A Guide to Program Learning Outcomes and Assessment Plans

Office of Educational Effectiveness
The College
University of Rochester

The Program Assessment Cycle

- Define program learning outcomes.
- Ensure alignment of curriculum and learning outcomes.
- Choose assessment method(s) for each program learning outcome.
- Gather assessment data and review findings periodically.
- Evaluate findings together with faculty and recommend action(s) as appropriate to ensure continual improvement of program.
- Review timing and required resources for action. Obtain necessary approvals any major changes needed.
- “Close the loop” and implement recommended/approved action(s) and begin next continuous improvement cycle.

Assessment Terminology --
Program Learning Outcomes (PLOs)

- **Statements that outline the type of measureable evidence that will be used to ensure that learning goals have been achieved. These are statements that describe competencies, skills, etc. that a student successfully completing the program will possess.**

- Some common areas for program learning outcomes:
  - Knowledge depth and or breadth areas
  - Using methods and tools of discipline
  - Critical thinking and analytic reasoning
  - Creative thinking
  - Quantitative reasoning
  - Research, experimentation
  - Decision making
  - Oral and written communication
  - Self and Society, Global Citizenship
  - Ethics and Responsibility
  - Leadership and Teamwork

Sample Program Learning Outcomes

PLOs for Engineering Programs

Students successfully completing an undergraduate engineering degree will be able to:

- identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- communicate effectively with a range of audiences
- recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- acquire and apply new knowledge as needed, using appropriate learning strategies.

PLOs for Mathematics (BA/BS)

Students successfully completing an undergraduate degree in Mathematics will be able to:

- **1. Core Knowledge/Methods: Demonstrate conceptual understanding of the foundational ideas, concepts, and methods of the discipline of mathematics (calculus, linear algebra, differential equations, computational methods)**
- **2. Proofs: Read, understand, and construct proofs. They will develop awareness of the structure of arguments and the role of assumptions.**
- **3. Subfield Knowledge and Methods: Demonstrate conceptual understanding of the ideas and methods of some of the major subfields of mathematics, and be able to apply those ideas and methods in problem solving.**
- **4. Problem Solving and Creativity: Solve mathematical problems requiring a combination of ingenuity and technical facility.**
- **5. Communication: Communicate mathematically through formal proofs and expository writing for a general audience.**

PLOs for History (BA)

Upon successful completion of the History major, students will be able to:

- Frame historical questions.
- Employ a broad range of sources.
- Demonstrate an awareness of interpretive differences.
- Evaluate and analyze primary sources.
- Write clearly.
- Develop an interpretation based on evidence.
- Demonstrate knowledge of relevant historical facts and context.

PLOs for English (BA)

Students successfully completing a degree major in English will be able to demonstrate:

- 1. Analytic reading skills. The ability to understand and "take apart" a work, closely analyzing specific aspects of its content and/or its formal features.
- 2. Knowledge and comprehension in the discipline. The ability to comprehend many literary and/or cultural texts, and to place them appropriately into their relevant contexts.
- 3. Communication. The ability to convey one's knowledge and ideas to others.
- 4. Independent application of knowledge and abilities. The ability to build on the above skills and integrate them in order to produce scholarly or creative work or performance

More Assessment Terminology

Assessment Measures: **A** measure of student performance for a particular learning outcome using a particular mode of measurement.

- Direct measure -- an "objective" measure of student performance for a learning outcome such as tests, projects, presentations, assignments, etc.
- **Indirect measure – a** measure that can be an indicator of student performance based on perception of performance such as survey results.
- **External measure --** a measure that gathers data from external constituents or from external testing and may include alumni, employers, professional associations, advisory boards, GRE testing, professional society testing, etc.
- **Internal measure** – a measure that gathers data from internal College constituents or from internal pre-graduation testing such as from students, faculty, staff and other internal constituents.

Mixed assessment measures for measuring a learning outcome

- "Triangulation" of assessment methods includes multiple measures for any one intended outcome
- At least 1 of 3 methods should be a direct method.
- A mix of internal & external measures is also of value, but not always possible.
- Sample table for measuring graduation writing ability:

Assessment measure type	Assessment measure
Internal-Indirect	•Senior survey rating of writing •Student portfolio where student self assesses progress for writing
Internal- Direct	•Senior capstone review by faculty using scoring rubric for writing •Essay test where writing is being directly assessed
External- Indirect	Alumni survey rating of writing
External- Direct	Employer survey rating of graduate writing

Choosing Assessment Methods: Qualitative vs. Quantitative

- Both can provide valuable information! Sample sizes and representativeness of data collected (along with reliability and validity of instruments) can impact results.
- Quantitative methods provides numeric or ”countable” sets for statistical data analysis, but you need a student N of 15 or more. Also, data may have limits in value based on type of evidence and assessment instruments.
- Qualitative methods may provide “richer” information not subject to numerical classifications and can be of great value especially in understanding the student experience of learning for a given learning outcome. However, gathering and analyzing data for large groups may be time consuming.

Sample Assessment Methods

Internal, indirect	Internal, direct	External, indirect	External, direct
Senior survey with questions where students numerically self assess development of learning for each program learning outcome	Internal test designed to measure graduate level performance in senior level subject	Alumni survey with questions where students numerically self assess development of learning for each program learning outcome	National professional association test
Subject survey with questions aligned with program learning outcomes	Faculty scoring of senior project using scoring rubric for each program learning outcome	Alumni focus group	Employer Survey of alumni, either numerical or qualitative questions
Senior exit interview or focus group	Faculty scoring of student presentations using presentation scoring rubric	GRE scores	Internship supervisor survey, either numerical or qualitative questions
Student portfolio of work where student gathers and reflects on achievement of each program learning outcome	Peer evaluation of team work skills of team members	Employment or graduate school admission	

Program Learning Outcomes and Curriculum Mapping

- This matrix shows which curriculum subjects are key to producing a given program learning outcome.
- If gathered assessment data for an outcome shows a need for improvement, a target is course would be easily identifiable.
- This mapping also communicates level of achievement that might be expected based on whether the outcome is being introduced, reinforced or mastered.

Subject Program learning outcome	Freshman Seminar Course	Introductory Psychology Course	Research Methods Course	Senior Psychology Research Project
Students will demonstrate ability to apply knowledge of field of psychology in problem analysis		Introduce	Reinforce	Mastery
Students will convey ideas clearly in written communication	Introduce		Reinforce	Mastery

Assessment Plan Implementation Schedule

- For EACH important program learning outcome, create an assessment plan template that shows:
  - Type of assessment method
  - Benchmark criterion for adequate student performance
  - Where in the curriculum it will be implemented
  - Who is responsible for implementing the method and how often
  - Who is responsible for review the method
- See attached templates file for program major use
- Sample table for assessment of program learning outcome of writing:

Assessment method	Where implemented	Who is responsible for implementation	When implemented	Who reviews data
Senior survey (indirect, internal)	Online survey	Institutional Research	Every other year, in April of academic year	Department Undergraduate Committee or Program Assessment Coordinator
Senior capstone scoring by 3 faculty using writing rubric (direct, internal)	Senior capstone subject, Psych3150	Senior capstone faculty	Annual, in Spring term when class taught	Department Undergraduate Committee or Program Assessment Coordinator
Internship employer survey (direct, external)	Online survey	Faculty director for department internships	Annual, in Fall or Spring term	Department Undergraduate Committee or Program Assessment Coordinator

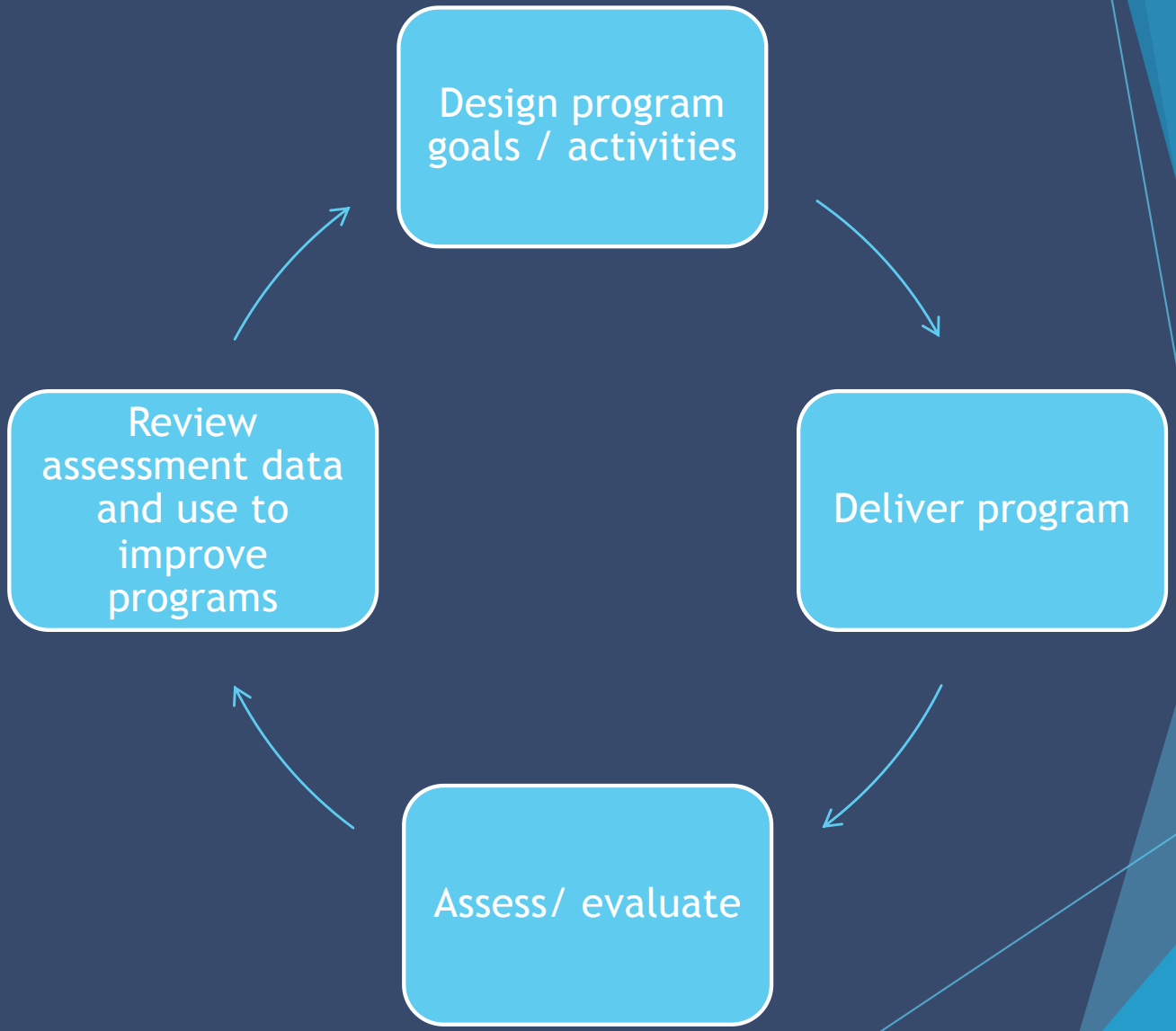
Using scoring rubrics as an assessment method

- Begin with AAC&U VALUE rubrics for major shared learning outcomes: critical thinking, writing, quantitative reasoning, global citizenship, analytical reasoning, oral presentation (there are 15 outcomes in total). See AAC&U website.
- Also take a look at professional society sites for rubrics tailored to given discipline.
- A rubric is designed to contain several criterion that describe a given learning outcome. Decide, as a faculty, which criteria apply to the intended outcome. Also, not all criteria in a rubric need be used each year for scoring student work.

How to use scoring rubrics to score student work…

- Faculty should be trained in rubric use. The Office of Educational Effectiveness is available to help!
- The "short version of training"… all read 2 papers together and use, for example, writing rubric to score work. Group then discusses results, assumptions made in choosing scores, and ease/difficulty of using rubric levels and wording.
- Scoring representative student work: At minimum, 2 faculty, trained in use of scoring rubric, should score student work for EACH criterion chosen for that ability.

“Closing the Loop” and the Assessment Cycle



An array of shared, available assessment resources…

- Tools for organizing an assessment plan
- Scoring rubrics for key learning outcomes program major faculty can adopt/adapt

  E.g., AAC&U VALUE rubrics that can be modified as needed
- Institutional surveys tied to key learning outcomes

  E.g., alumni, senior, employer, internship supervisor surveys
- Subject survey templates that are tied to key learning outcomes

  E.g., service-learning student survey, teamwork peer evaluation survey

  A College-based shared website where assessment resources and plans along with contact information are readily available