Student Learning Outcomes: An In-Depth Look

Contents

What are Student Learning Outcomes?

Student learning outcomes (SLO) describe the knowledge, skills, and dispositions (i.e., values and attitudes) students are expected to develop by the end of a program or other learning experience. SLOs are critical components of an assessment plan. This document primarily refers to SLOs for academic programs; however, the information provided is also relevant for developing SLOs for academic and co-curricular projects, courses, workshops, activities, and the like.

Here are examples of program-level SLOs from various disciplines:

- Students will critique the methods historians have used to interpret the past.
- Students will evaluate environmental issues from a sustainability perspective.
- Students will forecast weather using meteorological data.
- Students will describe linguistic features of the foreign language in which they specialized.

Why Student Learning Outcomes are Important

SLOs are valuable at the course, program, and institutional levels in a number of ways.

1. SLOs communicate what faculty intend for students to get out of a course, major/program of study, and university degree. SLOs provide a way for faculty to communicate to students and other stakeholders (e.g., parents and employers) what faculty intend for students to learn from a course they take, from a major they select, and from completing a university degree. Faculty can share SLOs with students through course syllabi and a major/program of study website. The university can share SLOs through the university website.

2. SLOs are a planning tool for course design/redesign. Developing SLOs as a first step when creating a new course or redesigning an existing course helps establish what an instructor hopes students will learn by the time students complete the course. Using the SLOs as a guide, the instructor can then identify what students will need to do to demonstrate that they achieved those outcomes. In this step, the instructor identifies assessment methods. Finally, the instructor can determine what teaching and learning activities are needed during the course for students to achieve the learning outcomes and be successful on the assessments. Course-level SLOs can be connected to program-level SLOs to help demonstrate how the course contributes to the program curriculum.

3. SLOs are a guide for selecting course instructional activities. SLOs can be used as a guide to determine what students will do (i.e., learning activities) and what an instructor will do (i.e., teaching activities) to ensure students achieve the learning outcomes.

4. SLOs are a planning and assessment tool for program/departments. Programs create SLOs that describe the knowledge, skills, and dispositions students are expected to develop by the end of a major or program of study. SLOs communicate information about the department's identity and values and provide a common language that students, faculty, staff, and other stakeholders share. SLOs serve as guides to help faculty determine the courses that address each outcome. Faculty can develop curriculum maps with the learning outcomes and the

program courses to determine if there are redundancies (multiple courses teaching the same content) or gaps (some learning outcomes not addressed in any course) in the program. The SLOs also help faculty and advisors guide students during academic advising and course selection in their major.

5. SLOs allow for improved academic advising. SLOs can be valuable tools for helping students select courses during academic advising. When students need to select general education courses, an advisor can help students select general education courses that provide the best opportunities for students to achieve the general education SLOs. Similarly, when students are selecting courses in their major, an advisor can review program-level learning outcomes and help students select a course plan that provides the best opportunities for students to achieve the SLOs for the major.

6. SLOs are a planning tool for institutional assessment and accreditation. Course-level and program/department-level SLOs communicate the learning goals for disciplines. Course-level and program/department-level SLOs can be linked to institutional SLOs to show how they contribute to the intended learning for university graduates. SLOs address accrediting body requirements. Accrediting bodies require institutions to have program SLOs, assess the SLOs, and improve student learning based on information gathered from assessment.

Who Should Develop SLOs

All faculty responsible for and involved in a program curriculum or learning experience should be involved in the process to develop SLOs. Programs and faculty are also encouraged to get feedback from their students and other stakeholders about program SLOs.

Who Should Know about the SLOs

All major stakeholders should be aware of the SLOs. At a minimum, this includes full and part-time faculty, students, fieldwork and internship supervisors, and student support personnel who work with the program. Other stakeholders could include parents, employers, and alumni/ae of the program. Programs can list SLOs on their UNC websites, on course syllabi, in program brochures, and the like.

How Many SLOs Should a Program Have

Generally, academic programs have 5-10 program-level student learning outcomes. However, there is no firm rule about how many SLOs a program should develop. Programs should develop enough SLOs so that they can determine if students are leaving the program with the knowledge, skills, and dispositions that are important. However, there shouldn't be so many SLOs that it becomes impractical for programs to collect and analyze data for all of the outcomes.

Guidelines for Writing SLOs

SLOs should describe observable and measurable student behaviors that allow faculty to know if students have achieved the expected knowledge, skills, and dispositions described in the SLOs. Below are guidelines to use when developing new or evaluating existing SLOs.

1. Each SLO should directly link to the program mission. The connection to the program mission should be evident in your program SLOs. A student or other stakeholder should be able to read your mission and generally understand what they will learn if they complete the program. Similarly, a student or other stakeholder should be able to read the SLOs and connect them to the program's mission.

Below is an example showing alignment between a program's SLOs and its mission statement. The mission statement and learning outcomes are from the UNC Criminology and Criminal Justice Program. Components of the program mission that serve as a foundation for the SLOs are underlined in the Program Mission column.

Program Mission	Program SLOs
The mission of the University of Northern Colorado's Department of Criminology and Criminal Justice is to create a student-centered academic environment that provides students with opportunities to understand the role the criminal justice system plays in a multifaceted democratic society, to examine complex social problems, and to become contributors to the on-going process of system improvement. Relying on an interdisciplinary approach grounded in the liberal arts tradition, our faculty and curriculum encourage students to articulate, through written and oral methods, how criminological theories inform policy, how research guides system review and decision-making and how ethical considerations and cultural awareness promote visionary leadership in the criminal justice system. Our graduates are prepared to serve and enhance their communities in a variety of work settings or to continue their contribution to the field of criminal justice through advanced education.	1. Students will describe a research method to investigate a criminal justice issue. 2. Students will interpret statistical research data results related to a criminal justice issue. 3. Students will interpret social settings to identify criminological theories to explain criminal or deviant behavior. 4. Students will critique how social diversity influences human behavior as related to criminal justice policy. 5. Students will determine how ethical issues inherent in the criminal justice system affects organizations, groups, and individuals. 6. Students will apply written and oral skills necessary for criminal justice internships and employment.

2. SLOs should describe capstone knowledge, skills, and dispositions developed across your entire curriculum. SLOs should describe the knowledge, skills, and dispositions students exhibit by the time they complete the entire program. Often programs will write an SLO that focuses on knowledge, skills, and dispositions that we might expect students to demonstrate at introductory and intermediate levels of a program rather than at the end of a program. For

example, the following SLO describe learning at an introductory or intermediate level because it requires students to identify research methodologies: "Identify fundamental characteristics of qualitative and quantitative research methodologies used in the study of human communication." *Identifying* a concept is the type of learning expected at introductory and intermediate levels of an undergraduate program. By the time of graduation, we hope that students have moved beyond identifying to applying and synthesizing information. A revised SLO that describes the knowledge and skills expected of a graduating senior is: "Develop an original research study of human communication." When developing SLOs, ensure that they describe the knowledge, skills, and dispositions expected by the time students complete a program.

3. SLOs should be written using action verbs that describe observable and measurable behaviors. There is a tendency to use the verbs "know" and "understand" when writing SLOs. For example, the SLO "Students will understand geologic maps" or the SLO "Students will know the major concepts in geology." The verbs know and understand are difficult to assess because they don't describe observable and measurable behaviors (i.e., they don't indicate what behavior students will demonstrate if they have achieved the SLOs).

   Stating each SLO with an action verb and a description of a specific ability/activity helps translate learning objectives into practical outcomes that students can actually demonstrate and faculty can actually measure. For example, restating one of the SLOs above to "Students will construct a geologic map" provides an observable and measurable behavior that indicates student learning and provides guidance to faculty and students about what type of data might be collected to evaluate student learning related to the SLO. The Appendix has a list of verbs to avoid and lists of action verbs that can be used in SLOs.

4. SLOs should directly relate to the academic discipline. It can be tempting to write program outcomes based on general knowledge or skills that are important but not specific to the disciplinary content of the program. It is common to see program SLOs that emphasize writing or critical thinking. For example, a program may have the following as a program-level SLO: "By the time students graduate with a degree in biology, they will demonstrate effective oral communication." As written, the SLO doesn't describe oral communication related to the program's discipline. When writing SLOs it is important to describe skills, knowledge, and dispositions that are directly attributable to learning acquired in a program. If a program intentionally develops skills like written and oral communication, critical thinking, and quantitative literacy, then the SLOs should be written to show how students will apply the knowledge and skills in the context of the program's discipline. For example, the SLO above indicates that a biology department thinks that oral communication is a critical outcome for their students. As the SLO is written above, it doesn't directly relate to the discipline of biology. That SLO can be rewritten as follows: "By the time students graduate with a degree in biology, they will orally present results of biology research." It is important to write SLOs that are linked to the specific discipline of a program.

5. Avoid including multiple outcomes in a single SLO statement. It can be difficult to write SLOs that describe summative student learning, and often multiple outcomes are inadvertently included in one SLO statement. The following SLO includes three separate

outcomes: "By the time students graduate with a degree in sociology, they will assess, evaluate, and critique written and oral arguments." The three outcomes embedded within the one outcome are 1) assess, 2) evaluate, and 3) critique. It is difficult to assess complex SLOs like this. In the example above, students will need to assess and evaluate to be able to critique, so the SLO can be simplified by stating only the highest level of learning. Here is a revised version: "By the time students graduate with a degree in sociology, they will critique written and oral sociological arguments." If multiple outcomes/components are embedded in one SLO, determine if each separate outcome is critical for understanding summative student learning related to that outcome.

Another way to revise a SLO with multiple outcomes embedded in it is to consider if some of the embedded outcomes are aspects of a rubric rather than the overarching, summative learning expected. For example, consider the following SLO that has multiple outcomes embedded in it: "Students will design and conduct research studies and communicate the results of their research both orally and in writing." In this outcome, students will 1) design research, 2) conduct research, 3) communicate their research orally, and 4) communicate their research in writing. This outcome has four embedded outcomes in it. This outcome can be simplified by restating it as two outcomes "Students will conduct research" and "Students will communicate research results." Using a structured rubric, program faculty can separately evaluate students' ability to design a study, collect data, analyze data, interpret results, write research reports, and communicate their findings to others. Such a rubric will provide faculty with summative information about how well students conducted and communicated research. The rubric can also provide detailed information about separate components of research if faculty want more information.

6. SLOs should be concise. If the SLOs are lengthy, they tend to include multiple outcomes and to be less clear. Aim to write concise outcomes.

7. SLOs should follow a format. SLOs should use a format similar to the following: "By the time students graduate, they will _____;" or "Graduating students will _____;" or "By the time students complete the program, they will _____" or "Students will _____."

8. SLOs should accommodate special accreditation or certification requirements. Programs with specialized accreditation or certification should write SLOs that consider those accreditation or certification expectations.

Checklist for Evaluating SLOs

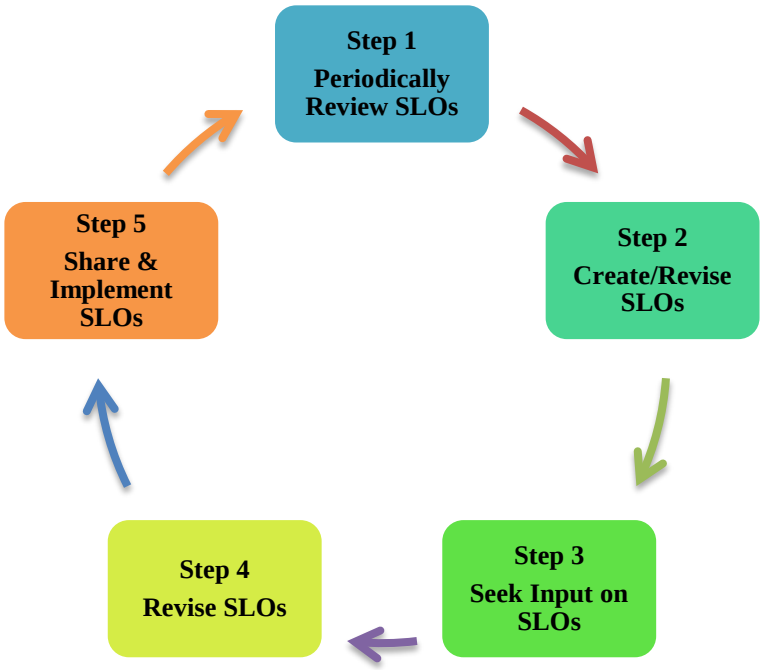
This checklist is a summary of the guidelines for creating SLOs. Use the checklist to create, evaluate, and revise SLOs.

Checklist Question	Does the SLO meet the guideline?	
	Yes	No
1. Does the SLO directly link to the program mission?		
2. Does the SLO describe capstone knowledge, skills, and dispositions developed across the entire curriculum?		

3. Does the SLO describe observable and measurable actions?		
4. Does the SLO describe learning directly related to the academic discipline?		
5. Does the SLO avoid including multiple outcomes in a single statement?		
6. Is the SLO concise?		
7. Does the SLO use the recommended format?		
8. If relevant, does the SLO accommodate special accreditation or certification requirements?		

Process for Developing SLOs

Below is a process for developing and revising SLOs. Each step in the diagram is described in more detail.



Step 1: Periodically Review SLOs

- If your program does not have any SLOs, skip to Step 2 to create them.
- If your program has existing SLOs, your program faculty should periodically review them to ensure that they align with the guidelines for SLOs. Also, disciplines change over time. Review SLOs to ensure they are relevant to your discipline and reflect current disciplinary knowledge, skills, and dispositions.
- As programs develop, implement, and revise their assessment plan, they may find that they need to revise SLOs. For example, some programs create SLOs and they construct a

curriculum map and identify methods to assess the SLOs. Often programs find that the process of creating a curriculum map and identifying methods leads them to review and revise their SLOs. Sometime programs realize they need to revise the SLOs only after collecting student data related to the SLOs.

- Your faculty may be uncertain about whether your program SLOs need revision. If your program faculty are uncertain about whether SLOs need revision, then you might skip to Step 3 to get feedback from stakeholders to help you determine if the SLOs need revision.

Step 2. Create/Revise SLOs

- Your program will need to create new SLOs if it does not have existing ones. Revision is needed if your program is dissatisfied with existing SLOs. If your program has decided that the SLOs need revision, then at this step, faculty revise existing and/or create new SLOs to address what is lacking with existing SLOs.
- The SLOs should be developed/revised by a team of faculty. Some programs have a small team of program faculty or an assessment committee develop/revise the SLOs. Other programs have all program faculty participate in creating/revising the SLOs.

Step 3. Seek Input on SLOs

- When you have a set of SLOs, the next step is to seek input from stakeholders. Stakeholders include current students, alumni, faculty who were not involved in creating/revising the SLOs (e.g., new faculty), employers who hire your students, faculty in graduate programs where your students end up. A good starting place is getting feedback from current students. You can expand to other stakeholders. The UNC Office of Assessment can help you identify alumni if you would like to get feedback from them (see the contact information at the end of this document).
- Before sharing your draft of SLOs with stakeholders, first ask them an open-ended question using the model questions below:
    - Current students and alumni. Ask: "What are the main skills, knowledge, and values/beliefs you gained by majoring in ___ [insert the major]?"
    - Employers. Ask: "What are the main skills, knowledge, and values/beliefs new hires need to be successful?"
    - Faculty in graduate programs. Ask: "What are the main skills, knowledge, and values/beliefs incoming students need to be successful?"
    - Faculty in your program who were not involved in creating/revising the SLOs. Ask? "What are the main skills, knowledge, and values/beliefs students should have by the time they graduate from our program?"
- Review stakeholder responses to see if there are skills, knowledge, and values/beliefs they identify that are missing from your SLOs.
- After asking stakeholders the open-ended question, provide them with your SLOs and ask them to critique the SLOs. You can have the stakeholders determine if the SLOs are missing any critical skills, knowledge, and values/beliefs. You can also ask stakeholders to review the SLOs using the SLO guideline checklist provided earlier in this document.
- Review stakeholder feedback and determine if revisions are needed to the SLOs.

Step 4. Revise SLOs

- Make changes to the existing SLOs and add SLOs based on feedback from stakeholders.

Step 5. Share & Implement SLOs

- Once you have a set of SLOs, post them on your program website. Discuss the SLOs with students during advising sessions. Discuss the SLOs in classes with students by pointing out how the class helps students develop skills, knowledge, and values/beliefs to achieve the SLOs. Include the SLOs in recruitment materials.
- Once you have a set of SLOs, create a plan and collect data to assess student learning related to the SLOs.

Step 1: Periodically Review SLOs

- Periodically review the SLOs and follow the process, as needed.

Note: Developing SLOs is in iterative process. Very often the SLOs will need to be revised after faculty develop a curriculum map, identify methods to assess the SLOs, or collect data to identify student learning related to the SLOs.

Process to Write SLOs (Step 2 in the process above)

Some faculty get stuck writing an initial set of SLOs (Step 2 in the process above). Here is one process faculty can use to write SLOs.

Step One: Individual brainstorm of ideas (provide faculty with 15 minutes to work individually)

1. Ask faculty members to answer the following questions:
   a. What are the main skills students should have by the time they graduate from our program?
   b. What content knowledge should students have by the time they graduate from our program?
   c. What are the main dispositions (values/beliefs) students should have by the time they graduate from our program?
2. When generating ideas tell faculty:
   a. Withhold criticism (don't critique your ideas or the ideas of others). All ideas are welcome.
   b. No filtering.
   c. Creative ideas are welcome.
3. Write each skill, content knowledge, and disposition on a separate sticky note.

Step Two: Collect and group individual brainstorm ideas (allow 30-90 minutes for this step)

1. In this step, faculty will share their ideas, and you will group similar ideas.
2. Start with the first question asked in Step One related to skills: What are the main skills students should have by the time they graduate from our program?
   a. Have each faculty member share the skills they wrote on sticky notes.
   b. Group together sticky notes that describe similar skills. You may realize that some sticky notes represent subsets of skills represented on other sticky notes. Group those sticky notes together in a way that makes sense to you. As you do this, you may see some sticky notes that you want to discard. Set them aside for now. You may come back to them.

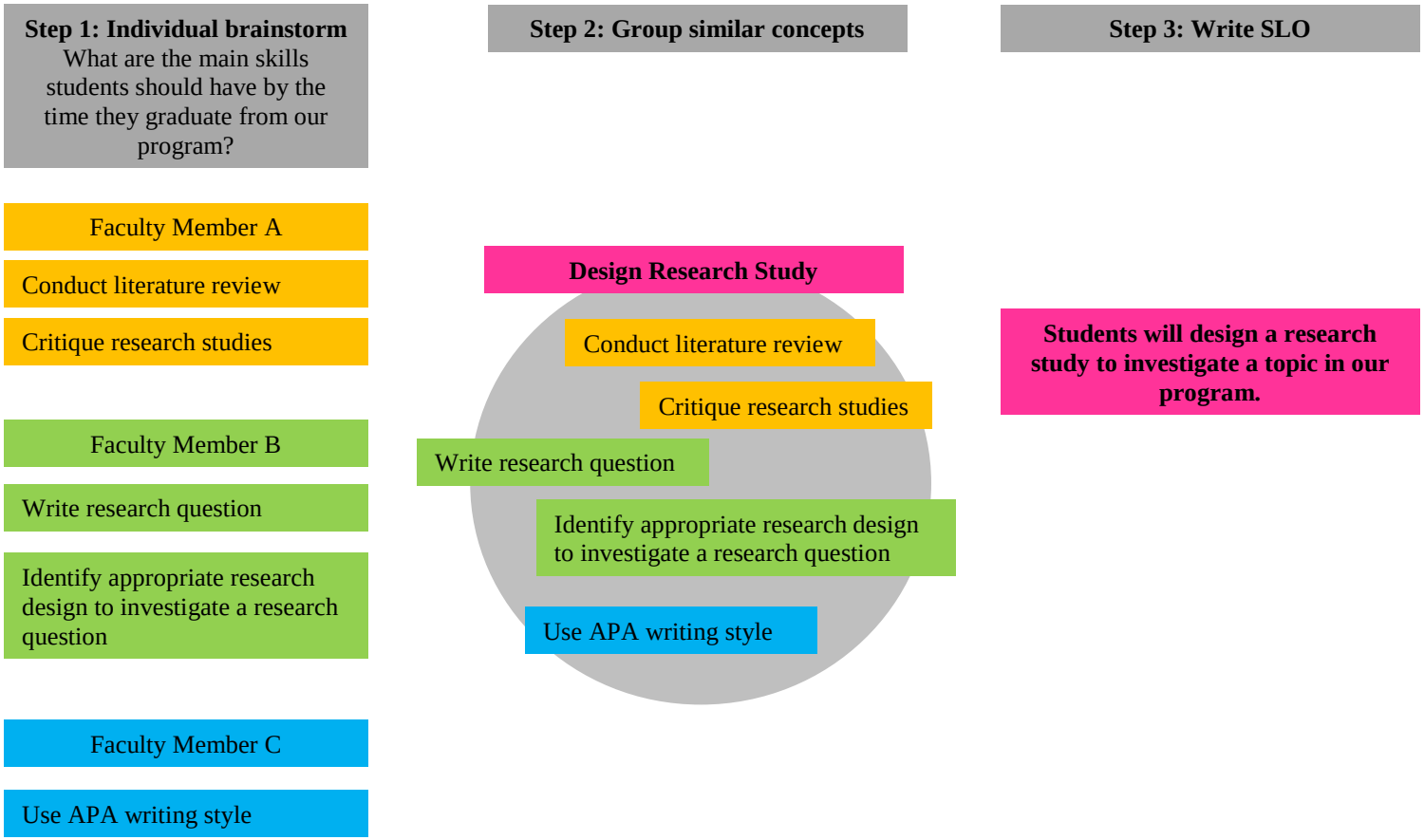
3. Review the groups of skills. Ask faculty if there are any other skills they expect students to have by the time they graduate. If there are any skills missing, write them on sticky notes. Decide if the new skills belong in existing groups or go into another group.
4. Review the groups of skills and identify an overarching skill for that group.
5. Repeat the process with the other questions asked in Step One above related to content knowledge and dispositions.
6. By the time you finish this step, you should have identified the major skills, content knowledge, and dispositions students should have by the time they graduate.

Step Three: Write SLOs related to the skills, content knowledge, and dispositions (allow 30-90 minutes for this step)

1. Use the guidelines and write SLOs for the skills, content knowledge, and dispositions.

An example of the three steps is in the diagram below.

Example. Below is an example showing faculty responses about the skills students should learn by the time they graduate. Three faculty members brainstormed skills in Step 1. In Step 2, they shared the skills and decided that the skills could all be grouped together under the overarching skill of "design research study." In Step 3, the faculty wrote a SLO to reflect the overarching skill identified in Step 2.



Appendix: Verbs to Avoid in SLOs

Avoid using vague and non-observable verbs. Below are examples of verbs to avoid:

- Understand
- Appreciate
- Become familiar with
- Learn about
- Think about
- Become aware of
- Gain an awareness of
- Demonstrate the ability to

Appendix: Verbs to Use in SLOs

Bloom's Taxonomy is often used as a source for action verbs when writing SLOs. The table below goes from simple at the top to more complex/challenging types of thinking at the bottom.

List 1

Blooms Category	Definition	Action Verb
Remember Information Gathering	recalling or remembering something without necessarily understanding, using, or changing it	Tell, list, describe, name, recall, identify, state, select, match, locate, report, choose, cite, define, indicate, label, outline, reproduce,
Understand Deeper Understanding of Knowledge	understanding something that has been communicated without necessarily relating it to anything else	Explain, restate, find, describe, review, relate, define, clarify, illustrate, diagram, outline, summarize, interpret, transform, compare similarities and differences, derive main idea, arrange, convert, defend, discuss, estimate, give examples, locate, report, translate
Apply Use of Knowledge	using a concept to solve problems; using learned material in new and concrete situations	Apply, employ, solve, use, illustrate, show, report, paint, draw, dramatize, classify, put in order, change, compute, construct, interpret, investigate, manipulate, modify, operate, organize, predict, prepare, produce, schedule, sketch, translate
Analyze Compare and Contrast	breaking something down into its parts; focus on identification of parts or analysis of	Analyze, dissect, detect, test, deconstruct, discriminate, distinguish, examine, find coherence, survey, compare, contrast, classify, investigate, outline, separate, structure,

	relationships between parts, or recognition of organizational principles	categorize, solve, diagram, determine evidence and conclusions, appraise, break down, calculate, criticize, debate, experiment, identify, illustrate, infer, inspect, inventory, relate, select
Evaluate Judging the Outcome	judging the value of material or methods as they might be applied in a particular situation; judging with the use of definite criteria	Coordinate, judge, select/choose, decide, debate, evaluate, justify, recommend, verify, monitor, measure, test, appraise, assess, compare, conclude, contrast, criticize, discriminate, estimate, explain, grade, interpret, rate, relate, revise, score, summarize, support, value
Create Original or new creation	creating something new by putting parts of different ideas together to make a whole.	Create, hypothesize, design, construct, invent, deduce, induce, bring together, compose, predict, organize, plan, modify, improve, produce, set up, propose, formulate, solve, arrange, assemble, categorize, collect, combine, devise, generate, manage, perform, prepare, rearrange, reconstruct, relate, reorganize, revise, argue for

Table modified from Krathwohl, D. R. (2002): A revision of Bloom's taxonomy: An overview. *Theory into Practice, 41*(4), 212-218

List 2

Action verbs organized by what you expect students to know and do.

1. Verbs describing student acquisition and preparation of tools, materials, and texts of various types (including digital and archival): **access, acquire, collect, accumulate, extract, gather, locate, obtain, retrieve**
2. Verbs indicating what students do to certify information, materials, texts, etc.: **cite, document, record, reference**
3. Verbs indicating the modes of student characterization of the objects of knowledge or materials of production, performance, exhibit: **categorize, classify, define, describe, determine, frame, identify, prioritize, specify**
4. Verbs describing what students do in processing data and allied information: **calculate, determine, estimate, manipulate, measure, solve, test**
5. Verbs further describing the ways in which students format data, information, materials: **arrange, assemble, collate, organize, sort**
6. Verbs describing what students do in explaining a position, creation, set of observations, or a text: **articulate, clarify, explicate, illustrate, interpret, outline, translate, elaborate, elucidate**
7. Verbs falling under the cognitive activities we group under “analyze”: **compare, contrast, differentiate, distinguish, formulate, map, match, equate**
8. Verbs describing what students do when they “inquire”: **examine, experiment, explore, hypothesize, investigate, research, test**

9. Verbs describing what students do when they combine ideas, materials, observations: **assimilate, consolidate, merge, connect, integrate, link, synthesize, summarize**
10. Verbs that describe what students do in various forms of "making": **build, compose, construct, craft, create, design, develop, generate, model, shape, simulate**
11. Verbs that describe the various ways in which students utilize the materials of learning: **apply, carry out, conduct, demonstrate, employ, implement, perform, produce, use**
12. Verbs that describe various executive functions students perform: **operate, administer, control, coordinate, engage, lead, maintain, manage, navigate, optimize, plan**
13. Verbs that describe forms of deliberative activity in which students engage: **argue, challenge, debate, defend, justify, resolve, dispute, advocate, persuade**
14. Verbs that indicate how students valuate objects, experiences, texts, productions, etc.: **audit, appraise, assess, evaluate, judge, rank**
15. Verbs that reference the types of communication in which we ask students to engage: **report, edit, encode/decode, map, display, draw/ diagram**
16. Verbs, related to modes of communication, that indicate what students do in groups: **collaborate, contribute, negotiate**
17. Verbs that describe what students do in rethinking or reconstructing: **accommodate, adapt, adjust, improve, modify, refine, reflect, review**

List adapted from Adelman, C. (2015, February). *To Imagine a Verb: The Language and Syntax of Learning Outcomes Statements.* (Occasional Paper No. 24). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment. Accessed March 25, 2015 at http://learningoutcomesassessment.org/occasionalpapertwentyfour.html

Need Help?

Need help creating/revising SLOs? Contact the UNC Assessment Office at Assessment@unco.edu.

References Used to Create Student Learning Outcome Resource

Adelman, C. (2015, February). To imagine a verb: The language and syntax of learning outcomes statements. (Occasional Paper No. 24). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment. Accessed March 25, 2015 at http://learningoutcomesassessment.org/occasionalpapertwentyfour.html

Allen, M. J. (2004). Assessing academic programs in higher education. Bolton, MA: Anker Pub. Co.

Baker. W. (2011). The assessment handbook: Five steps to effective planning, reporting, and decision-making. University Office of Evaluation and Educational Effectiveness, Arizona State University.

Barkley, E. F., & Major, C. H. (2015). Learning assessment techniques: A handbook for college faculty. John Wiley & Sons.

Brophy, T. S. (2015). Developing program goals and student learning outcomes. Institutional Assessment, University of Florida, Office of the Provost. http://assessment.aa.ufl.edu/Data/Sites/22/media/2015-16/2015-16-university-of-florida-guide-for-developing-program-goals-and-student-learning-outcomes.pdf.

Fink, L. D. (2013). Creating significant learning experiences: An integrated approach to designing college courses. John Wiley & Sons.

Frye, R., McKinney, G. R., Trimble, J. E. (2006). Tools and techniques for program improvement: A handbook for program review and assessment of student learning. Office of Institutional Assessment, Research, and Testing, Western Washington University.

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. Theory into Practice, 41(4), 212-218.