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What is Bloom's Taxonomy

Bloom's Taxonomy is a classification of the different outcomes and skills that educators set for their students (learning outcomes). 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 outcomes, 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, 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.

How Bloom's can aid in course design

Bloom's taxonomy is a powerful tool to help develop learning outcomes 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 all the way 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 freshman? Is this an "Introduction to…" course? If so, many your learning outcomes 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 outcomes 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 your course? If so, then you should not have many ***remembering*** and ***understanding*** level outcomes. 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 outcomes might cause boredom or apathy.

How Bloom's works with learning outcomes

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 outcome that states "At the end of this lesson, students will be able to **explain** the difference between H2O and OH-." This would be an ***understanding*** level outcome. 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.

Bloom's Level	Key Verbs (keywords)	Example, Learning Outcome
Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop.	*By the end of this lesson, the student will be able to design an original homework problem dealing with the principle 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 to in her/his own 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* recite Newton's three laws of motion.

Adding to this confusion, you can locate Bloom's verb charts that will 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.

How Bloom's works with Quality Matters

For a course to meet the Quality Matters standards it must have learning outcomes that are measurable. 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 outcomes. For example, if your learning outcome has an ***application*** level verb, such as "present", then you cannot demonstrate that your students have mastered that learning outcome by simply having a multiple choice quiz.

Steps towards writing effective learning outcomes:

1. Make sure there is one measurable verb in each objective.
2. Each outcome needs one verb. Either a student can master the outcome, or they fail to master it. If an outcome 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 outcome are *at least* at the highest Bloom's Taxonomy as the highest lesson level outcomes 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 outcomes measurable, clear and concise.