Writing And Mapping
Student Learning Outcomes

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Identify Student Learning Outcomes

Use Results

Curriculum Mapping

Assessment at NOVA

Gather Evidence

Methods of Assessment
Steps to Assess Student Learning Outcomes

1. Identify student learning outcomes for your program
2. Determine practices used to achieve outcomes through curriculum mapping
3. Determine methods of assessment
4. Gather evidence
5. “Close the loop”
   - Review and interpret results
   - Recommend actions
   - Make changes
   - Measure effectiveness of changes
Student learning outcomes for today’s workshop

After attending today’s workshop, you will be able to:

• Summarize what student learning outcomes at NOVA are
• Identify components and important characteristics of student learning outcomes
• Write appropriate student learning outcomes for your program
• Map SLOs to your program’s curriculum
Part 1

Writing Student Learning Outcomes (SLOs)
What are student learning outcomes?

Student learning outcomes identify observable and measurable knowledge, skills, and attitudes/values a student obtains by the end of a learning experience.

Important components:
- Observable and measurable
- Knowledge, skills, and attitudes/values (KSAs)
Why are SLOs important?

• Communicate expectations to learners
• Act as a template for course design
• Guide selection/design of appropriate assessments
• Allow faculty, staff, and institutional researchers to assess the impact of instruction
• Clearly communicate graduates’ skills to prospective employers
• Provide benchmarks for formative, summative and prior learning assessment

Source: Aundrea D. Wheeler, How to Write SMART Student Learning Outcomes
SLOs- Knowledge

What do you want your students to know by the time they complete your program?

• What are the most important terms, concepts, theories, and principles they should know?

• What methods and procedures should they know?
SLOs- Skills

What do you want your students to be able to do with what they know?

• What types of skills should they demonstrate?
• What constitutes “effective writing” in the program?
• What performance skills or competencies should they demonstrate?
• What skills do they need to solve problems in the discipline?
• What types of research experiences should students have?
SLOs – Attitudes/Values

What do you want your students to care about?

• What values or attitudes should they develop?
• What should they appreciate or respect?
• What ethical issues should they be able to address?

Source: Judy Shoemaker, UC-Irvine
How do SLOs differ from course objectives/goals?

SLOs

- represent overarching products of a curriculum
- express higher-level KSAs that represent an important product applicable outside of a class
- represent an end-product displayed by something the student can know, can do, values

Course objectives/goals

- represent valuable skills, tools, or content (nuts and bolts) that enable a student to engage a particular subject
- focus on content and skills important within the classroom
- reflect the goals a faculty member has for the course

Source: Janet Fulks, Assessing Student Learning, 2004
How do SLOs differ from program goals/outcomes?

Program goals/outcomes
• Goals of a program pertaining to enrollment, graduation rates, resources, faculty, etc.

Student learning outcomes
• Observable and measurable knowledge, skills, and attitudes/values a student obtains by the end a learning experience
Activity #1

Determine which statements are program goals and which are student learning outcomes.

Program goals/outcomes
  • Goals of a program pertaining to enrollment, graduation rates, resources, faculty, etc.

Student learning outcomes
  • Observable and measurable knowledge, skills, and attitudes/values a student obtains by the end a learning experience
Guidelines for writing SLOs

- Focus on your most important outcomes.
- Work with colleagues.
- Focus on the ends, not the means; that is what students will be able to do by the time they successfully complete the program, not the processes on the way to completing the program (e.g., acquire, develop).
- Aim for outcomes that are neither too broad nor too specific.
- Use concrete action words that describe what students should be able to do in explicit, observable terms.
- Define fuzzy terms whenever possible. For example, think critically could be better defined as analyze and evaluate arguments.

Source: adapted from Linda Suskie (Assessing Student Learning, 2004)
SLOs should be **SMART**

- **Specific**
- **Measurable**
- **Attainable**
- **Results-oriented**
- **Time-bound**
Sources for SLOs

- Course syllabi
- Written descriptions of the program
- Mission statements
- Teaching goals inventory
- Accreditation agencies
- Professional/certification exams
- Colleges to which many graduating students transfer
- Employers
- Your “ideal” graduate
Brainstorming with faculty

• What are the most important things we want our students to accomplish? What do we want them to remember or be able to do once they have completed our program?

• What do we want all of our students to know and be able to do, regardless of the set of courses or track they take through the program?

• What skills and knowledge will our students need after they graduate? What will make them successful (in a job, in graduate school, in life, etc.)?

• To what extent does the program (and/or its individual courses) provide opportunities for students to learn and practice these important outcomes?

Source: UC Irvine
Steps to writing SLOs

1. In one sentence, describe one major piece of knowledge, skills, or attitude/value a student should gain by the end of a program.

2. Use action verbs (see Bloom’s Taxonomy).

3. Make sure that the knowledge, skill, or attitude/value can be observed and measured. Consider what kind of evidence can be collected.

4. Ensure that outcome is clear and understandable to students.
## Components of SLOs

<table>
<thead>
<tr>
<th>Action Verb</th>
<th>Product</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify</td>
<td>relevant database</td>
<td>for term paper research.</td>
</tr>
<tr>
<td>Construct</td>
<td>a research question</td>
<td>that can be investigated using primary archival resources.</td>
</tr>
<tr>
<td>Produce</td>
<td>a website</td>
<td>using most appropriate programs.</td>
</tr>
<tr>
<td>Analyze</td>
<td>global and environmental factors</td>
<td>in terms of their effects on people.</td>
</tr>
</tbody>
</table>
## Levels of Bloom’s Taxonomy and Common Verbs
(lowest to highest)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Verbs and Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge/Remembering</td>
<td>define, list, recognize</td>
</tr>
<tr>
<td>Comprehension/Understanding</td>
<td>characterize, describe, explain, identify, locate, recognize, sort</td>
</tr>
<tr>
<td>Application/Applying</td>
<td>choose, demonstrate, implement, perform</td>
</tr>
<tr>
<td>Analysis/Analyzing</td>
<td>analyze, categorize, compare, differentiate</td>
</tr>
<tr>
<td>Evaluation/Evaluating</td>
<td>assess, critique, evaluate, rank, rate</td>
</tr>
<tr>
<td>Synthesis/Creating</td>
<td>construct, design, formulate, organize, synthesize</td>
</tr>
</tbody>
</table>
Make sure outcome is measurable

<table>
<thead>
<tr>
<th>Not Measurable</th>
<th>Measurable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know the arguments</td>
<td>Summarize the arguments</td>
</tr>
<tr>
<td>Think critically</td>
<td>Interpret, analyze, and evaluate evidence, construct arguments</td>
</tr>
<tr>
<td>Envision solutions</td>
<td>Illustrate solutions</td>
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<tr>
<td>Understand principles</td>
<td>Apply principles</td>
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<tr>
<td>Understand methods</td>
<td>Explicate methods</td>
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<tr>
<td>Appreciate art</td>
<td>Choose to attend art events</td>
</tr>
</tbody>
</table>
### Examples

<table>
<thead>
<tr>
<th>Original</th>
<th>Improved</th>
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</thead>
<tbody>
<tr>
<td>Students will know the historically important systems of psychology.</td>
<td>Students will recognize and articulate the foundational assumptions, central ideas, and dominant criticisms of the psychoanalytic, Gestalt, behaviorist, humanistic and cognitive approaches to psychology.</td>
</tr>
<tr>
<td>Students will have knowledge of engineering principles.</td>
<td>Students will apply and demonstrate the principles of engineering design, formulating requirements and constraints, following an open-ended decision process involving tradeoffs, and completing a design addressing an aerospace engineering need.</td>
</tr>
<tr>
<td>Students should be able to independently design and carry out research.</td>
<td>Students will independently design and carry out experimental and correlational research that yields valid results.</td>
</tr>
<tr>
<td>This program will teach students about statistics.</td>
<td>Students will be able to choose the most appropriate statistical test for a given problem.</td>
</tr>
</tbody>
</table>
Activity #2

Using the checklist on the next slide and Bloom’s verbs,

Revise SLOs from Activity #1
(e.g., 13, 14, 22, 44, 45, 49)

or

Check SLOs for your own program.
SLOs Checklist

Does the learning outcome:
• Use action verbs?
• Ask students to apply what they’ve learned by producing something?
• Address student competency rather than content coverage?
• Represent a fundamental result of the program?
• Represent an appropriate level of work?
• Contain a piece of knowledge, skill, or attitude/value that is observable and measurable?
Part 2

Mapping SLOs to Curriculum
What is a curriculum map?

Before asking the question “Do students know this?” we need to ask “Are we providing this experience?”

Curriculum Mapping can help determine degree of coverage of SLOs
Purposes of Curriculum Mapping

• Demonstrates the alignment between curriculum and a program’s SLOs

• Identifies which courses contain learning experiences which help student achieve SLOs

• Shows the extent to which SLOs are addressed

• Details which courses contain/include/have assessments of SLOs
Benefits of Curriculum Mapping

• Shows where gaps are (i.e., if SLOs are not being addressed sufficiently)

• Can result in the refinement of SLOs and assessment methods

• Points to where, when, and how assessment can take place
  • Can identify already-existing sources of data
    = embedded assignments

• Contributes to foundation of a program assessment plan

• Provides an overview of curriculum
How to Create a Curriculum Map

Begin with a table with SLOs listed on the vertical axis and all courses/learning experiences listed across the horizontal axis at the top.

Each SLO will have a row; each course will have a column.
## Sample Curriculum Map Template

<table>
<thead>
<tr>
<th>SLO #1</th>
<th>Course 101</th>
<th>Course 102</th>
<th>Course 103</th>
<th>Course 104</th>
<th>Course 201</th>
<th>Course 202</th>
<th>Course 203</th>
<th>Course 204</th>
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</thead>
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<td>SLO #2</td>
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<td>SLO #4</td>
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<tr>
<td>SLO #5</td>
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</table>
Step 1

• For each SLO, indicate in which course(s) the outcome is addressed.

• Each SLO must be addressed at least once.

• If not, then the outcome and its place in the program should be reexamined.
### Sample Curriculum Map – Step 1

<table>
<thead>
<tr>
<th></th>
<th>Course 101</th>
<th>Course 102</th>
<th>Course 103</th>
<th>Course 104</th>
<th>Course 201</th>
<th>Course 202</th>
<th>Course 203</th>
<th>Course 204</th>
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<tbody>
<tr>
<td><strong>SLO #1</strong></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SLO #2</strong></td>
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<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SLO #3</strong></td>
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<td></td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
<td><strong>SLO #5</strong></td>
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<td>X</td>
<td>X</td>
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</tbody>
</table>
Step 2

• Describe the level to which the outcome is addressed:

  I  = Introduced

  P  = Practiced

  M  = Mastered

• SLOs can be addressed at more than one level within a course.
### Sample Curriculum Map – Step 2

<table>
<thead>
<tr>
<th>SLO #1</th>
<th>Course 101</th>
<th>Course 102</th>
<th>Course 103</th>
<th>Course 104</th>
<th>Course 201</th>
<th>Course 202</th>
<th>Course 203</th>
<th>Course 204</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
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<td></td>
<td>P/M</td>
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<tr>
<td>SLO #2</td>
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<td>I/P</td>
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<tr>
<td>I/P</td>
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<td>I</td>
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<td>P</td>
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<td></td>
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<td>M</td>
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<tr>
<td>SLO #4</td>
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<td></td>
<td></td>
<td>I</td>
<td>P</td>
<td>P/M</td>
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<td>I</td>
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<td>M</td>
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<td>I</td>
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<td>M</td>
</tr>
</tbody>
</table>
# Step 3

Provide the method of assessment for the program-level assessment.

<table>
<thead>
<tr>
<th>Direct Methods</th>
<th>Indirect Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized tests</td>
<td>Surveys</td>
</tr>
<tr>
<td>Certificate exams</td>
<td>Student</td>
</tr>
<tr>
<td>Locally developed tests/test questions</td>
<td>Alumni</td>
</tr>
<tr>
<td>Rubrics for evaluating:</td>
<td>Employer</td>
</tr>
<tr>
<td>Essays/Papers</td>
<td>Exit interviews</td>
</tr>
<tr>
<td>Labwork</td>
<td>Focus groups</td>
</tr>
<tr>
<td>Exam questions</td>
<td>Job placement rates</td>
</tr>
<tr>
<td>Capstone projects</td>
<td>Course evaluations</td>
</tr>
<tr>
<td>Exhibits</td>
<td></td>
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<tr>
<td>Performances/Presentations</td>
<td></td>
</tr>
<tr>
<td>Portfolios of student work</td>
<td></td>
</tr>
<tr>
<td>Comprehensive exams</td>
<td></td>
</tr>
</tbody>
</table>
### Sample Curriculum Map – Step 3

<table>
<thead>
<tr>
<th>SLO #1</th>
<th>Course 101</th>
<th>Course 102</th>
<th>Course 103</th>
<th>Course 104</th>
<th>Course 201</th>
<th>Course 202</th>
<th>Course 203</th>
<th>Course 204</th>
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</thead>
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<td>I</td>
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<td>P/M Test Qs</td>
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</tr>
<tr>
<td>SLO #2</td>
<td></td>
<td>I/P</td>
<td>I</td>
<td></td>
<td>M Project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLO #3</td>
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<td></td>
<td>I</td>
<td>P</td>
<td></td>
<td></td>
<td>M Quiz</td>
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</tr>
<tr>
<td>SLO #4</td>
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<td></td>
<td></td>
<td></td>
<td>I</td>
<td>P</td>
<td>P/M Essay</td>
<td></td>
</tr>
<tr>
<td>SLO #5</td>
<td>I</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td>M MC test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Best Practices for Curriculum Mapping

• Involve all faculty
  • Once SLOs have been determined, ask each instructor to complete a curriculum map for the course(s) he/she teaches.
  • Once the curriculum map has been drafted, share with all faculty.
  • When curriculum map has been completed, distribute to all faculty.

• Students should have multiple exposures to SLOs with opportunities for practice.

• Address wherever there are gaps.
Assessment at NOVA

Identify Student Learning Outcomes

Use Results

Curriculum Mapping

Gather Evidence

Methods of Assessment
Questions?

Contact: Dr. Jennifer Roberts
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