Using Bloom's Taxonomy to Write Effective Learning Objectives

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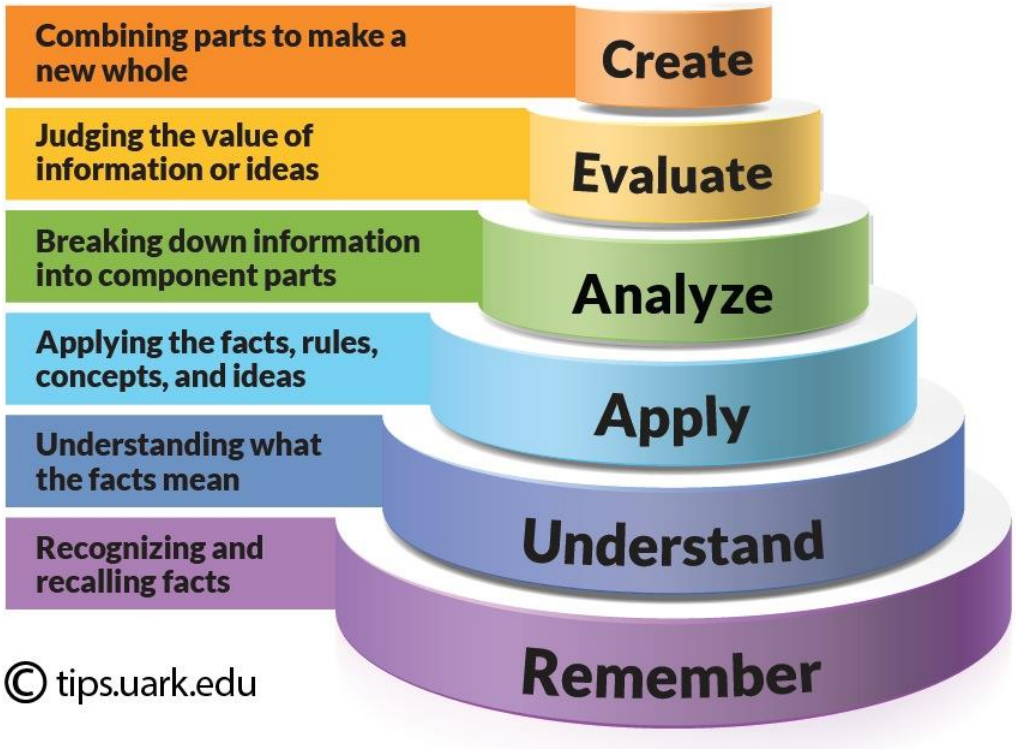
What is Bloom's Taxonomy

Bloom's Taxonomy is a classification of the different objectives and skills that educators set for their students otherwise known as learning objectives. The taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. The terminology has been recently updated to include the following six levels of learning. These 6 levels can be used to structure the learning objectives, lessons, and assessments of your course. :

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
2. **Understanding:** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
3. **Applying:** Carrying out or using a procedure for executing or implementing.
4. **Analyzing:** Breaking material into constituent parts and determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.
5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing.
6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

Like other taxonomies, Bloom's is hierarchical, meaning that learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels. You will see Bloom's Taxonomy often displayed as a pyramid graphic to help demonstrate this hierarchy. We have updated this pyramid into a "cake-style" hierarchy to emphasize that each level is built on a foundation of the previous levels.



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How Bloom's can aid in course design

Bloom's taxonomy is a powerful tool to help develop learning objectives because it explains the process of learning:

- Before you can ***understand*** a concept, you must ***remember*** it.
- To ***apply*** a concept you must first ***understand*** it.
- In order to ***evaluate*** a process, you must have ***analyzed*** it.
- To ***create*** an accurate conclusion, you must have completed a thorough ***evaluation***.

However, we don't always start with lower-order skills and step through the entire taxonomy for each concept you present in your course. That approach would become tedious–for both you and your students! Instead, start by considering the level of learners in your course:

1. Are lots of your students freshmen? Is this an "Introduction to…" course? If so, many of your learning objectives may target the lower-order Bloom's skills, because your students are building foundational knowledge. However, even in this situation, we would strive to move a few of your objectives into the ***applying*** and ***analyzing*** level, but getting too far up in the taxonomy could create frustration and unachievable goals.

2. Are most of your students juniors and seniors? Graduate students? Do your students have a solid foundation in much of the terminology and processes you will be working on in your course? If so, then you should not have many ***remembering*** and ***understanding*** level objectives. You may need a few, for any radically new concepts specific to your course. However, these advanced students should be able to master higher-order learning objectives. Too many lower-level objectives might cause boredom or apathy.

How Bloom's works with learning objectives

Fortunately, there are "verb tables" to help identify which action verbs align with each level in Bloom's Taxonomy.

You may notice that some of these verbs on the table are associated with multiple Bloom's Taxonomy levels. These "multilevel verbs" are actions that could apply to different activities. For example, you could have an objective stating "At the end of this lesson, students will be able to **explain** the difference between H2O and OH-." This would be an ***understanding***-level objective. However, if you wanted the students to be able to "…**explain** the shift in the chemical structure of water throughout its various phases." This would be an ***analyzing***-level verb.

Adding to this confusion, you can locate Bloom's verb charts that list verbs at levels different from what we list below. Just keep in mind that it is the skill, action, or activity you will teach *using that verb* that determines the Bloom's Taxonomy level.

Bloom's Level	Key Verbs (keywords)	Example Learning Objective
Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop.	*By the end of this lesson, the student will be able to desi an original homework problem dealing with the principl of conservation of energy.*
Evaluate	choose, support, relate, determine, defend, judge, grade, compare, contrast, argue, justify, support, convince, select, evaluate.	By the end of this lesson, the student will be able to determine whether using conservation of energy or conservation of momentum would be more appropriate for solving a dynamics problem.

Analyze	classify, break down, categorize, analyze, diagram, illustrate, criticize, simplify, associate.	*By the end of this lesson, the student will be able to* differentiate between potential and kinetic energy.
Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, perform, present.	*By the end of this lesson, the student will be able to* calculate the kinetic energy of a projectile.
Understand	describe, explain, paraphrase, restate, give original examples of, summarize, contrast, interpret, discuss.	*By the end of this lesson, the student will be able to* describe Newton's three laws of motion in her/his ov words
Remember	list, recite, outline, define, name, match, quote, recall, identify, label, recognize.	*By the end of this lesson, the student will be able to* recit Newton's three laws of motion.

Learning objective examples adapted from, Nelson Baker at Georgia Tech: nelson.baker@pe.gatech.edu

How Bloom's works with Quality Matters

For a course to meet the Quality Matters standards, it must have measurable learning objectives. Using a verb table like the one above will help you avoid verbs that cannot be quantified, like: understand, learn, appreciate, or enjoy. Quality Matters also requires that your course assessments (activities, projects, and exams) align with your learning objectives. For example, if your learning objective has an ***application***-level verb, such as "present," then you cannot demonstrate that your students have mastered that learning objective by simply having a multiple-choice quiz.

Course-level and lesson-level objectives

The biggest difference between course and lesson-level objectives is that we don't directly assess course-level objectives. Course-level objectives are just too broad. Instead, we use several lesson-level outcomes to demonstrate mastery of one course-level outcome. To create good course-level objectives, we need to ask ourselves: "What do I want the students to have mastery of at the end of the course?" Then, after we finalize our course-level outcomes, we have to make sure that mastery of all of the lesson-level outcomes underneath confirms that a student has mastery of the course-level outcome–in other words, if your students can prove (through assessment) that they can do every one

of the lesson level outcomes in that section, then you as an instructor agree they have mastery of the course level outcome.

How Bloom's works with course level and lesson level objectives:

- Course-level objectives are broad. You may only have 3-5 course-level objectives. They would be difficult to measure directly because they overarch the topics of your entire course.
- Lesson-level objectives are what we use to demonstrate that a student has mastery of the course-level objectives. We do this by building lesson-level objectives that build toward the course-level objective. For example, a student might need to demonstrate mastery of 8 lesson-level objectives in order to demonstrate mastery of one course-level objective.
- Because the lesson-level objectives directly support the course-level objectives, they need to build up the Bloom's Taxonomy to help your students reach mastery of the course-level objectives. Use Bloom's Taxonomy to make sure that the verbs you choose for your lesson-level objectives build up to the level of the verb that is in the course-level objective. The lesson level verbs can be below or equal to the course level verb, but they CANNOT be higher in level. For example, your course level verb might be an ***Applying*** level verb, "illustrate." Your lesson-level verbs can be from any Bloom's level that is equal or below this level (applying, understanding, or remembering).

Steps towards writing effective learning objectives:

1. Make sure there is one measurable verb in each objective.
2. Each objective needs one verb. Either a student can master the objective, or they fail to master it. If an objective has two verbs (say, *define* and *apply*), what happens if a student can define, but not apply? Are they demonstrating mastery?
3. Ensure that the verbs in the course level objective are *at least* at the highest Bloom's Taxonomy as the highest lesson level objectives that support it. (Because we can't verify they can **evaluate** if our lessons only taught them (and assessed) to **define.**)
4. Strive to keep all your learning objectives measurable, clear, and concise.

When you are ready to write, it can be helpful to list the level of Bloom's next to the verb you choose in parentheses. For example:

Course level objective 1. *(apply)* Demonstrate how transportation is a critical link in the supply chain.

1.1. *(understand)* Discuss the changing global landscape for businesses and other organizations that are driving change in the global environment.

1.2. *(apply)* Demonstrate the special nature of transportation demand and the influence of transportation on companies and their supply chains operating in a global economy.

This trick will help you quickly see what level verbs you have. It will also let you check that the course level objective is *at least* as high of a Bloom's level as any of the lesson level objectives underneath.

Before you begin constructing your objectives:

Please read our Learning Objectives: Before and After Examples page.

Additional External Resources:

For a longer list of Bloom's Verbs – TIPS tip: You can also use the "find" function (press: Ctrl-f or command-f on a mac) in your browser to locate specific verbs on this list.