Student Learning Outcomes

To understand how we might be impacting student learning we must first define our student learning outcomes and then measure if the program or service implemented to facilitate such learning was effective. *Learning Outcomes* are goals that describe how a student will be different because of a learning experience. More specifically, learning outcomes are the knowledge, skills, attitudes, and habits of mind that students take with them from a learning experience.

How do I go about writing a learning outcome?

It may be difficult to know where to start in writing a student learning outcome. Here are some questions that might help you brainstorm a list of outcomes.

1. What do you want the student to be able to do?
2. What knowledge, skill or abilities should students demonstrate?
3. How will students be able to demonstrate what they learned?
4. How does your curriculum (program/course) and outcome fit with each other?

The focus should be on what a student will be able to do after completing curriculum or after having learning experience.

Structuring an Outcome Statement

Once you have identified the intended outcomes, you will want to write a formal learning outcome statement. The key is to make sure the statement is S.M.A.R.T.

Specific-Outcome is focused on a specific category of student learning. If it is too broad, it will be difficult to measure.

Measureable- Data can be collected to measure student learning.

Attainable- The outcome is attainable given the educational experience.

Results-Focused- The program outcome is aligned with Student Learning Outcomes.

Tailored- Outcome is specifically tailored to the program.

Bloom's Taxonomy

Bloom's Taxonomy:

Although named after Bloom, the publication of *Taxonomy of Educational Objectives* followed a series of conferences from 1949 to 1953, which were designed to improve communication between educators on the design of curricula and examinations.

The first volume of the taxonomy, *Handbook I: Cognitive* was published in 1956, and in 1964 *Handbook II: Affective*. A revised version of the taxonomy for the cognitive domain was created in 2001.

Bloom's revised Taxonomy of Learning Domains

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts (rote learning). It is most often used when designing educational, training, and learning processes.

The Three Domains of Learning

The committee identified three *domains* of educational activities or <u>learning</u>:

Cognitive: mental skills (*knowledge*)

Affective: growth in feelings or emotional areas (*attitude or self*)

Psychomotor: manual or physical skills (*skills*)

Domains may be thought of as categories. Instructional designers, trainers, and educators often refer to these three categories as KSA (<u>Knowledge</u> [cognitive], <u>Skills</u> [psychomotor], and <u>Attitudes</u> [affective]). This taxonomy of learning behaviours may be thought of as "the goals of the learning process." That is, after a learning episode, the learner should have acquired new skill, knowledge, and/or attitude.

While the committee produced an elaborate compilation for the cognitive and affective domains, they omitted the psychomotor domain, however, there have been psychomotor models created by other researchers.

Bloom's Revised Taxonomy

The cognitive domain involves knowledge and the development of intellectual skills (Bloom, 1956). This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories of cognitive processes, starting from the simplest to the most complex. Lorin Anderson, a former student of Bloom, and David Krathwohl revisited the cognitive domain in the mid-nineties and made some changes.

- changing the names in the six categories from noun to verb forms
- rearranging them as shown in the chart below
- creating a processes and levels of knowledge matrix

The chart shown below compares the original taxonomy with the revised one:

The new taxonomy reflects a more active form of thinking and is perhaps more accurate.

1. Remembering: Retrieving, recalling, or recognizing knowledge from memory. Remembering is when memory is used to produce definitions, facts, or lists, or recite or retrieve material.

know	define	record
identify	recall	name
relate	memorize	recognize
list	repeat	acquire

2. Understanding: Constructing meaning from different types of functions be they written or graphic messages activities like i**nterpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.**

restate	identify	illustrate
locate	discuss	interpret
report	describe	draw
recognize	review	represent
explain	infer	differentiate
express	conclude	

3. Applying: Carrying out or using a procedure through **executing, or implementing**. Applying related and refers to situations where learned material is used through products like models, presentations, interviews or simulations.

apply	organize	practice
relate	employ	calculate
develop	restructure	show
translate	interpret	exhibit
use	demonstrate	dramatize
operate	illustrate	

4. Analyzing: Breaking material or concepts into parts, determining how the parts relate or interrelate to one another or to an overall structure or purpose. Mental actions included in this function are **differentiating, organizing, and attributing**, as well as **being able to distinguish between** the components or parts. When one is analyzing he/she can illustrate this mental function by creating spreadsheets, surveys, charts, or diagrams, or graphic representations.

analyze	differentiate	experiment
compare	contrast	scrutinize
probe	investigate	discover
inquire	detect	inspect
examine	survey	dissect
contrast	classify	discriminate
categorize	deduce	separate

5. **Evaluating:** Making judgments based on criteria and standards through **checking and critiquing**. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy evaluation comes before creating as it is often a necessary part of the precursory behavior before creating something.

judge	argue	validate
assess	decide	consider
compare	choose	appraise
evaluate	rate	value
conclude	select	criticize
measure	estimate	infer
deduce		

 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**. Creating requires users to put parts together in a new way or synthesize parts into something new and different a new form or product. This process is the most difficult mental function in the new taxonomy.

compose	plan	propose
produce	invent	develop
design	formulate	arrange
assemble	collect	construct
create	set up	organize
prepare	generalize	originate
predict	document	derive
modify	combine	write
tell	relate	propose

Guideline for writing learning outcomes:
As a result of participating in (program or experience), students should be able to (action verb) + (defined by explicit and observable terms).

Writing better multiple- choice questions

Some basic rules: -

Rule #1: Test comprehension and critical thinking, not just recall

Multiple choice questions are criticized for testing the superficial recall of knowledge. You can go beyond this by asking learners to interpret facts, evaluate situations, explain cause and effect, make inferences, and predict results.

Rule #2: Use simple sentence structure and precise wording

Write test questions in a simple structure that is easy to understand. And try to be as accurate as possible in your word choices.

Rule #3: Place most of the words in the question stem

If you're using a question stem, rather than an entire question, ensure that most of the words are in the stem. This way, the answer options can be short, making them less confusing and more legible.

Rule #4: Make all distractors plausible

All of the wrong answer choices should be completely reasonable. This can be very hard to accomplish, but avoid throwing in those give-away distractors as it detracts from the test's validity.

Rule #5: Keep all answer choices the same length

Expert test-takers can use answer length as a hint to the correct answer. Often the longest answer is the correct one. So, try to keep the length of all options same.

Rule #6: Mix up the order of the correct answers

Make sure that most of your correct answers aren't in the "b" and "c" positions, which can often happen. Keep correct answers in random positions and don't let them fall into a pattern that can be detected.

Rule #7: Keep the number of options consistent

Making the number of options consistent from question to question helps learners know what to expect.

Rule #8: Use 'All of the Above' and 'None of the Above' with caution

When you run out of distracters, 'All of the Above' and 'None of the Above' can come in handy. But they may not promote good instruction. All of the Above can be an obvious give-away answer when it's not used consistently. Also, the All of the Above option can encourage guessing if the learner thinks one or two answers are correct. In addition, the downside to None of the Above is that you can't tell if the learner really knew the correct answer.

Validity of the test:

"ARE YOU MEASURING WHAT YOU THINK YOU'RE MEASURING?"

You want the test to accurately assess knowledge and skills. Hence, the questions must correspond to the most important learning objectives or actions. One way to achieve greater validity is to test the most important content. Here's a reasonably quick way to go about it.

1. Review the course goal so you can keep it in mind.
2. Create a matrix in order to determine the value of each learning objective or action.

3. Score each objective in terms of its importance to the learner's job, its difficulty and the frequency in which it occurs in the course.

Reliability Is Consistency

A test that is reliable or consistent has few variations within itself and produces similar results over time. This is often compared to a scale. If you weigh yourself every day and your weight is reasonably consistent, you consider the scale reliable. If the scale displays wildly different weights from day to day (even during the holidays), you would not consider it a reliable measure.

A test that is reliable will have a degree of consistency evidenced by these characteristics:

- The test items seem similar or highly related. The test comes together as one whole.
- There are no great leaps in difficulty, wording and tone. It might seem like one person wrote the entire test.
- If the test were administered to similar groups, you would see similarities in the scores across the groups.

How to Improve A Test's Reliability?

- Avoid creating one test for several different courses.
- Add more questions to the test. A longer test is going to be more reliable.
- Word test questions and instructions very clearly so that no other interpretations are possible.
- Make sure the answer choices are clearly different from each other and that distractors (wrong answers) are 100% wrong.
- Create test items of similar difficulty, when possible.