Assessing Student Learning Outcomes for Improving Academic Program Quality

ACCE Council for Construction Education

Mid-Year Meeting

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Marty Smith Sharpe
Assistant Vice President for Institutional Research and Assessment
msharpe@odu.edu

Old Dominion University

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Assessing Student Learning: A Common Sense Guide

Bolton, MA: Anker Publishing (2004)

Learning Outcomes for These Sessions

Participants will be able to:

- ... identify the salient characteristics of student learning outcomes
- ... define the role assessment plays in program improvement

Learning Outcomes for These Sessions

Participants will be able to:

- ... differentiate / define appropriate measures of student learning
- ... know how to relate student learning outcomes to curricular improvement

Important Concepts To Be Covered

- Quality
  - Characteristics of quality
  - Developing consensus
  - Measurement
- Purpose, goals, objectives
  - Inputs, outputs, outcomes
  - Competencies = Student Learning Outcomes

Concept of Quality

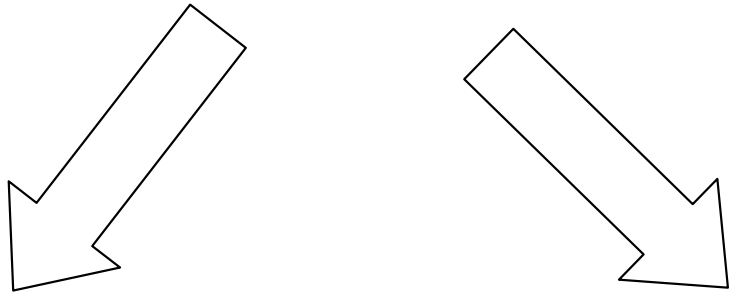
Define

Measure

Improve

Quality in Educational Programs

- Define
- Measure
- Student Learning Outcomes
- Assessment



Improve

Communicate

Example 1: Quality HVAC System

- What are the characteristics of a quality HVAC system?
  - What physical capacities does it have?
  - What types of things should it be able to do?
- How do you know when you have a quality HVAC system? What would know?
  - High quality? Low quality?
- Could you come to general agreement in the profession regarding these characteristics?

Example 2:
Request for Bid for Construction

- When an organization solicits bids for construction and a contractor responds, what happens?
  - Plans and expectations for building
  - Minimum specifications for raw materials
  - Specific milestones and deliverables are identified
  - Standard of quality for the building, its functionality, its durability

Construction Management Education Programs

Construction Management Education Programs

- What is your purpose?
- What are your goals?
- What are your objectives?
- How do you know you are doing a good job?
- What is your product?

Construction Management Education Programs

- What characteristics does a person capable of assuming “a leadership role in construction?” have? **(Competencies/Learning Outcomes)**
- How do you assist the student to achieve this capability? **(Curriculum)**

Construction Management Education Programs

- How do you know and verify that your graduates achieve these capabilities? **(Assessment)**
- How do you ensure that you have and maintain a quality program? **(Continuous Improvement)**
  - And how does this relate to your "product"?

Program Processes and Products Continuum

- Inputs
- Processes
- Outputs
- Outcomes

Program Inputs

- Resources
- Knowledge Base/Professional Practice
- Faculty
- Students
- Facilities
- Budgets
- Industry Contacts

Program Processes

- Requires Inputs/Resources
- Learning Experiences through Curriculum Delivery

Outputs vs. Outcomes

- Degrees awarded
- Graduation rates
- Graduate satisfaction

Outputs

- Employer satisfaction with graduates
- Pass rates on certification exam
- End Product: Competent entry-level professionals

Outcomes

Student LEARNING Outcomes

- A competent entry-level professional who is capable of assuming “a leadership role in construction”
- Need to identify specific elements or learning outcomes or competencies which are component parts of this

Student Learning Outcomes

Student Learning Outcomes are . . .

- Your destination, not your path
- What you aim to accomplish in terms of student learning and achievement at the completion of your program

Student Learning Outcomes Competencies

- In a general sense, student learning outcomes are:
  - Knowledge
  - Skills
  - Attitudes
  - Habits of mind
- .... that students take with them from a learning experience.

Student Learning Outcomes

- Become the basis for measuring student learning outcomes - assessment
- May begin generically, globally with broad objectives to be further broken down
- *What want to engender in our students – what we want our students to know, do, and be*
- Ideally, specific and measurable

Purpose of Student Learning Outcomes Assessment

- To communicate to ourselves:
  - What we intend for students to learn.
  - The content and sequence of learning
  - Whether students have gained
    - appropriate skills
    - attitudes
    - and/or knowledge
  - How successful a learning activity has been

Purpose of Student Learning Outcomes Assessment

- To communicate to students what we intend for them to learn:
  - So they can organize their efforts toward accomplishing the desired behavior
  - So they can assess their own performance

Purpose of Student Learning Outcomes Assessment

- To communicate to other interested parties including professional accrediting agencies and the public
  - The purpose and degree of success of our activities
  - Our commitment to engage in the process of improvement

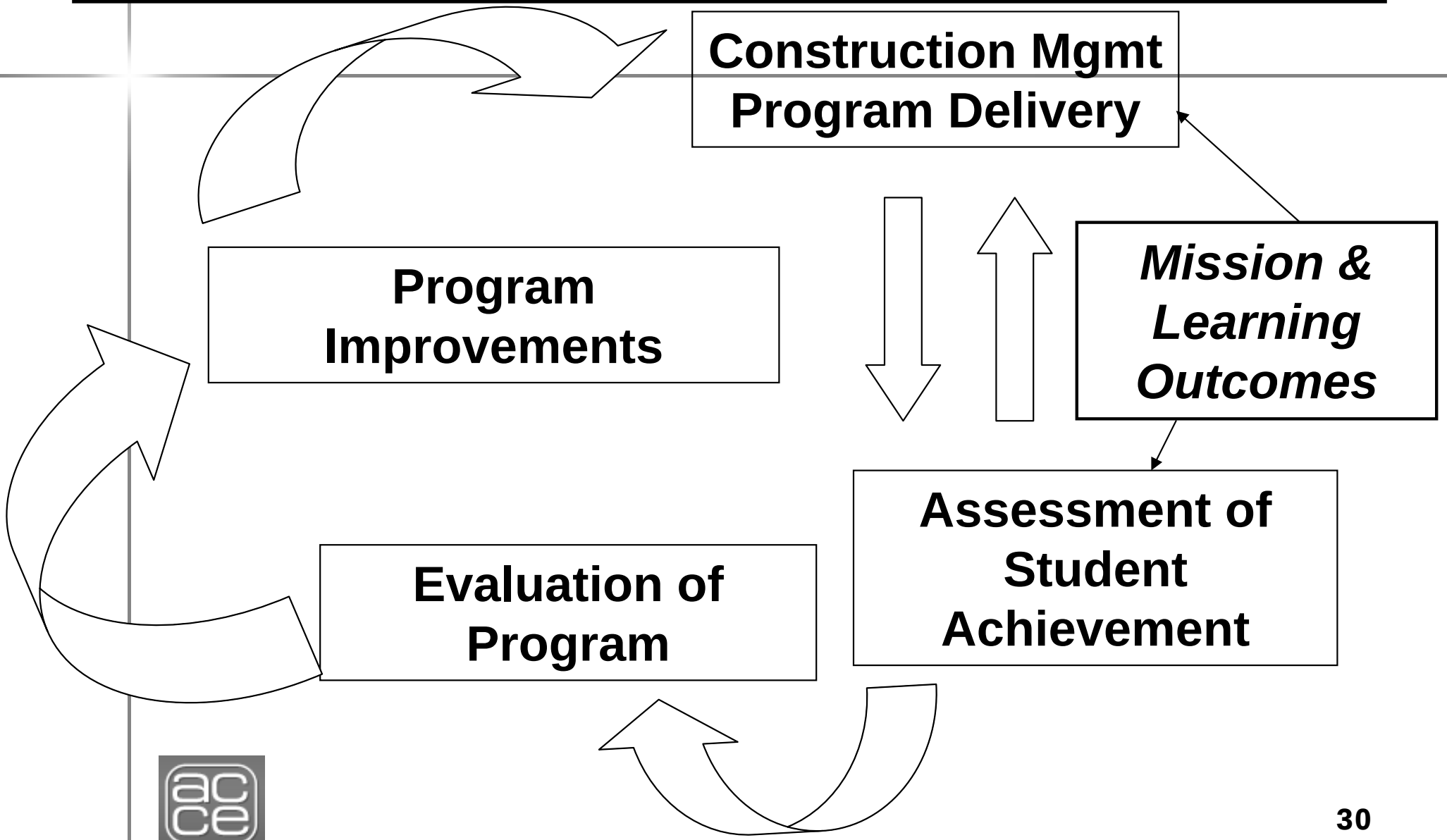
Assessment of Student Learning Outcomes

- Learning outcomes provide the basis for assessing whether or not students completing your program have attained the agreed upon outcomes
- Program has to organize itself in such a way that student achievement is captured at various points in time
- Assessment results provide information to support program improvement

Developing Student Learning Outcomes

- Input from all stakeholders
- Process of consensus and expert opinion
- Faculty
- Professional Practice: Industry
- Accrediting and Professional Organizations
  - Example Texas A&M Study

Model Student Outcomes Assessment System



Common Myths and Misconceptions Regarding Student Outcomes Assessment and Program Improvement

Common Questions and Answers

"How can I do this and complete all of my other teaching and other duties?"

Building the Scholarship of Assessment
(Banta, 2002)

Common Questions and Answers

"Isn't this just an accountability problem someone else to take care besides the faculty?"

Focus on student learning

…. has to involve faculty

Common Questions and Answers

"I know how well my students are performing because I teach them and grade their work!!!"

"In God we trust ….. "

"….. all others bring data"

Common Questions and Answers

"Why not use grades in courses?"

Grades in courses often include more than student learning

Single grader

Results not specific enough for most program improvements

Common Questions and Answers

"We have a capstone course; isn't that assessment?"

If used properly, a wonderful vehicle for assessment

… but it is only a starting point

Common Questions and Answers

"*We do surveys and course evaluations to assess our students satisfaction; isn't that sufficient assessment?"*

Surveys are good measures of confidence, not competence

Surveys are good measures of satisfaction, not student learning

Common Questions and Answers

"What about academic freedom?"

Faculty have a responsibility to cover common learning outcomes

Faculty can add learning outcomes and decide how to teach common learning objectives most effectively

Assessment is not a form of faculty evaluation . . .

Unit of Analysis

- .... Is not the faculty member
- Is not the student
- IS the PROGRAM

Drivers of Outcomes Assessment

- A revolution in education: **the learning-centered paradigm**
  - **Faculty go from being the "sage on the stage" to the "guide on the side"**
- Higher Education's response to the Total Quality Management movement
  - Review, assess, improve ... review, assess, improve ...
- Historical role of accreditation in ensuring quality

Drivers of Outcomes Assessment

- Calls for accountability/consumer protection
- Federal and association requirements for regional accreditation include documenting **“student achievement“** and using it for program improvement
- Spellings Commission: Accreditors are not requiring institutions to demonstrate student learning outcomes adequately

Defining Student Learning Outcomes Assessment

What is Assessment?

- "Assessment is the ongoing process of:
  - Establishing clear, measurable ***expected outcomes*** of student learning
  - Ensuring that students have sufficient ***opportunities to achieve*** those outcomes

- **Suskie, p. 3**

What is Assessment?

- "Assessment is the ongoing process of:
  - Systematically gathering, analyzing, and interpreting ***evidence*** to determine how well student learning matches our expectations.
  - Using the resulting information to ***understand and improve*** student learning."

- **Suskie, p. 3**

Evaluation vs. Assessment

Evaluation:

Using information to make an informed judgment

Assessment:

Judgment as part of the assessment process

Evaluation:

Determining the quality or worth of a program

Assessment:

Using outcomes for accountability and continuous improvement

Grading vs. Assessment

- Grading and assessment criteria appropriately differ (e.g., attendance)
- Grading standards may be vague or inconsistent (or, at best, idiosyncratic)
- Grades alone may give insufficient information on student strengths and weaknesses
- Grades do not reflect all learning experiences (whole curriculum)

Explaining What Assessment Is and Why it is Important

- A common question:
  - We give the students grades, so shouldn't that be enough to demonstrate they have mastered the knowledge, skills, and attitudes required?
  - Yes, for the purpose of certifying student satisfactory course completion
  - No, for the purpose of assessing the effectiveness of the program

Why Not Course Grades?

Jim Nichols' Grade Book Analogy:

"How you can use student performance to assess course and/or program strengths and weaknesses? "

A way to conceptualize the whole outcomes assessment process

Typical Grade Book

	Grading Dimensions						
Student	Paper 1	Midterm	Attendance	Participation	Paper 2	Final	Student Performance
#1							
#2							
#3							
#4							
#5							
#6							
#7							
#8							
#9							
#10							

Typical Grade Book

- Rows represent individual students
- Dimensions across the top most typically represent measures of student performance at various points in time and/or results of different measures or instruments
- Student performance at the end of the semester is summarized and a course grade results.

Typical Grade Book: Focus on the Rows

- Student performance may vary across the columns, but, in general, is not important in summarizing individual student performance in each row.
- If all/most students pass the course, presumably, the targeted learning outcomes have been met -- BUT have they?
  - Need to focus on columns

Focus on the Columns: Learning Outcomes

- Analyzing the ***row*** data results in a summary of individual student performance.
- HOWEVER, analysis of the ***column*** achievement should identify strengths and weaknesses of the course which are not apparent when looking at student summary data only.

Substituting Student Learning Outcomes

Student	Student Learning Outcomes ~ Competencies						Student Performance
	A	B	C	D	E	F	
#1	1	0	1	1	1	1	84%
#2	0	1	1	1	1	1	84%
#3	1	1	1	1	0	1	84%
#4	0	0	1	1	1	1	67%
#5	1	1	1	1	1	1	100%
#6	1	0	1	1	1	1	84%
#7	1	1	0	1	1	1	84%
#8	1	0	1	1	1	1	84%
#9	1	1	1	1	1	1	100%
#10	1	1	1	1	1	1	100%
Outcome Performance	80%	60%	90%	100%	90%	100%	

Substituting Program Student Learning Outcomes as Column Dimensions

- Unit of analysis changes from an individual course to the academic program
- Achievement of each outcome may be measured at one or more times and in one or more ways during the course of the program

Substituting Program Learning Outcomes

Student	Program Learning Outcomes						Student Performance
	A	B	C	D	E	F	
#1	*1*	*0*	*1*	*1*	*1*	*1*	84%
#2	*0*	*1*	*1*	*1*	*1*	*1*	84%
#3	*1*	*1*	*1*	*1*	*0*	*1*	84%
#4	*0*	*0*	*1*	*1*	*1*	*1*	67%
#5	*1*	*1*	*1*	*1*	*1*	*1*	100%
#6	*1*	*0*	*1*	*1*	*1*	*1*	84%
#7	*1*	*1*	*0*	*1*	*1*	*1*	84%
#8	*1*	*0*	*1*	*1*	*1*	*1*	84%
#9	*1*	*1*	*1*	*1*	*1*	*1*	100%
#10	*1*	*1*	*1*	*1*	*1*	*1*	100%
Outcome Performance	80%	60%	90%	100%	90%	100%	

Typical Grade Book Summary

- Rows focus on…
  - Individual student performance
- Columns focus on …
  - Course student learning outcomes
  - Program student learning outcomes
- Once particular strengths and weaknesses are identified, analysis of how the course or curriculum is delivered should ensue.

Curriculum Mapping

- Links student learning experiences in curriculum to attainment of competencies
- Identifies where in the curriculum a particular competency should be attained
- Used with student learning outcomes assessment to engender program improvement

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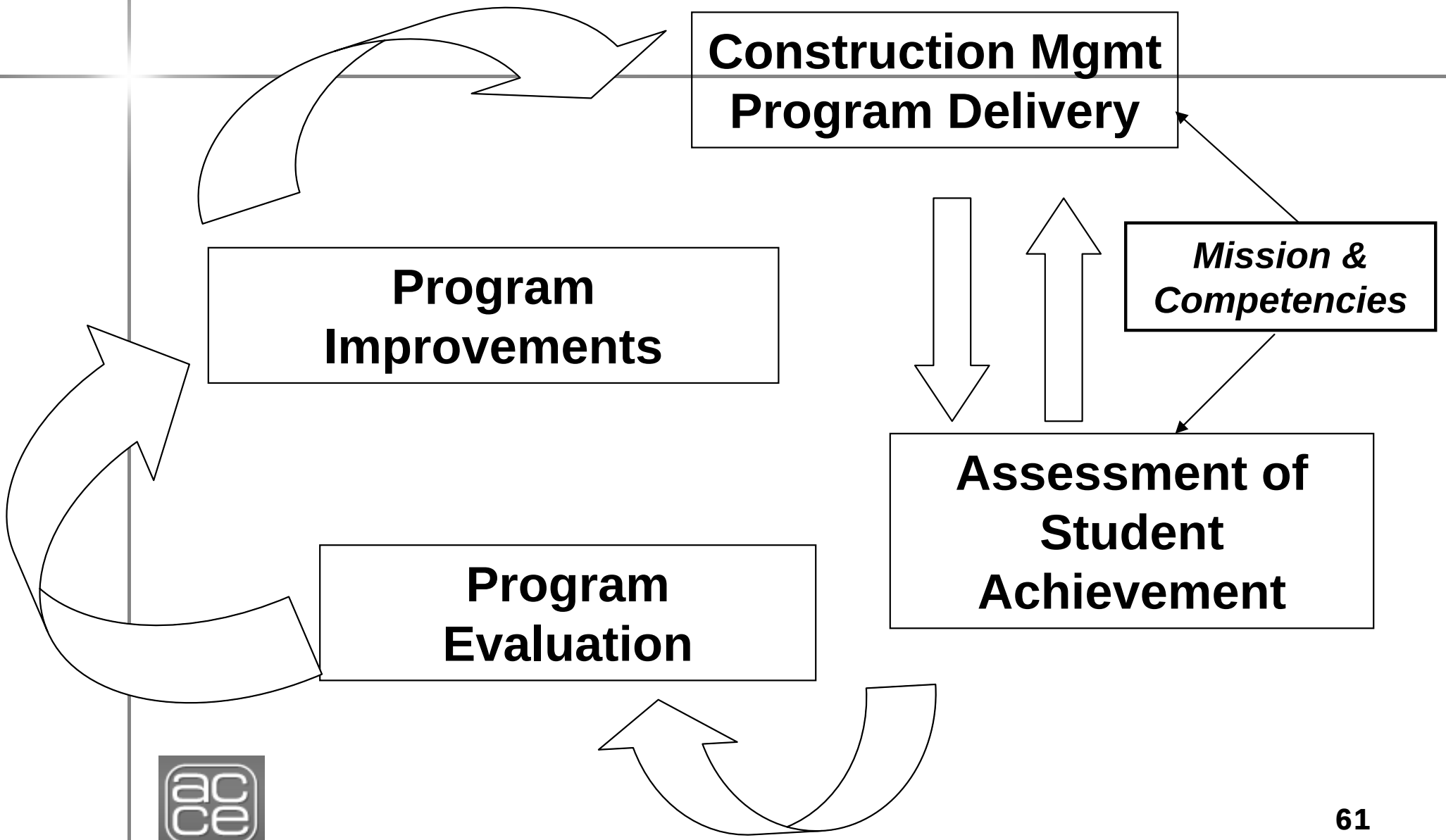
From the perspective of the accreditor, the public

- How do I know that your graduates know what you say they know?
- Providing evidence of student learning outcomes
- Using evidence to improve the program

Model Student Outcomes Assessment System



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Student Learning Outcomes Competencies

- In a general sense, student learning outcomes are:
  - Knowledge
  - Skills
  - Attitudes
  - Habits of mind
- .... that students take with them from a learning experience.

Establishing Learning Outcomes - Competencies

- Not to broad, not too specific
- Use concrete action words
- Define fuzzy terms
- Focus on the end not the means
- Focus on your most important goals
- Work with colleagues and other stakeholders
- Become the basis for measuring student learning outcomes

Suskie, p. 78-79

Levels of Learning

- In 1948 a group of educators began classifying educational goals and outcomes
- Bloom's taxonomy of the Cognitive Domain was completed in 1956

Bloom's Taxonomy of Cognitive Development

Evaluation

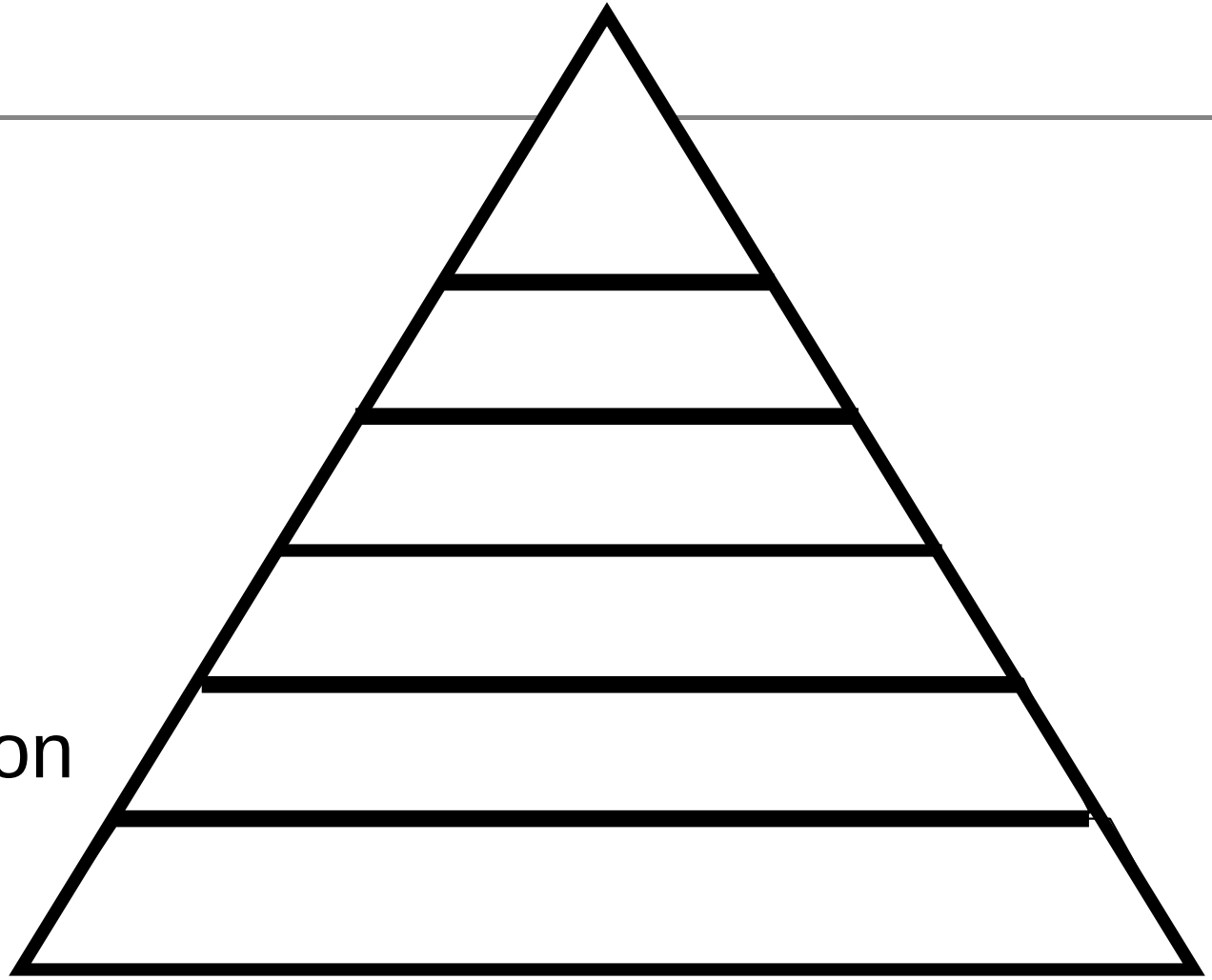
Synthesis

Analysis

Application

Comprehension

Knowledge



Program vs. Course Outcomes

- Program outcomes are more global but should fall within a specific domain
- Course outcomes will be more specific, often behavioral
- Assessment of learning outcomes at the course level can be aggregated (by learning outcome) to the level of the program

Resources for Identifying Learning Outcomes

- Mission and vision statements
- Standards established by professional organizations
- Course syllabi
- Capstone experiences
- Employer Surveys of need in practice

Examples of Learning Outcomes

- Health Care Management: Apply basic problem-solving skills along with health care financial management knowledge to develop recommendations related to the financial issues(s) confronted by a health care organization.

Examples of Learning Outcomes

- Communication Studies: Systematically analyze and solve problems, advocate and defend one's views, and refute opposing views.

..... Examples of Learning Outcomes

- Construction Management.
  Demonstrate an ability to develop detailed construction cost estimates within acceptable parameters considering all relevant factors, e.g., how market trends affect material costs.....

Writing Measurable Student Learning Outcomes

Writing Measurable Outcomes

- Break into groups
- Utilizing your collective knowledge and resource materials provided
- Develop six (6) distinct student learning outcomes for an associates or bachelors degree program
- Report back to group

Measures of Student Learning

Good Assessment Practices

- Focus on teaching and learning rather than on assessment
- Set clear expectations
- Be flexible
- Minimize the burden of assessment
- Start small
- Start with successes
- Involve students
- Use assessment results appropriately

Good assessments…

- Measure what we intend to measure **(validity)**
- Give us **useful** information
- Yield **results specific to the learning outcomes** so that improvements can be made
- Give us **reasonably accurate, truthful** information
- Are **fair** to all students and applied consistently

Good assessments…

- Yield **consistent results** across administrations **(reliability)**
- Are **ethical** and protect the privacy and dignity of those involved
- Are **systematized**
- Are **cost effective**, yielding value that justifies the time and expense we put into them

Chiropractic Education: Guidelines on Assessment Measures

Assessment tools must be compatible with the domain being assessed:

(1) knowledge must be assessed using appropriate written and oral examinations as well as direct observation;

(2) psychomotor skills must be assessed by direct observation;

Chiropractic Education: Guidelines on Assessment Measures

(3) communication skills must be assessed by direct observation of student interactions with faculty, colleagues, and patients and their families. Skills may also be assessed by review of any written communications to patients and colleagues including clinical reports, and referral or consultation letters;

(4) interpersonal skills must be assessed by reviewing performance in collaboration with staff, members of the patient care team, and consultations with doctors of chiropractic and other health care providers as appropriate;

Chiropractic Education: Guidelines on Assessment Measures

(5) attitudes must be assessed by interviews, observations, or evaluations with peers, supervisors, clinic faculty, and patients and their families; and

(6) competence in utilizing the acquired clinical data to arrive at a diagnosis, and develop a case management plan, must be assessed using appropriate written and oral examinations as well as direct observation.

Reasons for Assessment

Formative

- Improve teaching and learning (or service and satisfaction)
- Used while learning is taking place
- Focus on feedback and adjustment

Summative

- Document learning or service and satisfaction
- Occur **at the end** of the course or service period
- Focus on sum/total, with little feedback

Types of Assessment

Qualitative

- Flexible, naturalistic methods that are usually analyzed by looking for recurring patterns and themes
- Often underused, underappreciated
- Can give fresh insight and help discover problems and solutions

Quantitative

- Structured, pre-determined response options that can be summarized into meaningful numbers and analyzed statistically
- Some audiences find quantitative results more convincing

Course-Embedded Assessments

- Developed and implemented within the context of individual course(s)
- Required courses in the major, capstone course ideal
- Completion of assessment measures part of course grades
- Contrast to separate session assessment – issues of motivating student to complete assessment

Types of Evidence

Direct

- Tangible, visible, self-explanatory
- Quality and quantity of student learning is concretely exhibited

Indirect

- Signs, indicators, less convincing – "tell us about . . ."
- Results may be consistent with student learning, but don't solicit specifics

Common Direct and Indirect Measures of Student Learning

Direct

- Tests
- Rubrics
- Portfolios of student work
- Capstone projects
- Field supervisor ratings
- Employer ratings
- Scores and pass rates on licensure exams

Indirect

- *Course grades*
- Surveys
- Focus Groups
- Course evaluations
- Admission to graduate school
- Student self-ratings
- Student / alumni satisfaction with learning
- Honors, awards, and scholarships

Types of Assessment

Objective

- No professional judgment to score correctly – usually one correct answer
- Multiple-choice test
- Matching items
- True-false questions

Subjective

- Need professional judgment to score – many possible answers of varying quality
- Many assessments are of this type

Subjective Assessments...

- Assess many important skills that objective tests cannot.
- Assess skills directly.
- Promote deep, lasting learning.
- Allow for nuances in scoring.
- Can capture a lot of information on a broad range of learning goals in a relatively short time.

Developing Assessment Measures

- Using the six (6) student learning outcomes identified in the previous exercise
- Identify at least two different types of measures for each and describe how they will be implemented
- Report back to the group

Assessing Student Learning Outcomes: Getting Started

1. Draft a list of student learning outcomes utilizing faculty, industry advisory committees, and other stakeholders

Outcomes Assessment: Getting Started

2. Develop a curriculum map
   - Identify where in the curriculum, down to the course and unit, where the learning experiences are that engender the outcome
3. Identify measures within each learning experience which assess each learning outcome . . .

Outcomes Assessment: Getting Started

3. .... Link the learning outcome to the measure, and whenever possible, use the measure in the context of the course (course-embedded assessment)
4. Organize results of the various assessment according to the individual learning outcomes and analyze, review, and identify weaknesses

Outcomes Assessment: Getting Started

5. Track the weaknesses in student learning outcomes back through the curriculum map to the associated learning experiences
6. Identify curricular improvement and implement
7. Continue assessing, reviewing, improving

References

- Banta, T. W. (2002). *Building a scholarship of assessment*. San Francisco: Jossey-Bass.
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Marty Smith Sharpe
Assistant Vice President for Institutional Research and Assessment
msharpe@odu.edu

Old Dominion University