DEVELOPING STUDENT LEARNING OUTCOMES

What are student learning outcomes?

Student learning outcomes (or "SLOs") are statements that describe how students will act and think differently as the result of having successfully completed a course, providing information about how the course will transform them. From increasing their base of knowledge about a particular topic to acquiring important practical/professional skills to improving critical thinking, SLOs tell students how the course will contribute to their academic, professional, and personal development. Moreover, by assessing the extent to which students achieve SLOs, faculty members and administrators in departments, schools, and colleges can use student-provided data to consider how they might change how a course is taught or how a particular part of their curriculum is delivered.

What are the characteristics of a well-defined student learning outcome?

A well-defined student learning outcome specifies actions by students that are:
- observable,
- measurable, and
- completed by the students themselves.

The crucial factor in determining if your learning outcome is well-defined is whether or not the action taken by the students can be assessed.

How do I develop expected student learning outcomes for my course?

Prior to crafting the student learning outcome statements for a particular course, you should step back and consider some important foundational issues.

1. Keep in mind the knowledge and skills that are *most* central to the course and/or discipline. While student should be expected to master some level of detail in a course, the SLOs should address core issues.

2. Focus on anticipated results. Do not merely describe activities or lessons from the course, but rather state what students will be able to do (or do differently or more competently) by virtue of having successfully completed the course.

3. Link your course's SLOs to learning objectives at some higher level (e.g., departmental objectives and/or core curriculum objectives). Doing so helps you and your students link what happens in the course to some larger context. Making these connections is especially important in the case of general education or introductory courses with multiple sections taught by different members of the faculty.

4. Consider both *what* your students will learn and *how* they might demonstrate this learning. In doing so, you are better equipped to write SLOs that are less focused on what you are going to teach and more focused on what students will be able to do with the knowledge and skills that they will be acquiring.

> Non-Optimal SLO: "One objective of this course is to teach about the critical elections in 20th Century America and explain the importance of each."
>
> Improved Version: "Upon completion of this course students will be able to identify all the critical elections in 20th Century America and explain why each is important."

What does it mean to assess a student learning outcome?

When you assess an SLO for a course, you are gathering data that help you determine the extent to which students achieved the intended goal. In reviewing these data, you are in a better position to determine if students are learning what you expected. Based on your findings, you can decide how you might want to alter the direction of your course, in whole or in part.

Aren't final grades sufficient for purposes of assessment?

Actually, no – they're not. Final grades are too coarse a summary measure of how well students are achieving the learning outcomes that you have set for the course. Moreover, final grades in many classes incorporate elements that are not directly tied to how well students have mastered learning objectives. So while attendance, participation, and "completion grades" for otherwise ungraded assignments might factor into a student's final course grade, these elements are not directly tied to specific learning outcomes.

How might I assess an SLO in my course?

Assessing SLOs doesn't require a lot of extra work on your part. With a bit of forethought, you can readily incorporate assessment into the grading process.

Example #1: In your senior capstone course, students are required to write a 20 page research proposal in a style and format consistent with those used in your discipline. In reviewing each student's work for a grade, you very likely measure the proposal against some set of standards. Moreover, these standards – be they explicitly stated in a course document or residing silently in your mind – are very likely consistent with the intended academic, professional and personal goals of the course (i.e., the SLOs). In this case, you might take the time to make the standards upon which you're evaluating the students' work explicit by creating a *rubric*, an evaluation tool that (a) identifies what you're looking for and (b) provides you with guidelines as to how a student's proposal "rates" on each of these key properties. Determining what's important, what it means to "rate," and how these components should be weighted to determine a final grade is all up to you, the instructor. What's important, however, is that in using a rubric to grade the work of individual students, you have also extracted data on identifiable components of the students' performances (i.e., writing the proposals) which you can now review to determine if you might want to teach such-and-such a component differently next time.

Example #2: In your large sophomore level survey class, you might give exams with some combination of multiple choice, short answer, short essay, etc. In this situation, assessing learning outcomes might begin with "mapping" certain questions on a test to specific SLOs. After administering the test, you can then examine the students' performance on these specific test questions to determine how well the students are grasping the corresponding intended learning outcomes. If you determine the performance is satisfactory – and remember that you determine what "satisfactory" means – then you have evidence that the learning objective is being met. If, however, you determine the students' performance is below your expectations, you can use this feedback to reevaluate how the material is presented. If the examination was given prior to the end of the semester, you might identify which SLOs are proving most challenging for the students and then review those specific issues before moving forward.

It is important to remember that the purpose of the assessment is to create both a better teaching experience for you *and* a better learning experience for them.

What does a student learning outcome statement look like?

A student learning outcome statement needs to specify:
- who is to perform (the student),
- what must be done (the action), and
- some effect that arises from the action (the result).

Since the outcome must be measurable, the action specified must be an action verb. In other words, it should specify overt behavior that can be observed and measured. Some examples include *describe, identify, explain, justify, compare…* See Table 1 for additional examples.

You should, however, avoid action verbs that describe student-internal process, such as *know, become aware of, appreciate, learn, understand,* or *become familiar with*. In these cases, the actions involved are "covert" behaviors, none of which can be directly observed or measured.

What are some basic examples of well-defined student learning outcome?

Consider some typical but non-optimal student learning outcome statements:

> × The students will understand democracies.
>
> × The students will appreciate art from other cultures.
>
> × The students will learn about the human skeleton.

These statements are not well-defined learning outcomes because they are not measurable. These statements can be improved, however, by modifying the verb after "will be able to" so that it refers to an action that creates a product that can be observed and assessed by the instructor:

> ★ The students will be able to describe the major theories of democracy.
>
> ★ The students will be able to identify the characteristics of art from other cultures.
>
> ★ The students will be able to explain the structure and function of each part of the human skeleton.

A further elaboration of the three SLOs above would include a follow-up clause that further contextualizes the action:

> ★ The students will be able to describe the major theories of democracy so that they can make fully informed decisions as responsible citizens.
>
> ★ The students will be able to identify the characteristics of art from other cultures so that they might respond more thoughtfully to a wide variety of artistic expression.

★ The students will be able to explain the structure and function of each part of the human skeleton in order that they might formulate maximally effective treatments for future patients.

How do I write student learning outcomes aimed at critical or higher-order thinking that should be expected from advanced undergraduates or graduate students?

Consider incorporating words that reflect critical or higher-order thinking into your student learning outcome statements. Benjamin Bloom, in various works such as *Taxonomy of Educational Objectives (1984)*, developed a system that outlines the types of thinking skills people use in the learning process. This taxonomy may be a useful guide.

Bloom believes that learners use different levels of thinking skills to process different types of information and situations. The levels range from the most basic cognitive skills, such as memorization, to more complex skills such as creating new ways to apply the information i.e., the so-called "critical" or "higher-order" thinking skills.

What benefit do well-defined student learning outcomes have for my course?

Determining desired learning outcomes provides direction in terms of allowing you to:
- Identify specifically what you want a student to learn
- More efficiently design content, instruction, and evaluation for the course
- Convey to students and to colleagues what you are covering, thereby helping to clarify how the course fits into the curriculum
- Allow for more effective use of resources in designing curricular offerings and priorities
- Allow you to manage your own expectations concerning what you and your students can actually accomplish during the course

A final note on assessment

In traditional models of teaching, learning, and grading, the focus has been on how well an individual student has performed relative to some standard (as determined by the instructor). The end result is a rating ("grade") that is assigned to the student on the basis of his/her performance. Under this model, as student is often conceptualized as the primary unit of analysis: each student earns X points on Y items to earn a grade of Z.

In a learning-focused assessment model, however, there is a second unit of analysis that is aligned orthogonally to the students: the student learning outcome. In this case, the instructor can examine how each item was responded to by every student, thereby developing a sense of how well the community of learners is grasping key points. This type of evidence can directly inform teaching, which in turn can enhance learning.

Table 1: Bloom's Taxonomy

Category	Key Words, Examples, and Question Prompts
Knowledge Recall data or information	**Key Words**: define, describe, identify, label, list, match, name, outline, reproduce, select, state **Examples**: Recite a policy. Quote rules from memory. Know safety procedures. **Prompts**: Who…? What…? When… ? Where…?
Comprehension Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	**Key Words**: convert, defend, estimate, explain, extend, generalize, give an example of, interpret, paraphrase, rewrite, summarize, translate **Examples**: Rewrite the principles of X. Explain in your own words the steps for performing a complex task. Translate an equation into a computer spreadsheet. **Prompts**: *In your own words,* …; Convert X into Y;
Application Use a concept in a new situation or unprompted use of an abstraction. Apply what was learned in the classroom to novel situations.	**Key Words**: apply, change, compute, construct, demonstrate, manipulate, modify, operate, predict, prepare, produce, relate, show, solve, use **Examples**: Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test. **Prompts**: How is X an example of Y? How is X related to Y? Using…, *co*mplete the following task:…; Given X and Y, what is …?
Analysis Separate material or concepts into component parts so that its organizational structure may be understood. Distinguish between facts and inferences.	**Key Words**: analyze, break down, compare, contrast, diagram, deconstruct, differentiate, discriminate, distinguish, identify, illustrate, infer, outline, relate, select, separate **Examples**: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gather information from a department and selects the required tasks for training. **Prompts**: What are the features of …? How does … compare to …? Diagram the process of …; How would you classify… according to…?
Synthesis Build a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	**Key Words**: categorize, combine, compile, compose, create, devise, design, generate, modify, organize, plan, rearrange, reconstruct, relate, reorganize **Examples**: Write a company operations or process manual. Design a machine to perform a specific task. Integrate training from several sources to solve a problem. Revise a process to improve the outcome. **Prompts**: Given …, what do you predict? How would you crea*te / improve* upon a new …? If you combined X and Y, what would happen? Given these facts, what solution would you suggest to … ?
Evaluation Make judgments about the value of ideas or materials.	**Key Words**: appraise, compare, conclude, contrast, criticize, critique, defend, discriminate, evaluate, explain, interpret, justify, relate, support **Examples**: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget. **Prompts**: How would you rate …? What criteria would you use to assess…? Do you agree (that)…? How would you rank the importance of…?