GUIDE FOR COURSE STUDENT LEARNING OUTCOMES SUNY Cortland

This guide provides a basic overview of elements of building student learning outcomes at the course level. Course student learning outcomes (SLOs) allow students what knowledge, skills, and attitudes they can expect to develop when they successfully complete a course. SLOs also help articulate how the course contributes to program and institutional goals.

Remember that SLOs help students AND faculty. Writing and assessing SLOs:

- Help departments understand how to better facilitate student learning.
- Provide departments with feedback.
- Enable students to articulate what they've learned.

Contents of the Guide

Effective Student Learning Outcomes

SLOs are the observable or measurable results subsequent to a learning experience. They may involve knowledge (cognitive), skills (behavioral), or attitudes and values (affective) that provide evidence that learning has occurred. SLOs also indicate the level of learning (e.g., introductory to advanced).

Basically, SLOs represent what you want students to be able to demonstrate at the end of a course. They set expectations for the type and level of learning, help in designing the course and elements within the course, and identify appropriate evaluation measures.

General Parameters for the Course Level

- Each course should have 2-5 learning outcomes that represent major themes of the course
- Students are the target audience and SLOs should use language that is accessible. Use language that students can understand rather than technical language.
- Course-level SLOs should be consistent across multiple sections of the same course. The assessments used by faculty do not need to be the same across sections,
- SLOs are not a complete list of all activities and learning that will occur, rather a focus on the primary outcomes of the course.
- SLOs should appear on course syllabi and may be presented with, or integrated into, a broader set of course objectives.

Effective Learning Outcomes: SMART Outcomes

A standard for learning outcomes/objectives is the smart model.

- **Specific** (each objective clearly states *one* skill or competency)
- **Measurable** (they describe student performance in observable terms)
- **Attainable** (they target an appropriate level of learning, within the scope of the course)
- **Relevant** (assessments align with lesson level objectives, which align with course level objectives)
- **Targeted** (written from the students' perspective in terms they can grasp)

We have created a Course SLO rubric based on the SMART model with some adaptions:

- Clarity
- Student-Centered
- Measurable
- Meaningful
- Useful
- Feasible

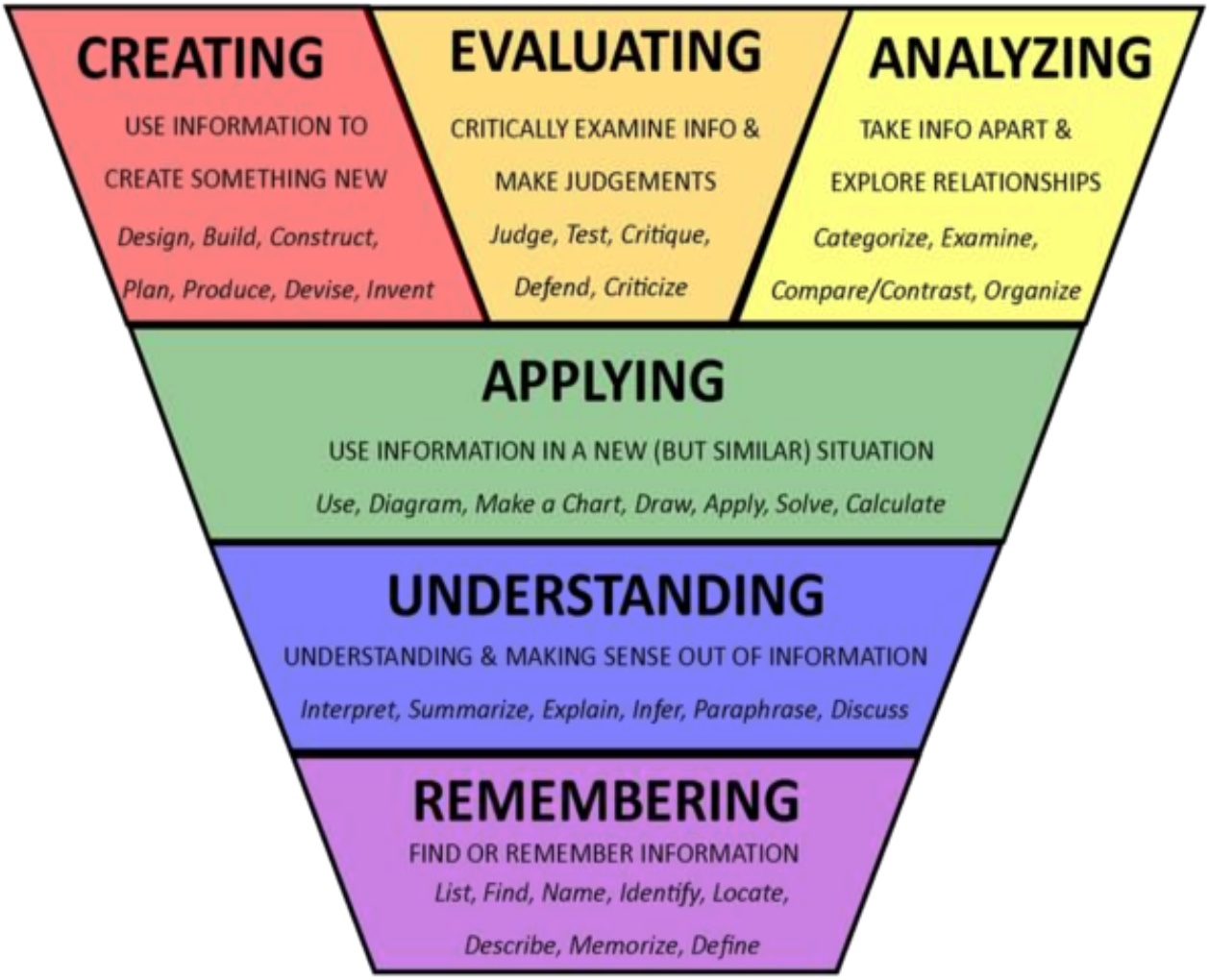
A review sheet based on these elements is included on page 12 of this guide.

Bloom's Taxonomy

Adapted with permission from the University of Arkansas Office of Academic Tech and Innovation TIPS resources.

Bloom's taxonomy first developed in the 1950's has been continually developed to include three domains (cognitive, affective and psychomotor) and to represent developments in our understanding of learning and development. You might be familiar with the original pyramid and the image below represents more current presentation of the taxonomy.

These domains and levels can guide faculty in conceptualizing and eventually writing student learning outcomes as they help us think about what types of learning are occurring and the level of learning appropriate in a given class.



Derek Bok Center for Teaching and Learning

Learning Domains

Adapted with permission from: https://www.emporia.edu/studentlife/learning-and-assessment/guide/domains.html

Learning can generally be categorized into three domains: cognitive, affective, and psychomotor. Within each domain are multiple levels of learning that progress from more basic, surface-level learning to more complex, deeper-level learning. The level of learning we strive to impact will vary across learning experiences depending on 1) the nature of the experience, 2) the developmental levels of the participating students, and 3) the duration and intensity of the experience. When writing learning objectives, it is important to think about which domain(s) is relevant to the learning experience you are designing. The tables below provide further information about each domain.

Bloom's Taxonomy has developed into three parts, or 'overlapping domains'. Bloom's development of the cognitive domain, along with David Krathwohl's work on the affective domain and Anita Harrow's work on the psychomotor domain are three pillars of the with the founding model

Cognitive	Affective	Psychomotor
knowledge	**Attitude and values**	**skills**
1. Recall data	1. Receive (awareness)	1. Imitation (copy)
2. Understand	2. Respond (react)	2. Manipulation (follow instructions)
3. Apply (use)	3. Value (understand and act)	3. Develop Precision
4. Analyze (structure/elements)	4. Organize personal value system	4. Articulation (combine, integrate related skills)
5. Synthesize (create/build)	5. Internalize value system (adopt behavior)	5. Naturalization (automate, become expert)
6. Evaluate (assess, judge in relational terms)		

Where Are Your Students on the Taxonomy?

Students come into class at varying levels, so consider the following when determining your levels:

- Is this an introductory course where no previous content knowledge is assumed at college level?
- Will there be a high number of first year students?
- Is this part of a sequence of courses? If so, where does the expected level of achievement fall compared to other courses in the sequence?
- Is this an upper division course? Does it have pre-requisites? Should objectives target higher learning?
- What is the time frame for the course and credit hours? What level of achievement can be expected in that timeframe?
- How challenging should this course be?

Cognitive Domain: Thinking

The cognitive domain deals with how we acquire, process, and use knowledge. The table below outlines the six levels in this domain and verbs that can be used to write learning objectives.

Cognitive Domain Levels					
----------Increasing Complexity---------->					
Remember	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
Retrieve relevant knowledge from long-term memory	Construct meaning from instructional messages, including oral, written, and graphic communication	Carry out or use a procedure in a given situation	Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose	Make judgments based on criteria and standards	Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure
Arrange Cite Choose Count Define Describe Duplicate Identify Label List Locate Match Name Outline Recall Recite Recognize Record Repeat Restate Review Select State	Abstract Associate Categorize Clarify Classify Compare Conclude Contrast Exemplify Explain Extrapolate Generalize Illustrate Infer Interpret Map Match Paraphrase Predict Represent Summarize Translate	Apply Carry out Demonstrate Determine Develop Employ Execute Implement Operate Show Sketch Solve Use	Analyze Attribute Deconstruct Differentiate Discriminate Distinguish Focus Organize Outline Parse Select Structure	Argue Assess Check Conclude Coordinate Criticize Critique Detect Evaluate Judge Justify Monitor Prioritize Rank Rate Recommend Test	Assemble Build Combine Compose Construct Create Design Draft Formulate Generate Hypothesize Integrate Plan Produce

The Affective Domain: Valuing

The affective domain deals with our attitudes, values, and emotions. The table below outlines the five levels in this domain and verbs that can be used to write learning objectives.

Affective Domain Levels				
----------Increasing Complexity---------->				
Receiving	**Responding**	**Valuing**	**Organization**	**Characterization**
Openness to new information or experiences	Active participation in, interaction with, or response to new information or experiences	Attaching value or worth to new information or experiences	Incorporating new information or experiences into existing value system	Full integration/ internalization resulting in new and consistent attitudes, beliefs, and/or behaviors
Ask Choose Describe Follow Give Hold Identify Locate Name Select Reply Use	Answer Assist Aid Compile Conform Discuss Greet Help Label Perform Practice Present Read Recite Report Select Tell Write	Complete Demonstrate Differentiate Explain Follow Form Initiate Join Justify Propose Read Share Study Work	Adhere Alter Arrange Combine Compare Complete Defend Formulate Generalize Identify Integrate Modify Order Organize Prepare Relate Synthesize	Act Discriminate Display Influence Listen Modify Perform Practice Propose Qualify Question Revise Serve Solve Verify Use

The Psychomotor Domain: Doing

The psychomotor domain deals with manual or physical skills. The table below outlines the five levels in this domain and verbs that can be used to write learning objectives.

Psychomotor Domain Levels				
----------Increasing Complexity---------->				
Imitation	**Manipulation**	**Precision**	**Articulation**	**Naturalization**
Observing and copying another's action/skill	Reproducing action/skill through instruction	Accurately executing action/skill on own	Integrating multiple actions/skills and performing consistently	Naturally and automatically performing actions/skills at high level
Adhere Copy Follow Repeat Replicate	Build Execute Implement Perform Recreate	Calibrate Complete Control Demonstrate Perfect Show	Adapt Combine Construct Coordinate Develop Formulate Integrate Master Modify	Design Invent Manage Project Specify

More Information and References

https://www.emporia.edu/studentlife/learning-and-assessment/guide/domains.html

REVISED BLOOM'S TAXONOMY (IOWA STATE CELT)

Anderson, L.W., & Krathwohl, D.R. (eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives*. New York: Longman.

Anderson, L.W., & Krathwohl, D.R. (eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives*. New York: Longman.

Dave, R.H. (1975). *Developing and writing behavioral objectives.* (R J Armstrong, ed.) Educational Innovators Press.

Owen Wilson, L. (2016). Anderson and Krathwohl – Bloom's Taxonomy Revised. .https://thesecondprinciple.com/teaching-essentials/beyond-bloom-cognitive-taxonomy-revised/

Writing Student Learning Outcomes: Components

When writing learning outcomes, a helpful start is considering the following components:

1. A *verb* that identifies the performance to be demonstrated
2. A *learning statement* that specifies what learning will be demonstrated in the performance
3. A broad statement of the *criterion* or standard for acceptable performance

For example:

Verb (performance)	**Learning Statement (the learning)**	**Criterion (the conditions of the performance demonstration)**
produces and debugs	source code of programs	using at least programming languages (e.g., C++, Java).
analyzes	global and environmental factors	in terms of their effects on people

Upon completion of this course students will be able to (VERB) (LEARNING) by (CRITERION).

The ABCD Components

Another similar approach is to make sure that all of the following are covered in the SLO:

Audience
Who will change and when

Behavior
What will the audience be able to do? What will demonstrate their development? Include an action verb describing the learning (e.g., Bloom's Taxonomy)

Condition
How will this learning occur? What are the circumstances that lead to the growth?

Degree
A statement of the criterion or standard for acceptable performance (level of mastery). How much, how well, to what level?

Other Considerations

- **Simplicity**: each SLO should address one learning concept and not be compound.
- **Less is more**. Write the fewest number of SLOs while still capturing the range of your course topics.
- **How does the course fit into program student learning outcomes?**

Examples of Learning Objectives by Bloom's Taxonomy

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 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.

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

Learning Objectives – examples and before & after

- Original version: *Understand immigration policy.*

How can we improve this? *Understand* is not a measurable verb. A conversation with this instructor revealed that she was really wanting to focus on historical aspects. These are things her students would be able to *describe*, which is measurable.

- Revised version: *Describe the history of American immigration policy.*

- Original version: *Describe and create a marketing plan for your organization.*

How can we improve this? This objective had two verbs. Having two verbs could result in a "split" objective, where a student could potentially meet part, but not all of the requirement. Additionally, the verbs (*describe* and *create*) were at different levels of learning according to Bloom's Taxonomy. Often a quick fix for this situation is to see if in order to complete the higher level verb (*create*) if they would presumably have to be able to also do the lower level verb (*describe*). In this case, if they can create a marketing plan, we will assume they can describe one as well.

- Revised version: *Create a marketing plan for your organization.*

- Original version: *Become familiar with the elements of editing.*

How can we improve this? This objective does not have a measurable verb. It is also too broad. We suggested using the measurable verb identify, and also defining the scope of what we want to see from the student.

- Revised version: *Identify elements of editing, including composition, setting and lighting.*

- Original version: *Complete the assignment.*

How can we improve this? This item needs to be a "to-do" list item, not a learning objective. If your assignment helps to support your course level objective, then create a learning objective that describes the purpose of the assignment using a measurable verb.

- Original version: *Explain the benefits of various exercise modalities for an elderly person.*

How can we improve this? This objective is not student centered. The instructor has described what they are going to *teach* in the lesson, not what they wanted the student to be able to do–which was "determine the most appropriate exercise for a patient."

- Revised version: *Determine the most appropriate exercise modality for health maintenance in the patient who is elderly.*

- Original version: *List types of abnormal pulmonary functions.*

How can we improve this? The verb "list" is in the lowest level of Bloom's Taxonomy, too low for this 3000 level course. When the instructor thought about what she wanted her students *to be able to do* with their knowledge of pulmonary functions, the objective became a higher level verb (determine) that was clearly measurable:

- Revised version: *Given the calculated results of tests compared with predicted normal values, determine the presence or absence of abnormal pulmonary function and classify it as to type and severity.*

- Original version: *Formulate a management plan for each of the above.*

How can we improve this? The instructor intended this objective to be third of fourth on a list. However, each objective must stand alone without reference to other objectives.

- Revised version: *Develop a management plan for the four commonly found greenhouse pests of tomatoes–aphids, fungus gnats, white-flies and scale.*

Some of the above examples were adapted from: http://www.aafp.org

Additional Learning Objective Examples:

- Creating Course Goals and Learning Objectives: (Look at the examples of course goals.)http://teachingcommons.depaul.edu/Course_Design/developing_a_course/goals.html
- This is a short list by subject, but it also lists the Bloom's levels at the end of each example: http://www.cidde.pitt.edu/ta-handbook-teaching-assistant-experience/course-design
- A very nice list of sample learning objectives by subject : http://www.cmu.edu/teaching/designteach/design/learningobjectives-samples/index.html

Review Sheet for Course Student Learning Outcomes

The following is an adaptation of the SMART model for learning outcomes. It can be used to review a course SLO.

Criteria	Above target	Target	Approaching Target	Notes
Clarity	**Very clear: Anyone in or out of the discipline could understand. States one skill or competency.**	**Somewhat clear. Reader might need additional information to understand.**	**Not clear.**	
Student-centered	**Outcome clearly focuses on students and what they will be able to demonstrate at end of course.**	**Outcome seems to focus on student and what students will be able to demonstrate at end of course.**	**Focus not on students; may focus on activity/teaching more than student learning and performance.**	
Measurable	**Outcome has very clear measures of student knowledge, skills, or behaviors.**	**Outcomes includes reference to measure of knowledge, skills, or behaviors.**	**Outcome is too broad; not stated in terms of measurable knowledge, skills or behaviors.**	
Meaningful Connection between the outcome and the overall course goal. Students can understand why they are learning this outcome.	**It is clear why outcome is critical to the course.** **People within and outside the discipline can understand how outcome contributes to the overall course.**	**It is somewhat clear why outcomes is relevant to the course.**	**It is not clear why the outcome is included.**	
Useful Can the outcome be used to make decisions on how to improve the course?	**Evidence from outcome will highly inform course decision making and contribute to performance.**	**Evidence from outcome will inform course decision making and contribute to student performance.**	**Limited evidence that outcome will inform course decision making and contribute to student performance.**	
Feasible and Reasonable Can the outcome be accomplished within timeframe of course?	**Outcome is clearly achievable within the timeframe of course.**	**Outcomes appears to be achievable within the timeframe of course.**	**What the what? No way.**	