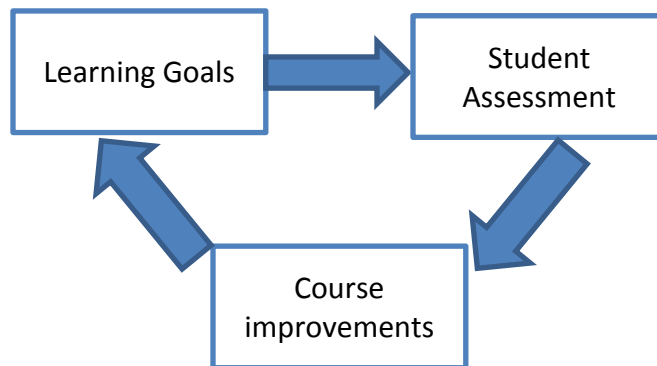# Writing Learning Outcomes

Introduction: Why?

Clearly stated learning goals focus the content, teaching methods and assessment methods on expected outcomes, and make expected outcomes clear to students.

Well-stated learning outcomes guide the design of exams, homework or other assessment tools used in the class, and the performance of students on assessments guide the instructor to make improvements to the course to better reach learning goals. Thus formulating *actionable* learning goals can help *close the loop* between student learning and course design, as shown in the below diagram.

It is an important and worthwhile exercise to *invest time* to formulate actionable learning goals. Learning goals provide a course with a clear focus.

When writing learning goals/outcomes, ask yourself the following questions:

1. What do I want students to be able to do as a result of taking this course?
2. How do I assess that students will actually be able to do these things?
3. How do I use the result of the assessment to improve the course to better meet learning goals?

Requirement

Because of national accrediting requirements, syllabi for all new course proposals will be required to contain appropriate learning outcomes. Instructors are also encouraged to revise syllabi for existing courses to include learning outcomes if they haven't already done so. Eventually all courses will require well-stated learning goals.

How?

Measurable learning outcomes typically consist of:
- Focus on what the student will be able to do as a result of instruction/ active participation in a course
- Specific criteria for student success: What would constitute proficiency?
- Aligned assessment methods: How is proficiency assessed?

Learning outcomes are most easily written by using the phrase: "Students will be able to" , combined with action verbs, such as organize, apply, articulate, evaluate, use, solve, calculate, apply, etc.

How many learning outcomes should be included? It is better to formulate a few of the most important learning outcomes ("If my students could really learn this, I would be happy"), rather than providing an exhaustive list. Clearly, this depends on the course, but typically, 3-5 outcomes are appropriate. More than 10 is probably not a good idea, as the class (and the students) will lose focus.

List of useful action verbs can be taken from "Bloom's taxonomy " (see for example: http://www.clemson.edu/assessment/assessmentpractices/referencematerials/documents/Blooms%20Taxonomy%20Action%20Verbs.pdf):

Cognitive Learning	Action Verbs:
Knowledge - to recall or remember facts without necessarily understanding them	arrange, define, duplicate, label list, memorize, name, order, recognize, relate, recall, reproduce, list, tell, describe, identify, show, label, collect, examine, tabulate, quote
Comprehension – to understand and interpret learned information	classify, describe, discuss, explain, express, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend, translate, review, restate, locate, recognize, report
Application – to put ideas and concepts to work in solving problems	apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, calculate, complete, show, examine, modify, relate, change, experiment, discover
Analysis – to break information into its components to see interrelationships and ideas	analyze, appraise, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, separate, order, connect, classify, arrange, divide, infer
Synthesis – to use creativity to compose and design something original	arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, set up, rewrite,

	integrate, create, design, generalize
Evaluation – to judge the value of information based on established criteria	appraise, argue, assess, attach, defend, judge, predict, rate, support, evaluate, recommend, convince, judge, conclude, compare, summarize
Affective Learning	appreciate, accept, attempt, challenge, defend, dispute, join, judge, praise, question, share, support

Examples of learning outcomes:

"Students will be able to *locate* relevant articles on research topics using a scientific database, and *perform* advanced searches using logical operators, such as AND and OR."

"Students will be able to *articulate* differences between materialism and idealism, both orally and in writing."

"Students will be able to *synthesize* various sources describing the socioeconomic factors influencing language skills and be able to *formulate* possible strategies to overcome socioeconomic disadvantages in language learning."

"Students will be able to *apply* Schrödinger's equation to any 1D potential and be able to *solve* the equation square and parabolic potential wells."

Assessment methods

These examples show that formulating clear learning outcomes often suggests appropriate methods of assessing student learning. For example, if students are supposed to *locate* resources in databases, then a project or exercise would be an appropriate and useful way to assess such a skill. If they are supposed to be able to *apply* an equation to various situations, then homework and exams may give students adequate opportunity to demonstrate this.

Many students are primarily motivated by grades and will "study to the test". This is an unfortunate, but often true observation. Therefore, if your assessment tools, which determine the students' grades, are not aligned with your stated learning goals, students will likely not meet these goals.

Having well-articulated learning outcomes also provides a clear path to create grading rubrics for a course. Moreover, by using clear, delineated learning outcomes and aligned assessments, stumbling blocks can be more clearly isolated and addressed.

Sources and further reading:

"Writing Measurable Learning Outcomes", by Sandi Osters, Director of Student Life Studies and F. Simone Tiu, Assistant Director for Institutional Effectiveness, 3rd Annual Texas A&M Assessment Conference, URL: http://www.gavilan.edu/research/spd/Writing-Measurable-Learning-Outcomes.pdf

"Student Learning Outcomes 101", University of Rhode Island, URL: http://www.uri.edu/assessment/media/public/page_files/uri/outcomes/student/outcomes/outcomes_tools/Handout_Student_Learning_Outcomes_101__8_7_06.pdf

"Writing learning outcomes for the Core Curriculum" & "How to write learning outcomes", UCSB, http://www.ncgia.ucsb.edu/education/curricula/giscc/units/format/outcomes.html

More examples (some of these are program-, rather than course-level learning outcomes, but they illustrate the basic idea):

Examples from the physical sciences:
http://www.physics.ucsb.edu/education/undergrad/learning-outcomes

Examples from the humanities:
http://www.unm.edu/~thinker/objectives.html

Examples from social sciences:
http://www.american.edu/cas/sociology/resources/learning-outcomes.cfm