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 measurable 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 BS - Mechanical Engineering

Students successfully completing a BS degree in Mechanical Engineering will be able to demonstrate:

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
PLOs for BA/BS - Mathematics

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

1. Core Knowledge/Methods: Students will demonstrate conceptual understanding of the foundational ideas, concepts, and methods of the discipline of mathematics (calculus, linear algebra, differential equations, computational methods)

2. Proofs: Students will learn to read, understand, and construct proofs. They will also learn to appreciate the structure of arguments and the role of assumptions.

3. Subfield Knowledge and Methods: Students will 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: Students will demonstrate an ability to solve mathematical problems requiring a combination of ingenuity and technical facility.

5. Communication: Students will learn to communicate mathematically through formal proofs and expository writing for a general audience.
PLOs for degree major in History

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.
- Knowledge of relevant historical facts and context.
PLOs for degree major in Dance:

Students successfully completing a major in Dance will be able to:

- Embody knowledge of culture, dance and movement forms within a theoretical framework.
- Demonstrate knowledge of the ways in which dance exists in relationship to other fields of study.
- Effectively communicate through listening to self and others, and self-assessing.
- Think critically, using skills in observation, analysis and critical response to dance as an art form and as a component of life and culture.
- Access and trust creative or artistic expression through knowledge of compositional and/or improvisational structure.
- Express dance literacy and appreciation.
- Recognize dance in its plethora of forms: as scholarship, as an art form, as community building, as activism, as a mindful practice, and as a collaborative endeavor.
- Display a positive and more confident sense of self.
- Exhibit awareness of the nuances of working with others and the ability to collaborate.
PLOs for degree in English

Students successfully completing a degree major in English will be able to demonstrate the following.

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.
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:

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

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

<table>
<thead>
<tr>
<th>Subject</th>
<th>Freshman Seminar Course</th>
<th>Introductory Psychology Course</th>
<th>Research Methods Course</th>
<th>Senior Psychology Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program learning outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students will demonstrate ability to apply knowledge of field of psychology in problem analysis</td>
<td></td>
<td>Introduce</td>
<td>Reinforce</td>
<td>Mastery</td>
</tr>
<tr>
<td>Students will convey ideas clearly in written communication</td>
<td>Introduce</td>
<td></td>
<td>Reinforce</td>
<td>Mastery</td>
</tr>
</tbody>
</table>
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:

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

1. Design program goals / activities
2. Deliver program
3. Review data
4. Improve program
5. Assess / evaluate

Discrete actions and steps in the assessment cycle include:
- Designing program goals and activities
- Delivering the program
- Reviewing data
- Improving the program based on feedback
- Assessing and evaluating the program's effectiveness
An array of shared, available assessment resources...

- **Tools for organizing an assessment plan.**
  E.g. assessment measure templates for each program learning outcome are included here.

- **Scoring rubrics for key learning outcomes that gen ed and program major faculty can adopt/adapt**
  E.g. critical thinking rubric options are included here. LEAP VALUE rubrics are the best source for other key outcomes.

- **Institutional surveys tied to key learning outcomes.**
  E.g. alumni, senior, employer, internship supervisor surveys are included with this presentation.

- **Subject survey templates that are tied to key learning outcomes**
  E.g. service learning student survey, teamwork peer evaluation survey are included with this presentation.

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