Learning Outcome Statements

Learning outcomes (LOs), sometimes called learning goals, are the knowledge, skills, attitudes, and habits of mind that students take with them from a learning experience.[1] The term objective is often used synonymously with outcomes, but objectives refer to statements of instructor intention for a learning activity, course, or program whereas an outcome refers to an observable demonstration of learning by students. Learning outcomes are also sometimes referred to as competencies or proficiencies, but these terms typically refer specifically to skills rather than knowledge, values, or attitudes.[1] Outcome statements are used to describe the learning students will be able to demonstrate proficiently by the completion of one or more structured learning experiences. Learning outcomes exist in a continuum of forms depending on the function they serve. Referred to generally as student learning outcomes (SLOs), the scope of an outcome typically defines its nomenclature and the acronym that is used. For example, in ascending scope, student learning outcomes may serve at the course level as course learning outcomes (CLOs), the program level as program learning outcomes (PLOs), and at the level of the university as institutional learning outcomes (ILOs). Other naming permutations are possible based on the terminology and structures in individual institutions and organizations, but these three general levels of learning outcome are common.

Dimensions of Learning Outcomes

To understand the function of a LO, it is useful to consider the type of learning represented in the outcome. A LO statement can be organized into one of four broad dimensions[2]:

1. Knowledge outcomes: cognitive content, core concepts or questions, principles of inquiry, a broad history, or disciplinary techniques
2. Skills outcomes: applications, basic skills, higher-order cognitive skills, knowledge-building skills, or skills of practice in professions and occupations
3. Attitudes and values outcomes: affective outcomes, personal/professional/social values, ethical principles
4. Behavioral outcomes: manifestations of knowledge, skills, and attitudes; performances and contributions

Typically, programs articulate a range of 5–7 PLOs, and this assemblage of outcome statements should represent the balance of learning dimensions addressed in the program of study.

The A, B, C, D Elements of Learning Outcome Statements

Learning outcomes statements are composed of four key elements: Audience, Behavior, Condition/Context, and Degree—the A, B, C, D pattern. The first two elements, Audience and Behavior, are essential components while Conditions, Contexts, and Degrees within an outcome are optional and provide additional information. When composing or analyzing outcome statements, consider each of these four potential outcome statement elements:

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[1] Suski, L. (2009) Assessing student learning: A common sense guide (2nd ed.). Jossey-Bass.

[2] Driscoll, A., & Wood, S. (2007). Outcomes-based assessment for learner-centered education: A faculty introduction. Stylus, LLC.

- **Audience**: (necessary) the target audience of the outcome. Most outcome statements begin with an explicit or implied audience statement. For example, "Students will be able to . . . "
- **Behavior**: (necessary) the ultimate observable behavior students will exhibit to demonstrate mastery of the learning in a course (for CLOs), and cumulatively across courses in the overall program (for PLOs). An operative verb in the statement, aligned to Bloom's Revised Taxonomy, describes the mastery-level, observable and measurable learning behavior. This verb usually follows the audience portion of the outcome statement and is the key signifier of the level of learning that must be demonstrated to meet the outcome.

- **Condition/Context**: (optional) any conditions or contexts that influence the successful demonstration of the outcome. Examples of these can include a process performed with specific information or tools, a task performed in specific conditions or contexts, or tasks completed within a specific timeframe.

- **Degree**: (optional) the amount or degree to which the outcome will be achieved or demonstrated to constitute success. Examples of degree include levels of precision and/or accuracy, specific degrees of quality, or descriptions of the level of mastery expected.

S.M.A.R.T. Learning Outcomes

Effective learning outcome statements exhibit five qualities represented by the acronym S.M.A.R.T.:

- **Specific**—The outcome is well-defined, clear, and has a focused operative verb indicating the intended level of learning.

- **Measurable**—Metrics or measures can be used to ascertain progress and achievement of the outcome**.**

- **Attainable**—Under the given conditions, the outcome is capable of being mastered.

- **Relevant**—The outcome contributes to achieving the program's mission and goals.

- **Time-bound**—The outcome is articulated to be attainable within an effective timeframe.

Classifying Learning Outcomes:

Revised Bloom's Taxonomy of the Cognitive Domain

Significant space could be devoted to a thorough discussion of learning outcome classification paradigms and taxonomies. To address outcome classifications succinctly and in a familiar format, the Revised Bloom's Taxonomy is used here. However, while this material addresses the taxonomy briefly to provide a general structure, those interested in learning more about Bloom's Taxonomy and other outcome taxonomies should review the Assessment Toolbox page containing links to useful resources for using taxonomies and structuring learning outcome statements and contact the Office of Assessment with any questions.

Bloom's Taxonomy was created to establish a common language for educational outcomes and provide a means of classification to assist those who work with curricular structures and evaluation[3]. The taxonomy was revised in 2001 to reflect an updated understanding of how learning occurs, to reflect how teachers structure and assess learning, and to make the taxonomy more practical and useful to educators[4]. Bloom's Taxonomy is hierarchical with each higher level subsuming the levels below it. Each level of the taxonomy reflects growth of understanding and capabilities of the learner as the learner ascends the hierarchical structure. In fact, Bloom's Taxonomy is a collection of different but related taxonomies pertaining to three main domains: the Cognitive (the knowledge-based domain with six levels); the Affective (the attitudinal-, behavioral-, value-based domain with five levels); and the Psychomotor (the skills-based domain consisting of six levels). Many educators have encountered the revised cognitive process domain in the form of a one-dimensional pyramid that illustrates six levels of learning:
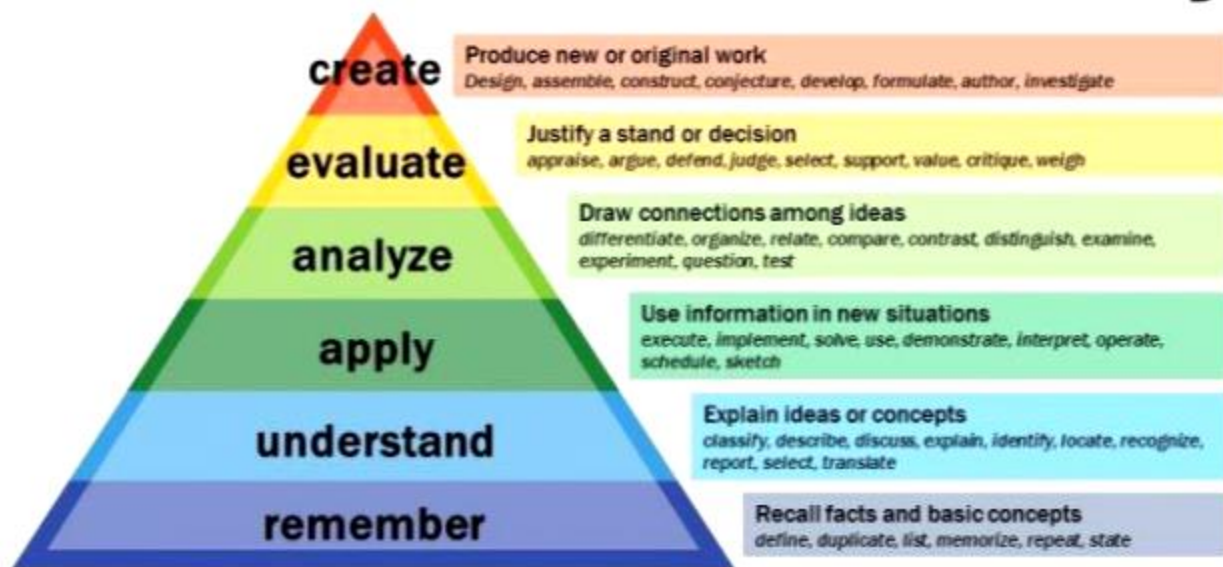
LOs addressing cognitive skills draw heavily on the action verbs associated with the levels of learning in the cognitive domain. This operant verb in an outcome statement signals the level of learning that the learner should be able to demonstrate proficiently by the completion of the learning. It is important to remember that the operant verb in an outcome statement should be observable and measurable. Verbs such as "remember" and "understand" are *not effective verbs in outcome statements because it is not clear what the student is required to do to demonstrate the learning*. The Assessment Toolbox page provides examples of the taxonomies for the affective and psychomotor domains.

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[3] Bloom, B., Englehart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). Taxonomy of educational objectives: Book 1 cognitive domain. Longman.

[4] Anderson, L., Krathwohl, D., Airasian, P., Cruikshank, K., Mayer, R., Pintrich, P., Raths, J., & Wittrock, M. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of education objectives. Longman.

The Cognitive Domain and Knowledge Dimension Matrix

The revised taxonomy of the cognitive process dimension developed upon this one-dimensional taxonomic structure by demonstrating that cognitive skills interact with another domain—the Knowledge dimension. The Knowledge dimension is comprised of four major types[4]:

1. <u>Factual Knowledge</u>: The basic elements learners must know to be acquainted with a discipline or solve problems in it
2. <u>Conceptual Knowledge</u>: The interrelationships among the basic elements within a larger structure that enable them to function together
3. <u>Procedural Knowledge</u>: How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods
4. <u>Metacognitive Knowledge</u>: Knowledge of cognition in general as well as awareness and knowledge of one's own cognition

The six levels of the cognitive process dimension intersect with the four types of knowledge to create a taxonomy table within which each cognitive domain outcome statement can be classified based on the levels of cognition and knowledge it reflects:

The Knowledge Dimension	The Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural						
Metacognitive						

For example, the outcome statement, "Students will apply the scientific method to research" requires that students apply a process in a research setting. Classifying the outcome on the taxonomy table requires identification of the cognitive level of the verb—in this case "Apply"—and identifying the dimension of knowledge—in this case "Procedural". With these elements determined, the classification of this outcome can be indicated on the taxonomy table:

"Students will apply the scientific method to research"

The Knowledge Dimension	The Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural			**X**			
Metacognitive						

Outcome statements often contain more information than this example and present more difficulty when attempting to classify them. For example, the outcome "Students will develop and deliver a lesson

plan for a unit of instruction" presents a few difficulties. First, there are two verbs in the outcome – develop and deliver. The outcome should be revised to contain only one operant verb representing the highest level of learning. To do so, the outcome could be broken into two separate but related outcome statements:

- "Students will develop a lesson plan for a unit of instruction"
- "Students will deliver a lesson plan for a unit of instruction"

Both outcomes can now be mapped to a classification in the taxonomy table by analyzing the operant verbs in each statement. "Develop" exists in the Create category of the cognitive dimension while "deliver" exists in the Apply category. A difficult aspect of classification arises with the noun phrase "a lesson plan", which is being developed and delivered, as the context of the situation for the application of knowledge is different in the two outcomes. The development of a plan requires the student to assemble the various elements into a cohesive whole that accounts for the content of the lesson and the intended audience, and so this work belongs to the Conceptual category of the Knowledge dimension. Delivering an existing lesson plan requires following the intended lesson plan and determining the appropriate teaching techniques to apply for a given audience of students, so this effort belongs to the Procedural category of the Knowledge dimension. After analysis of the cognitive and knowledge tasks of the statements, the learning outcomes can now be be indicated on the taxonomy table:

"Students will develop a lesson plan for a unit of instruction" (denoted by an **X**)

"Students will deliver a lesson plan for a unit of instruction" (denoted by a ✔)

The Knowledge Dimension	The Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						**X**
Procedural			✔			
Metacognitive						

Thus, while the two outcome statements in the example above are similar, the categories of knowledge and the levels of cognitive ability reflected in the statements are different and would therefore require varied assessment strategies and criteria. The first outcome in this example requires the student to create conceptual knowledge in the form of a plan while the latter requires the student to apply procedural knowledge to deliver the lesson.

To check your understanding, consider how the classification in the first example, "Students will apply the scientific method to research" would differ if the outcome were "Students will design an experiment to test a hypothesis" or "Students will assess the efficacy of experimental designs".

Classification (from lowest cognitive verb to the highest):
"Students will apply the scientific method to research" (denoted by **X**)
"Students will assess the efficacy of experimental designs" (denoted by ★**)**
"Students will design an experiment to test a hypothesis" (denoted by ✔)

The Knowledge Dimension	The Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural			X		★	✓
Metacognitive						

While all the outcomes stated above are interested in procedural knowledge —the *how* of the scientific method and experimental designs, each outcome uses a different level of cognition ranging from application to creation. Attention to these elements of learning outcomes is important to apply the appropriate assessment methods to assess the articulated learning of the outcome. Bloom's Taxonomy is the most widely used and recognizable learning taxonomy, but other useful taxonomies exist. See the Assessment Toolbox page for lists of verbs corresponding to Bloom's Taxonomy domains, illustrations of the domain taxonomies, and more examples of learning taxonomies.

Lists of verbs corresponding to Bloom's Taxonomy domains as well as illustrations of the domain taxonomies can be found on the Assessment Toolbox page.

Why Classify Outcome Statements?

By articulating learning in outcome statements, the learning becomes an objective that can be identified, measured, and the resulting information analyzed. Explicitly stated objectives allow students to understand the expectations of courses and programs of study and allow instructors and programs to effectively structure learning experiences and gather data on student learning, thereby improving intentionality and focus. A taxonomy provides an organizing framework, a continuum of categorizations, and a shared nomenclature allowing for the organization of learning outcomes in courses, programs, and the institution. Furthermore, classifying learning outcomes and teaching objectives allows for vertical communication to identify and analyze how each statement fits within the larger framework of statements such as the institutional or program mission, vision, and value statements down to the programmatic, course, and lesson levels.