of Affectiveness (See Bloom's Learning Domains: Affective Domain)		
		Low	Med	High
		Receiving and Responding	Valuing and Organizing	Characterizing
Example: Food Microbiology 361 develops an appreciation of the application of large scale microbiological techniques.	Example: Students will be able to integrate their awareness of the real time application of large scale microbiological techniques into their own practice.			X Integrate is a verb used at the Characterizing level of the Affective Domain.

✓ **EXAMPLE - Department of Chemistry**

TWO UNIQUE APPROACHES

The Chemistry Department at the University of Alberta is required to submit learning outcomes for every course for their unit review. In addition, the Department of Chemistry provides many of its courses to engineering students. As a result, these courses need to meet the accreditation requirements as set forth by Canadian Engineering Accreditation Board and therefore require measurable learning outcomes.

The Department of Chemistry began by developing learning outcomes for:

- Chemistry 101 and 103 (Engineering equivalent of 101), and
- Chemistry 102 and 105 (Engineering equivalent of 102).

In each course, there is an inherent progression and sequencing of course content: beginning with atoms, moving to molecules, then to gases, liquids, and solids, etc. Among faculty there is a common and underlying agreement as to what needs to be taught in the course.

In setting out to define learning outcomes, faculty took two distinct approaches:

APPROACH 1 - “BOTTOM UP” CHEMISTRY 101/103 AND CHEMISTRY 102/105

Christie took what she describes as a bottom up approach. Christie began developing learning outcomes by first examining the Engineering competencies and identifying and drafting a list of the knowledge and skills that enabled students to meet these competencies.

Yoram, a colleague within the Department then attended a session offered by the Centre for Teaching and Learning on how to write learning outcomes and further refined Christie’s list making the learning outcome measurable and specific; clearly defining what they required learners to do. Together, they articulated course level objectives and unit level outcomes.

APPROACH 2 - “AUDIT” CHEMISTRY 103

Arthur, on the other hand, examined the process Alberta Education had used to determine the KSAs required for Chemistry 20 and 30. Arthur sought to build on the skills and knowledge gained by students in Chemistry 20 and 30. To do this, he completed a thorough audit of all of his course materials, including lecture notes, assignment and assessments, identifying all of the knowledge, skills and attitudes he expected learners to come away with. Based on the KSA’s identified, Arthur developed a detailed course map. For each unit of learning, Arthur provided:

- Name of the unit;
- Themes explored;
- An overview that lists the specific courses (and units) to which the unit connects;
- The key concepts covered;
- General outcomes; and
- Specific outcomes listed for each general outcomes.

To view a sample of Arthur’s course map go to (p. 33).

The course map that Arthur developed for Chemistry 103 is based on the work of Alberta Education's curriculum of documents and takes an in-depth approach to curriculum mapping. At the time that Arthur shared this, it was still a work in progress. The following example is only a segment of an entire course map totalling 9 pages in length. Such level of detail may be helpful for instructors who are planning unit and lesson-level teaching and learning activities, but are not necessary at the course (syllabus) or program level, where the focus would be on the general outcomes i.e. higher order thinking and application skills.

Unit A. Atoms

Themes: The structure of atoms and its relation to chemical periodicity

Overview: Atoms form the foundation of all matter. Their detailed structure and in particular, the arrangements of electrons, can be related to the atomic, physical, and chemical properties of all elements in the periodic table. However, the simplistic view that electrons always behave as particles must be abandoned, and this must be superseded by a more powerful model – quantum theory – which provides a more accurate description of the structure of atoms.

This unit builds on:

- Chemistry 20, Unit A The diversity of matter and chemical bonding

This unit provides a background for:

- Chem 161, Unit X
- Chem 241, Unit X

Unit A requires approximately 25% of the time allotted for Chem 103.

Key concepts:

- electromagnetic spectrum
- quantization of energy
- photons
- line spectra, Bohr model
- ground and excited states
- wave-particle duality
- de Broglie wavelength
- uncertainty principle
- wavefunctions and orbitals
- probability distribution
- quantum numbers
- electron configurations
- effective nuclear charge, shielding and penetration
- Hund's rule, Pauli exclusion principle
- core and valence electrons
- periodicity
- atomic radii, ionization energy, electron affinity
- diamagnetism and paramagnetism.

General outcome 1. Appreciate the nuanced distinction between matter and energy.

Specific outcomes for knowledge:

A1.1k Recall the nuclear model of an atom and apply it to describe the subatomic structure (numbers of electrons, protons, and neutrons) of any isotope of an element in the form of a neutral atom or an ion.

A1.2k Become familiar with the periodic table, learn the names and symbols of elements, and distinguish between atomic number and atomic mass.

A1.3k Name and write formulas of ionic compounds (including those containing polyatomic ions) and covalent compounds (including simple binary and oxyacids); recall assignment of oxidation numbers.

A1.4k Identify different regions of the electromagnetic spectrum,

A1.5k Describe the experimental evidence for the quantization of energy and light.

A1.6k Relate energy, wavelength, and frequency of light viewed in the form of photons.

Q3

WHICH APPROACH IS BEST FOR WRITING COURSE-LEVEL LEARNING OUTCOMES?

A

For some, approaching the development of learning outcomes by brainstorming knowledge, skills, or attitudes may be a good starting point. However, it is not always necessary. One instructor might begin by identifying enduring understandings they want their students to have, while another might feel more comfortable analysing their existing assessments or lecture notes. An instructor who has already written careful rubrics for their assessments has, in a sense, already articulated their learning outcomes and may simply need to write them as clear statements.

On the other hand, in writing learning outcomes, an instructor may realize their their supporting lectures, classroom activities, or course materials need to be revised, restructured, reordered or refined to better assist students in meeting the goals of the course.

EXERCISE

TRY IT

1. **Identify a knowledge, skill or attitude you require students to demonstrate in your course.**
2. **Using the following template, try writing one of your own learning objectives for the selected knowledge, skill or attitude.**

By the end of the _____, students will be able to (measurable verb) + (the knowledge, skill, or attitude you expect them to acquire).

3. Double check your work

Ask yourself if it is:

- S**pecific.
- M**easurable (assessable, demonstrable).
- A**ttainable by students at current level and matched to purpose of the course.
- R**elevant for students, course, program and degree.
- T**ime-bound or can be completed in the time given.

QUESTIONS TO THINK ABOUT

EXERCISE

We have explored several approaches to writing learning outcomes.

Which approach are you more comfortable with and why?

What types of support might you need when writing learning outcomes?

TYING IT ALL TOGETHER

Lessons Learned

Through the process, the Chemistry Department faculty members realized that they were already teaching the knowledge and skills that students would require as professionals in their field. As Christie described it, writing learning outcomes was a matter of articulating what was already happening with respect to student learning in their department. To their own surprise, faculty realized that they were already teaching many of the “soft skills” (attitudes) that are often difficult to teach and assess.

Arthur identified two main challenges that faculty face with respect to the writing of learning outcomes:

- Knowing how to write learning outcomes effectively; learning the language that is used and what is meant by a measurable verb.
- The time required to write effective learning outcomes. When all was said and done, it took Arthur two days to develop his course map.

Ultimate Goal

The ultimate goal of the Department of Chemistry is to develop a curriculum map for the entire program of studies; a map that clearly (1) delineates the learning outcomes for each course, (2) illustrates how the learning outcomes are scaffolded from one course to another, and (3) indicates where there is strategic repetition/overlap between courses to address particularly challenging concepts. The next section of this document gives examples of mapping assessments to course learning outcomes and program level outcomes.

Also see:

SECTION 1. Definitions and Considerations

SECTION 3. Making Learning Outcomes Matter: Designing and Revising Courses Using Learning Outcomes

SECTION 4. Program Level Outcomes

TYING THINGS TOGETHER

Well-articulated and assessed learning outcomes at the course and program level are an important part of program assessment. As a result of their process, Augustana Campus is now able to demonstrate that their graduates are critical thinkers, skilled researchers, and effective communicators. Similarly the Faculty of Pharmacy and Pharmaceutical Sciences is able to ensure their program is well-designed to help students meet accreditation requirements. The assessment of learning outcomes in both programs can bring to light the possibilities for growth and improvement in educational delivery.

Also see:

SECTION 1. Definitions and Considerations

SECTION 2. Writing Learning Outcomes

SECTION 3. Making Learning Outcomes Matter: Designing and Revising Courses Using Learning Outcomes

FINAL THOUGHTS

Learning outcomes provide instructors and administrators with a means to create meaningful learning experiences:

- in which everyone has a clear understanding of the desired results they want to students to achieve and how they can be achieved;
- which build enduring understandings and impact learners long after the course has ended.

However, no matter the amount of thought, time, and planning that goes into writing effective learning outcomes, teaching and learning is a complex, creative, and messy process. Sometimes the most powerful learning is that which is unplanned or incidental. As an instructor, one must be aware that intentional and deliberate learning outcomes are likely not all that students are taking away from a course or program. This is particularly true of graduate programs where much learning happens as a result of being engaged in the research process and all that it entails. And unintended learning can have both positive and negative outcomes.

Unintended learning occurs through the hidden curriculum, role modeling, teachable moments, and informal peer-to-peer interactions.

THE HIDDEN CURRICULUM

The hidden curriculum conveys the norms, values and practices of a culture and educational institution. The hidden curriculum indirectly indicates to the learner what knowledge or information is valued, for example, by the selection of texts, authors. Other factors may also send conflicting messages about the type of learning expected to occur, for example the arrangement of desks in rows versus tables designed for collaboration.

ROLE MODELLING

Role modelling has both positive and negative impact on learners. Instructors who espouses one set of values only to role model the exact opposite may not have the intended impact on their students. However, instructors who embrace the values they wish to instill within their learners—in both the design and implementation of the instruction and in their own behaviour—will have a positive impact on student learning.

TEACHABLE MOMENTS

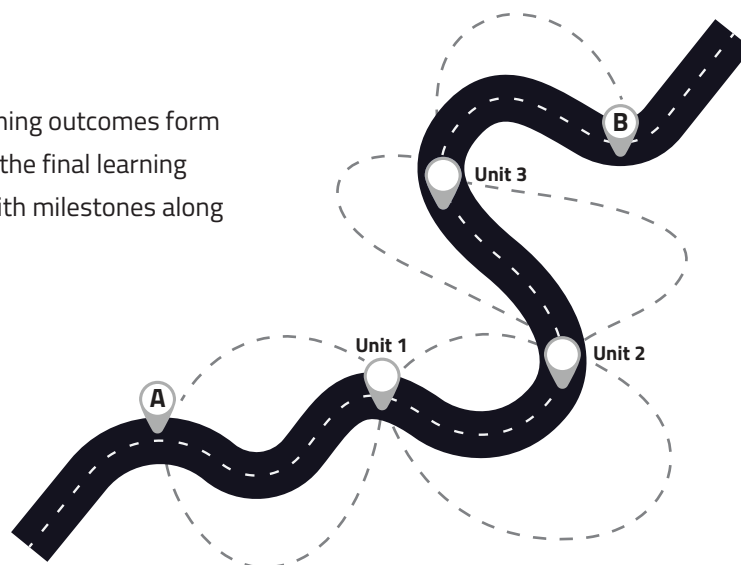
Instructors might seize upon a “teachable moment” to explore topics and concepts not delineated in the formal learning outcomes. A teachable moment may present itself when the time is right, in the right context, and when students are ready to engage with a particular topic or concept. These moments come unexpectedly and present powerful learning opportunities for students.

PEER TO PEER INTERACTIONS

Students also learn through significant, informal interactions with their peers, family and other role models. It is important to recognize these interactions can be (and often are) powerful learning experiences.

Of course, learning is also not limited to the classroom. Students take what they learn in the classroom, integrate it with their previous knowledge and experience, and use it to inform their view of the world around them. All of this has unintended consequences. And while there is little instructors can do to avoid unintended learning (nor would they always want to), instructors can harness the power of it by calling attention to the hidden curriculum, by being aware of the behaviour they role model, by taking advantage of teachable moments and making connections to the formal curriculum, and by encouraging peer to peer interactions which are well-informed and engaging. Formal learning outcomes, meanwhile, serve as anchors or guide posts, keeping students and instructors on track and headed towards a common destination.

Figure 2. Learning outcomes form a road map to the final learning destination, with milestones along the way.



ADDITIONAL SECTIONS

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GLOSSARY OF TERMS

Authentic Assessment

Authentic assessment requires that learners apply the knowledge and skills they have acquired throughout the course to address complex, real-world problems. Authentic assessment requires that learners demonstrate the specific competencies and skills that are expected of graduates working in the field or discipline.

Competency

“Competencies represent a dynamic combination of attributes, abilities and attitudes. Fostering these competencies is the object of educational programmes. Competencies are formed in various course units and assessed at different stages. They may be divided in subject-area related competencies (specific to a field of study) and generic competencies (common to any degree course)” ECTS Users’ Guide (2005).

Formative assessment

Formative assessment occurs throughout a course, may be informal or formal, is considered low-stakes, and provides learners with opportunities 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 Objectives or Goals Learning objectives (sometimes referred to as goals) are broad statements indicating the overall purpose of the course or program and indicate the instructor's overall intention in teaching the course. They are statements that focus on the instructor's intention(s) for teaching. Learning objectives can be phrased "The purpose of this course is to....."

Example: Discipline: English; Goal/Objective: The purpose of this course to develop students' critical reasoning about satiric writing in eighteenth century literature.

Learning Outcomes

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.

Example: Discipline: English; Learning outcome: By the end of the unit, students will be able to analyze the relationship between the language of satire to literary form by closely examining the eighteenth century texts in this course.

Unit

A unit (sometimes referred to as a module) of instruction focuses on a particular topic, theme, stage in a process. A unit or module can vary in length and depends entirely on the time required by learner to achieve the unit's learning outcomes. For example, a unit of learning can range in length from 1 - 4 weeks, etc. depending on depth and breadth of the learning.

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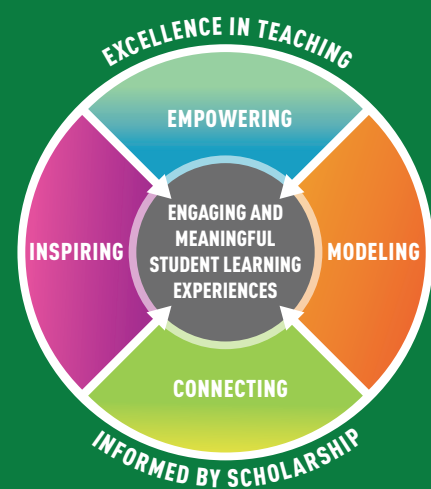
About the Centre for Teaching and Learning

VISION

CTL promotes excellent university teaching that leads to engaging and meaningful learning experiences for students.

MISSION

We pursue this goal through a combination of consultation, facilitation, technology integration, collaboration, and research to advocate for and support evidence-based, responsive, and positive change in teaching and learning. We provide important face-to-face and peer experiences for instructors and extend our reach through blended and online programming.



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