Overview

- Strategic planning and assessment structure
- Development of student learning outcomes
- Guides for methods
- Selection of relevant measures
- Data collection and analysis
- Analysis of results and actions
Student Learning Outcomes Assessment Template

- Student Learning Outcome(s) Assessed
  - Frequently, only one per year
- Assessment Methods and Tools
- Results
- Interpretation of Results
- Improvement Action
- Reflection
- Attachments
Our Review

- *Satisfactory* means that we think it will look okay to a SACSCOC reviewer—it does not necessarily mean that it is good.

![Academic Student Learning Outcomes](chart)

- **SLOs**
- **Results**
- **Use**

- Satisfactory
- Marginal
- Poor
Most programs have defined some student learning outcomes

Some programs have really embraced the use of assessment to improve student learning; others don’t get it

Many programs only assess one outcome per year

Assessment methods and measures vary considerably

Some programs focus only on student progress and not on learning

Undergraduate programs seem to have a better sense of SLO assessment than graduate programs
Issues and Needs

- Better understanding of focus on improvement
- Better understanding of assessment so outcomes and measure make sense
- Better understanding of how to construct an outcome related to mission
- Better understanding of what kinds of measures can be used to describe outcome performance levels
- Better understanding how to interpret results and appropriate actions to take
Developing an SLO Assessment Plan

- Include **mission** or purpose of program
  - State primary functions and activities
  - State why these are done (program purpose)
  - Identify stakeholders
- Include a sufficient number of **outcomes**
  - Student learning outcomes
- Include **methods** for measurement
  - Instrument, sample, when
- Include multiple **measures** for each outcome
  - Direct measures
  - Indirect measures
  - Targets

Focus on degree **program** and NOT department
Defining Student Learning Outcomes

- Describe specific performance that students of your program should demonstrate when completing the program

- Focus on intended knowledge, skills, attitudes, and behaviors of students after completion of program
  - What is expected from a graduate of the program?
  - What is expected as the student progresses through the program?

- Three questions
  - What does the student know? (cognitive)
  - What can the student do? (psychomotor)
  - What does the student care about? (affective)
Types and Levels of Student Learning Outcomes [Bloom’s Taxonomy]

- **Cognitive:** recall and intellectual skills
  - Knowledge, comprehension, application, analysis, synthesis, evaluation

- **Affective:** attitudes, values, interests, appreciation and feelings toward people, ideas, places, and objects
  - Receiving, responding, valuing, organization, characterization by, value

- **Skills (Simpson, 1972)**
  - Perception, set, guided response, mechanism, complex overt response, adaptation, origination

- Use concrete action verbs (e.g., define, classify, operate, formulate) rather than passive verbs (e.g., be exposed to) or vague verbs (e.g., understand, know)
Think **SMART** When Defining Outcomes

**Specific**
- Clear and definite terms describing abilities, knowledge, values, attitudes, and performance

**Measurable**
- It is feasible to get the data; data are accurate and reliable; it can be assessed in more than one way

**Aggressive but Attainable**
- Has potential to move the program forward

**Results-oriented**
- Describe what standards are expected from students or the program/service

**Time-bound**
- Describe where you would like to be within a specified time period
# Two Approaches to Generating Outcomes and Performance Measures

<table>
<thead>
<tr>
<th>First Approach</th>
<th>Second Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Describe mission</td>
<td>- Describe mission</td>
</tr>
<tr>
<td>- Describe vision</td>
<td>- Describe vision</td>
</tr>
<tr>
<td>- List goals</td>
<td>- List goals</td>
</tr>
<tr>
<td>- List learning outcomes</td>
<td>- Brainstorm performance indicators</td>
</tr>
<tr>
<td>- Determine measurement methods and measures</td>
<td>- Select “important” performance indicators</td>
</tr>
<tr>
<td></td>
<td>- Write learning outcomes</td>
</tr>
<tr>
<td></td>
<td>- Develop measurement methods and measures</td>
</tr>
</tbody>
</table>
Converting Performance Measures to Learning Outcomes

- Outcome answers “why?” for the performance measure
- Example performance measure: test scores in a subject area
  - Outcome: Students will have a high level of understanding of the subject area
- Example performance measure: satisfaction of employers with graduates communications skills
  - Outcome: Students will have a high level of communications skills
Writing Learning Outcomes

- Do not join elements in one outcome statement that can not be assessed by single method
  - Graduates will demonstrate good written and oral communication skills

- Should be stated so that the outcome can be measured by more than one assessment method (ideally)
  - Students will demonstrate satisfactory critical thinking skills for business problems
  - Graduates will demonstrate professional advancement by joining a professional organization within their chosen career path.
Checklist for an Outcome/Objective

- Is it aligned with mission statement?
- Is it important to management and reflect key results of program?
- Is it possible to collect accurate and reliable data for each outcome with existing resources?
- Is it stated so that it is possible to use a single measurement method?
- Is it stated so that more than one measurement method can be used?
- Can it be used to identify areas to improve?
- Is it SMART?
Checklist for a Student Learning Outcomes

- Does it clearly describe expected knowledge, skills, attitudes, and behaviors of the graduates of the program?
- Does it indicate the level and type of competence that is required of graduates of a program?
- Does it focus on the learning results and not the learning process?
Exercises

- Students will graduate from the program with the necessary skills and knowledge to succeed in XYZ engineering positions in industry
- To teach students engineering principles
- To adequately prepare students
- BSHE graduates will demonstrate knowledge of math, science, and engineering fundamentals, and gain competency in conducting oral presentations
- Students completing the XYZ engineering program will score over 95% on a locally developed exam that tests application of engineering principles
Assessment Methods and Measures

- Student learning
  - **Direct measures** quantify the competence of students
    - Exam scores, rated portfolios, employer rating
  - **Indirect measures** quantify the perceived learning
    - Student perception of learning, self-assessment

- Curriculum
  - Methods used to check alignment of curriculum with outcomes
    - Curriculum mapping
Describing Measurement Methods

- What are you going to use?
  - Presentation, assignment, test, survey, observation, performance rating, portfolio, embedded questions

- Of and/or by whom?
  - Student, mentor, focus group, course

- Context (e.g., where or when)?
  - Course, capstone, throughout the year, end of program

- For what purpose?
  - Desired learning outcome

- Example: Test the students at the end of the program for their level of knowledge in XYZ
Assessment Methods

- Curriculum or course performance-based (objectives not grades)
  - Standardized exams with sub-scores
  - Locally-developed exams
  - Rubrics
  - Juried competitions
- Content analysis
- National surveys
- Locally-developed surveys (institution/department/program)
What About Course Grades for Assessment?

- Problems with course grades
  - Do not provide meaningful information on what was learned or not learned
  - Grading standards may be vague or inconsistent
  - May include behaviors not related to SLO (e.g., attendance points)

- Grades based on direct evidence of performance linked to student learning outcomes (e.g., using test blueprints, rubrics) may be useful
What About Course Grades for Assessment?

- If you know a student’s grade, or a course grade average, or a grade distribution, what do you know about student learning and what has to change to improve it?
- Example:

<table>
<thead>
<tr>
<th>Student</th>
<th>Total (1,599)</th>
<th>Grade</th>
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<tbody>
<tr>
<td>A</td>
<td>1,413</td>
<td>88.4%</td>
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<tr>
<td>B</td>
<td>1,344</td>
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<tr>
<td>C</td>
<td>1,499</td>
<td>93.7%</td>
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<tr>
<td>D</td>
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<td>79.5%</td>
</tr>
<tr>
<td>E</td>
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<td>80.6%</td>
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<tr>
<td>F</td>
<td>1,445</td>
<td>90.4%</td>
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<tr>
<td>G</td>
<td>1,355</td>
<td>84.7%</td>
</tr>
<tr>
<td>H</td>
<td>1,458</td>
<td>91.2%</td>
</tr>
<tr>
<td>I</td>
<td>1,341</td>
<td>83.9%</td>
</tr>
<tr>
<td>J</td>
<td>1,378</td>
<td>86.2%</td>
</tr>
<tr>
<td>K</td>
<td>1,441</td>
<td>90.1%</td>
</tr>
<tr>
<td>L</td>
<td>1,452</td>
<td>90.8%</td>
</tr>
<tr>
<td>M</td>
<td>1,208</td>
<td>75.5%</td>
</tr>
<tr>
<td>N</td>
<td>1,343</td>
<td>84.0%</td>
</tr>
</tbody>
</table>
Consider Test Composition

- More information

<table>
<thead>
<tr>
<th>Student</th>
<th>Anatomy (175)</th>
<th>Biochemistry (102)</th>
<th>Cell Biology (55)</th>
<th>Clinical (198)</th>
<th>Physiology (125)</th>
<th>Total (1599)</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>152 86.9%</td>
<td>88 86.3%</td>
<td>46 83.6%</td>
<td>137 83.5%</td>
<td>111 88.8%</td>
<td>1413 88.4%</td>
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<tr>
<td>B</td>
<td>143 81.7%</td>
<td>86 84.3%</td>
<td>49 89.1%</td>
<td>149 75.3%</td>
<td>111 88.8%</td>
<td>1344 84.1%</td>
</tr>
<tr>
<td>C</td>
<td>163 93.1%</td>
<td>91 89.2%</td>
<td>48 87.3%</td>
<td>187 94.4%</td>
<td>115 92.0%</td>
<td>1499 93.7%</td>
</tr>
<tr>
<td>D</td>
<td>128 73.1%</td>
<td>75 73.5%</td>
<td>30 54.5%</td>
<td>165 83.3%</td>
<td>97 77.6%</td>
<td>1272 79.5%</td>
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<tr>
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<td>79 77.5%</td>
<td>42 76.4%</td>
<td>148 74.7%</td>
<td>92 73.6%</td>
<td>1289 80.6%</td>
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<tr>
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<tr>
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<td>40 72.7%</td>
<td>172 86.9%</td>
<td>107 85.6%</td>
<td>1355 84.7%</td>
</tr>
<tr>
<td>H</td>
<td>165 94.3%</td>
<td>92 90.2%</td>
<td>48 87.3%</td>
<td>177 89.4%</td>
<td>116 92.8%</td>
<td>1458 91.2%</td>
</tr>
<tr>
<td>I</td>
<td>149 85.1%</td>
<td>84 82.4%</td>
<td>48 87.3%</td>
<td>164 82.8%</td>
<td>108 86.4%</td>
<td>1341 83.9%</td>
</tr>
<tr>
<td>J</td>
<td>149 85.1%</td>
<td>84 82.4%</td>
<td>48 87.3%</td>
<td>169 85.4%</td>
<td>104 83.2%</td>
<td>1378 86.2%</td>
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<tr>
<td>K</td>
<td>148 84.6%</td>
<td>95 93.1%</td>
<td>50 90.9%</td>
<td>169 85.4%</td>
<td>120 96.0%</td>
<td>1441 90.1%</td>
</tr>
<tr>
<td>L</td>
<td>151 86.3%</td>
<td>88 86.3%</td>
<td>50 90.9%</td>
<td>176 88.9%</td>
<td>109 87.2%</td>
<td>1452 90.8%</td>
</tr>
<tr>
<td>M</td>
<td>133 76.0%</td>
<td>75 73.5%</td>
<td>34 61.8%</td>
<td>142 71.7%</td>
<td>85 68.0%</td>
<td>1208 75.5%</td>
</tr>
<tr>
<td>N</td>
<td>147 84.0%</td>
<td>86 84.3%</td>
<td>45 81.8%</td>
<td>152 76.8%</td>
<td>108 86.4%</td>
<td>1343 84.0%</td>
</tr>
</tbody>
</table>
Curriculum or Course-based

- Performance-based
  - Capstone courses
  - Capstone projects
  - Case studies
  - Minute Papers
  - Homework assignments
  - Course-embedded exam questions
  - Portfolios
  - Reflective essays

- Other (help determine appropriate measures)
  - Curriculum and syllabus analysis
  - Content analysis of courses
Types of Examinations or Tests

- Locally developed exams
  - Pre-post tests
  - Course-embedded exam questions
  - Comprehensive exam
  - Qualifying exam
- Standardized exams
  - National test
  - State test
  - Good when external comparisons are required
  - Scales and individual results are good for internal alignment with program outcomes
- Juried competitions
  - Recitals or shows
What Makes a Good Test?

- Variance in scores—discrimination
- Reliability—consistency
- Validity—measuring what it should measure
- Integrity and transparency—free of developer bias
- Standardization—benchmarking
- Leak proof
## Test Blueprints

- Identify the objectives and skills that are to be tested and the relative weight given to each
- Determine the number of questions related to each competency on the test based on the relative emphasis on each competency
- Provides cognitive level breakup
- Difficulty guideline
  - 2/3 of questions—population has 30-70% chance of answering correctly
  - 1/6 of questions—more than 70% of population will answer correctly
  - 1/6 of questions—fewer than 30% of population will answer correctly
# Test Blueprint Construction

## Question distribution

<table>
<thead>
<tr>
<th>Topic/Competency</th>
<th>Easy</th>
<th>Med</th>
<th>Hard</th>
<th>Items/topic</th>
<th>Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiology</td>
<td>7.2</td>
<td>18</td>
<td>10.8</td>
<td>36</td>
<td>30%</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>2.4</td>
<td>6</td>
<td>3.6</td>
<td>12</td>
<td>10%</td>
</tr>
<tr>
<td>Anatomy</td>
<td>12</td>
<td>30</td>
<td>18</td>
<td>60</td>
<td>50%</td>
</tr>
<tr>
<td>Cell Biology</td>
<td>1.2</td>
<td>3</td>
<td>1.8</td>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td>Clinical</td>
<td>1.2</td>
<td>3</td>
<td>1.8</td>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td>Distribution</td>
<td>20%</td>
<td>50%</td>
<td>30%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Number of Items = 120
Item Difficulty
Portfolios

- Collection of student work for the purpose of demonstrating learning or showcasing best work

- Types
  - Growth—show student progress or growth over time
  - Presentation—show student’s best work or final accomplishments
  - Evaluation—record student’s achievement for grading or placement purposes

- Typically assessed using a rubric
Portfolio Pros and Cons

- **Strengths of portfolios**
  - Promotes student engagement
  - Documents change in performance over time
  - Assess student's work holistically
  - Student opportunity for reflection and evaluation of own work
  - Peer review possible
  - Flexible options that promote individualization

- **Weaknesses of portfolios**
  - More time required for planning and coordinating
  - Students may require more guidance from instructor
  - Inappropriate for measuring student’s factual knowledge
You Might Need a Rubric If…

- You are getting carpal tunnel syndrome from writing the same comments on almost every student paper.
- Students often complain they can’t read the notes you labored so long to produce.
- After grading, you are worried that the last ones graded may have been graded differently than the first ones.
- You give a long narrative description of the assignment in the syllabus, but students continue to ask about your expectations.
- You work with colleagues designing a common assignment for program courses but wonder if your grading scales are different.

Types of Rubrics

- **Holistic**
  - Single score based on overall impression of work
  - Quick score
  - No detailed information

- **Analytic**
  - Specific feedback along several dimensions
  - Scoring more consistent across students and graders
  - More time consuming to score
Steps in Developing a Rubric

- Define the assignment (topic, process, and product students are expected to produce)
- Determine and define key dimensions (criteria) of interest
- Decide on type of rubric
- Develop scoring scale
  - Define number of levels
  - Analytic scoring scale should be consistent across all key dimensions
- Establish detailed standards of performance for each dimension
  - Think of how you would describe low, middle, and high
  - Avoid comparative language
Surveys

- Institutional level
  - Alumni survey
  - Employer survey
  - First destination survey
  - Graduating student survey
  - Non-returning student survey
  - Student satisfaction survey
  - Orientation survey
  - Climate survey

- Program or department level
  - Advisory board survey
  - Customer survey
  - Peer review survey
  - Point-of-service survey
  - Program-specific survey

- National level
  - Freshman
  - Senior
  - Faculty
Assessment Matrix Can Be Useful to Link the “Method” with the “Outcomes”

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Graduating Senior Survey</th>
<th>Capstone Course</th>
<th>Portfolio</th>
<th>Focus Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with advising</td>
<td>Direct</td>
<td></td>
<td></td>
<td>Indirect</td>
</tr>
<tr>
<td>Skills and knowledge</td>
<td>Indirect</td>
<td>Direct</td>
<td>Direct</td>
<td>Indirect</td>
</tr>
<tr>
<td>Communication skills</td>
<td>Direct</td>
<td>Direct</td>
<td></td>
<td>Indirect</td>
</tr>
</tbody>
</table>
Identify MATURE Measures/Methods

Matches
- Directly related to the outcome it is trying to measure

Appropriate methods
- Uses appropriate direct and indirect methods

Targets
- Indicates desired level of performance

Useful
- Helps to identify what to improve

Reliable
- Based on tested, known methods

Effective and Efficient
- Parsimoniously characterize the outcome
Student Learning Outcomes
Curriculum Map

Courses in the Curriculum

Learning Outcomes

- oral communication
- written communication
- teamwork skills
- quantitative skills
- ethics
- discipline knowledge
- professional skills
- performance skills
Curriculum Map Can be Useful to Link the “Where” with the “Outcomes”

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Course 1234</th>
<th>Course 2345</th>
<th>Course 3456</th>
<th>Capstone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of theory</td>
<td>Introduced</td>
<td>Emphasized</td>
<td>Emphasized</td>
<td>Reinforced Assess</td>
</tr>
<tr>
<td></td>
<td>Assessed</td>
<td></td>
<td>Assess</td>
<td></td>
</tr>
<tr>
<td>Skills and knowledge</td>
<td>Introduced</td>
<td></td>
<td>Emphasized</td>
<td>Reinforced Assess</td>
</tr>
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<td></td>
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<td>Assess</td>
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<tr>
<td>Communication skills</td>
<td>Introduced</td>
<td></td>
<td></td>
<td>Emphasized Assess</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Measuring Outcomes

- Should provide an objective means of quantifying the outcomes, quality, efficiency or productivity of programs, operations, activities, or services
- Should indicate *how* you will measure each of your outcomes
- Provide at least two ways to measure each outcome
- Should indicate *when* you will measure each outcome
Structure of a Measure

- “(Target) (subject) (action verb) (criteria) (object) (method)”

- **Example:** 90% of students completing the program will achieve an evaluation of satisfactory or above in critical thinking as determined by a panel of industry reviewers for the capstone project using the critical thinking rubric developed by the program faculty
Challenges and Pitfalls

- One size does not fit all—some methods work well for one program but not others
- Do not try to develop the perfect assessment all at once—take a continuous improvement approach
- Allow for ongoing feedback
Hints on Selecting Measures

- Match assessment method with learning outcome
  - Students completing BSHE will demonstrate competence in engineering principles comparable to graduates of other similar national programs
  - In a locally developed exam administered at the end of the program, 95% of the students will achieve a score of 90% or better
  - 95% of our students will equal or exceed the national average on the FE examination administered twice a year

- The assessment results should be useful for improving program
  - Students completing BSHE will demonstrate competence in conducting research
  - 90% of graduates will successfully complete the senior design project
Hints on Selecting Measures

- Results should be easily interpreted and unambiguous
- Data should not be difficult to collect or access
- Information should be directly controllable by the unit or program
- Use methods that can assess both the strengths and weaknesses of your program
- Identify multiple methods for assessing each outcome
  - Direct and indirect measures
  - Qualitative and quantitative
  - Passive or active measures
  - Within different courses
  - Conducted by different groups
Hints on Selecting Measures

- Identify subcomponents of a measurement approach that allow deeper analysis
  - Example: sub-scores on an exam
- Capstone or culminating senior projects are ideal for student learning outcomes assessment
- When using surveys, target all stakeholders
- Methods and measures should be built on existing data collection
  - Accreditation criteria
  - Program review
Outcome 1. BS-HSA students will communicate clearly and concisely with internal and external customers, including health care professionals, community partners, and other key stakeholders. [Discipline Specific]

- During the fall semester, 75% of students will earn a grade of 80% or better on the oral debates in Long Term Care Administration (HSA 3222).
- During the fall semester, 75% of students will earn a grade of 80% or better on writing assignments in Organization and Management for Health Agencies II (HSA 4184).
- During the spring semester, 75% of all students participating in the internship will receive an evaluation score of "3 Effective," "4 Above Expected," or "5 Outstanding" when rated by their preceptor in terms of "Communication" skills.
Collect and analyze assessment data
Review results and determine actions
Implement assessment and program changes
Assess impact of changes
Collect the Data

- Decide how data will be collected based on selected measures and methods (e.g., survey administration, facilitation of focus group)
  - Use institutional data and resources
  - Collect data locally using internal resources
- Clearly identify sample and sampling method
  - Random, census, stratified, or convenience sample
- Decide how to best document data for analysis
  - Spreadsheet, database, paper copies, electronic
Analyze the Data

- Goal of analysis is to determine what needs improvement
  - Secondary goal is to identify what is doing well
- Determine who will analyze the data
  - Internal versus external sources
  - Use of students
- Determine what analysis tools will be used
  - Excel, SPSS, paper and pencil
- Determine how results will be presented
  - Tables, graphs, units, numbers versus percentages
Review the Results

- Purpose is to critically examine the results and determine what actions should be taken
- Involve relevant constituencies
  - Faculty, staff, students, industrial advisory board, community
- Determine how the review will be conducted
  - Present results
  - Brainstorm potential solutions
- Compare to targets
- Consider the quality of the data
Determine Required Actions

- If you meet targets, the goal is still improvement…
  - May want to raise your targets
  - May want to choose something else to assess

- Results can indicate that you are not meeting your targets
  - Data may be questionable—change method of measurement
  - Your program or unit may require changes
  - You have not been able to meet your target yet, but are moving in the right direction—continue to track improvement
  - You have not been able to meet your target yet, but are moving in the wrong direction and need to take some action
Implement Actions

- Takes time and resources
  - Course modification
  - Classroom improvement
  - Hire additional staff
  - Training
  - May need to link to a budget request

- Document actions taken or not taken
  - Who, what, when, where, and why?
Assess the Impact

- Need to determine whether actions are effective or not
- Referred to as “Closing the loop”
- Implemented changes do not always result in improvements
  - Takes time before impact is apparent
  - Not the only thing that is changing
- Impact is usually assessed in the next “assessment cycle”
National Resources

- Measuring Quality in Higher Education—Vic Borden and Brandi Kernel
  - [http://applications.airweb.org/surveys/Default.aspx](http://applications.airweb.org/surveys/Default.aspx)

- National Institute for Learning Outcomes Assessment—Stan Ikenberry, George Kuh and Peter Ewell
  - [http://www.learningoutcomesassessment.org/index.html](http://www.learningoutcomesassessment.org/index.html)

- Internet Resources for Higher Education Outcomes Assessment—North Carolina State University
  - [http://www2.acs.ncsu.edu/upa/assmt/resource.htm](http://www2.acs.ncsu.edu/upa/assmt/resource.htm)
Discussion and Questions

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