Developing Program Learning Outcomes

November 14, 2011, R. W. Larsen

Student learning outcomes (SLOs) can be written for a course, a program, or an institution. This document focuses specifically on learning outcomes for programs (e.g., degree programs). In many cases, these are easier to write than course learning outcomes, because they are typically less specific.

Keep it Simple

Learning outcomes should be written as simple declarative statements. Overly complex or convoluted statements become very difficult to assess.

> **Poor Example:** Students will be able to ride a red horse and jump a fence or throw a ball.
> **Better Example:** Students will be able to jump a three-foot fence in a single bound.

Both examples are dumb, but at least the better example is comprehensible.

Focus on Student Learning

By starting learning outcomes with phrases such as "Graduates will…" you help ensure that the focus is on student learning and abilities. These are <u>not</u> student learning outcomes:

- Students pursuing this degree will study the masters of British literature.
- Our program is designed to create the leaders of tomorrow.

Learning outcomes should focus on the <u>expected</u> capabilities of the students upon successful completion of the program (hence the "will" in the starter phrases), not on the <u>actual performance</u> determined at the end of the program.

- **OK:** Our goal is to have at least 80% of students able to correctly compute a standard deviation for a set of values.
- **NOT OK:** Historically, 86.5% of graduates (±3.2%) were able to correctly compute a standard deviation for a set of values.

The NOT OK statement indicates measured performance, not an expected outcome. There is a place for these statements, but they are not learning outcomes.

Note that the OK learning outcome has the target value (80%) built in. This is OK, but the targets are often not included in the outcome (they are included in the Assessment Plan). Student learning outcomes are generally provided to the student and typically simply state what the desired outcome will be, as:

- **Better:** Graduates will be able to correctly compute a standard deviation for a set of values.

Program Outcomes

Program outcomes are much broader in scope than course outcomes. A common set of program learning outcomes contains:

- An outcome related to having the requisite knowledge for a discipline.
- An outcome related to being able to function as a professional in the discipline.
- An outcome related to critical thinking and higher-lever cognitive skills.
- An outcome related to communication skills.
- An outcome related to ethical decision making.
- Outcomes specific to a discipline.

While programs are certainly not required to use this set of outcomes, these are very common.

If this set were used, the program outcomes might be written as:

Our graduates will:

1. *have the knowledge required to be successful in their field.*
2. *have the skills needed to be able to function successfully in their field.*
3. *be able to analyze problems in their field and develop solutions or strategies to solve those problems.*
4. *be able to communicate effectively.*
5. *be able to apply the discipline's code of ethics when making decisions.*
6. *be able to design an experiment and analyze data.*

These may seem to be too vague to be useful, but if the goal is to keep the number of program outcomes to a workable number, they have to be fairly general. The specificity comes during the assessment process, because the components of each outcome can be assessed separately.

Components of Program Learning Outcomes

Program learning outcomes are typically quite broadly written to keep the number of outcomes to a manageable number. The broad outcome can be further defined by considering the components required to achieve the outcome. For example, most would agree that the "communicate effectively" outcome would include at least the following components:

- Ability to organize a presentation in a coherent fashion.
- Ability to research a topic.
- Ability to create a persuasive argument.
- Ability to write grammatically correct sentences and paragraphs.

These components are assessed using a scoring rubric, such as the following:

Scoring Rubric: Our graduates will be able to communicate effectively				
	Unacceptable	**Marginal**	**Proficient**	**Superior**
Structure	Unclear, often because thesis is weak or non-existent. Transitions confusing and unclear. Few topic sentences.	Generally unclear, often wanders or jumps around. Few or weak transitions, many paragraphs without topic sentences.	Generally clear and appropriate, though may wander occasionally. May have a few unclear transitions, or a few paragraphs without strong topic sentences.	Evident, understandable, appropriate for thesis. Excellent transitions from point to point. Paragraphs support solid topic sentences.
Evidence	Very few or very weak examples. General failure to support statements, or evidence seems to support no statement. Quotes not integrated into sentences; "plopped in" in improper manner. Demonstrates a little understanding of (or occasionally misreads) the ideas in the assigned reading and does not critically evaluates/responds to those ideas in an analytical, persuasive manner.	Examples used to support some points. Points often lack supporting evidence, or evidence used where inappropriate (often because there may be no clear point). Quotes may be poorly integrated into sentences. Demonstrates a general understanding of the ideas in the assigned reading and only occasionally critically evaluates/responds to those ideas in an analytical, persuasive manner.	Examples used to support most points. Some evidence does not support point, or may appear where inappropriate. Quotes well integrated into sentences. Demonstrates a solid understanding of the ideas in the assigned reading and critically **evaluates**/responds to those ideas in an analytical, persuasive manner.	Primary source information used to buttress every point with at least one example. Examples support mini-thesis and fit within paragraph. Excellent integration of quoted material into sentences. Demonstrates an in depth understanding of the ideas in the assigned reading and critically evaluates/responds to those ideas in an analytical, persuasive manner.
Analysis	Very little or very weak attempt to relate evidence to argument; may be no identifiable argument, or no evidence to relate it to. More description than critical thinking.	Quotes appear often without analysis relating them to mini-thesis (or there is a weak mini-thesis to support), or analysis offers nothing beyond the quote. Even balance between critical thinking and description.	Evidence often related to mini-thesis, though links perhaps not very clear. Some description, but more critical thinking. Usually **interprets** evidence correctly.	Author clearly relates evidence to "mini-thesis" (topic sentence); analysis is fresh and exciting, posing new ways to think of the material. Work displays critical thinking and avoids simplistic description or summary of information.
Mechanics	Big problems in sentence structure, grammar, and diction. Frequent major errors in citation style, punctuation, and spelling. May have many run-on sentences and comma splices. Does not conform to format requirements.	Problems in sentence structure, grammar, and diction (usually not major). Some errors in punctuation, citation style, and spelling. May have some run-on sentences or comma splices. Conforms in almost every way to format requirements.	Sentence structure, grammar, and diction strong despite occasional lapses; punctuation and citation style often used correctly. Some (minor) spelling errors; may have one run-on sentence or comma splice. Conforms in every way to format requirements.	Sentence structure, grammar, and diction excellent; correct use of punctuation and citation style; minimal to no spelling errors; absolutely no run-on sentences or comma splices. Conforms in every way to format requirements.

Extracted from a more complete rubric by Dr. Sophia McClennen, *General Evaluation Rubric for Papers,* (http://www.personal.psu.edu/users/s/a/sam50/rubric.htm)

The broad statements typically used as program learning outcomes can be handled by assessing numerous components separately. You may need to use multiple assignments, possibly from multiple courses, to assess all components. For example, the "communicate effectively" outcome might involve a

writing assignment and an oral presentation. You generally try to use assignments from upper-division courses (capstone courses are commonly used) to better assess the capabilities of (soon-to-be) graduates.

When you are developing the scoring rubrics, it is important to consider the skill level that you expect your students to achieve in your program. Typically, students completing college programs should have attained a fairly high level of performance in most of the program learning outcomes. That is, they should have a well-developed cognitive skill level in most areas.

To think about cognitive skill level, consider this abbreviated table of (old) Bloom Taxonomy[1] verbs:

I: Introductory Level		D: Developing Level		M: Mastery Level	
Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
defines	comprehends	applies	analyzes	categorizes	concludes
describes	distinguishes	computes	compares	composes	critiques
identifies	interprets	demonstrates	contrasts	creates	defends
knows	summarizes	prepares	distinguishes	devises	evaluates
lists		solves		designs	interprets
recognizes				modifies	justifies

Note: "Mastery" implies a level considered proficient at time of graduation.

While it is appropriate to focus on introductory level skills in freshman-level courses, most college graduates are expected to function at the mastery level. The way you demonstrate that students have these skills is to use the mastery-level verbs in your scoring rubrics. Examples of this have been highlighted in the scoring rubric on the previous page.

Targets or Threshold Values

The terms target and threshold are sometimes used interchangeably in the assessment arena, but consider the following definitions:

- *Target* – aspirational goal or objective
- *Threshold* – value at which a response is required

For example, a department's faculty members might desire to see 75% of students score in the "proficient" or higher categories on the "communicate effectively" rubric, but if scores on any component fall below 70% "proficient" or higher the faculty will take action to fix the problem.

In this case, the target is 75% "proficient" or higher, but the response threshold is 70%.

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[1] Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: the classification of educational goals; Handbook I: Cognitive Domain* New York, Longmans, Green, 1956.

Example

The faculty of a department had been hearing for some time that their graduates were poor writers. They decided in 2001 to build more writing into the curriculum, and they used the scoring rubric on page 3 to assess student performance on the new writing assignments. The following graph shows the student performance in the Analysis category over time.

Percent "Proficient" or Higher
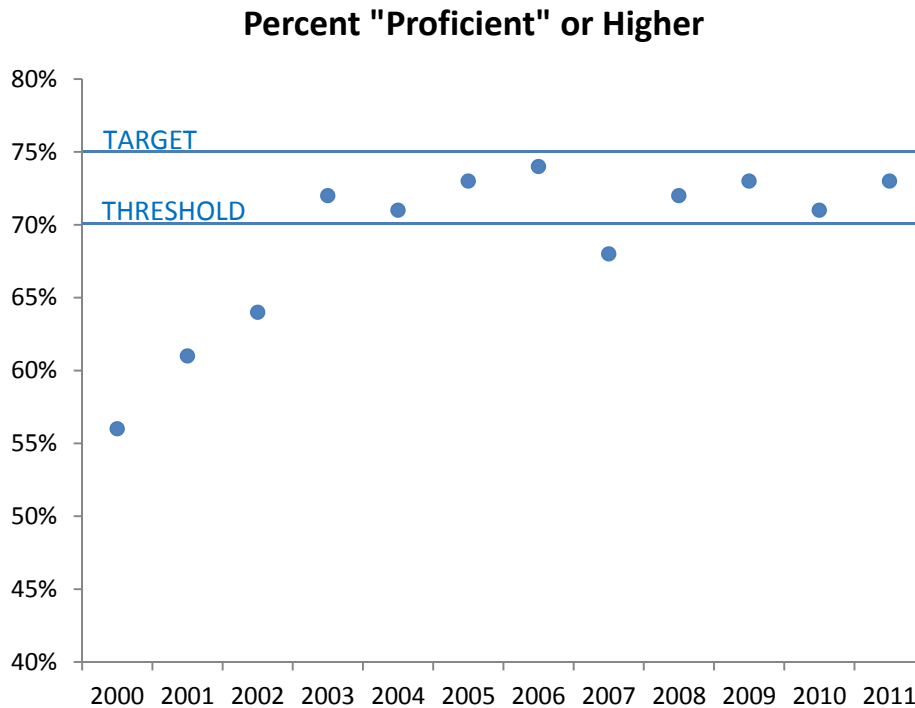
It took a while for the course changes to be fully implemented, but student performance passed the threshold value of 70% in 2003 and has stayed above the response threshold ever since – with one exception: 2007.

In 2007, student performance fell below the threshold so the faculty members did some investigating. They discovered that the usual instructor was on sabbatical that year, and the replacement instructor struggled with the course. Since the original instructor was returning from sabbatical, the faculty response was a decision to continue to monitor the scores and see if restoring the original instructor fixed the problem. Based on the student performance scores since 2008, it looks like they made the right decision – but they are still working towards the target of 75%.

The threshold for the "communicate effectively" program learning outcome could be written as follows:

> *70% of students will score at a level of "proficient" or higher on each component of the "communicate effectively" scoring rubric.*

Each program learning outcome needs to be assigned a response threshold value; target values are optional.