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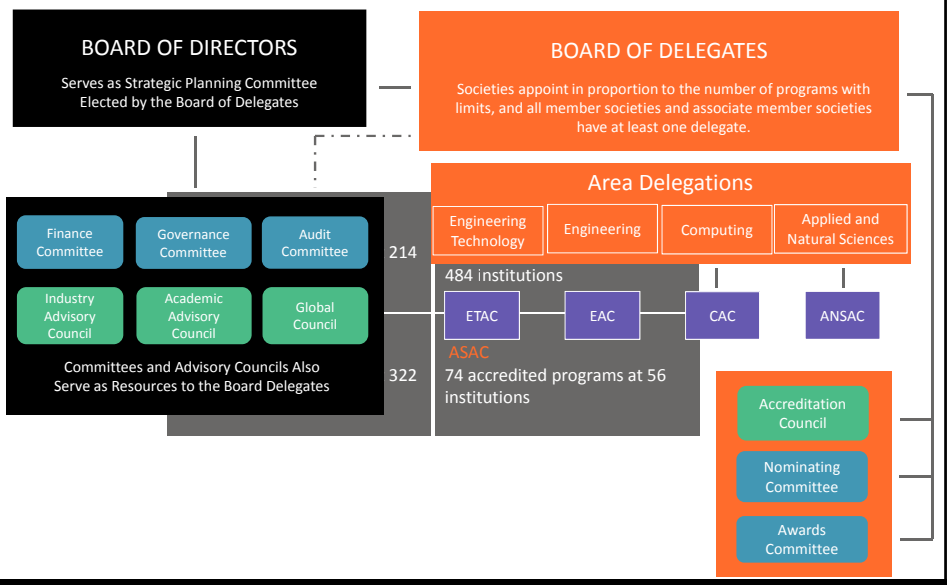
Facts to know about ABET

ABET ORGANIZATIONAL STRUCTURE



ABET

CONTINUOUS IMPROVEMENT

Better Evaluations

Faculty Assessment Training

Evaluator Training

Institution Expectations

Promote Accreditation

Promote CQI Everywhere

IDEAL, Workshops, Symposium

ABET

Workshop Overview

WORKSHOP OVERVIEW

- Setting the context for program assessment
- Identifying the similarities/differences between course assessment and program assessment
- Writing measurable performance indicators
- Developing scoring rubrics
- Mapping the curriculum
- Identifying assessment methods
- Developing efficient and effective assessment processes
- Reporting results
- Sharing lessons learned

WHAT THE WORKSHOP IS NOT

- It is not a recipe
  - Best practices will be discussed but there is no one way to implement them
- It is not an accreditation workshop
  - We will not discuss the interpretation of the ABET Criteria, the ABET program visit, or the preparation of the Self-Study

BEST PRACTICES SHOULD BE CONSISTENT WITH PRINCIPLES OF LEARNING

- Learning occurs best when we build on what students already know
- Learning is an active process (importance of students' active involvement in their own learning)
- Learners perform best when expectations for their learning is clear
- Learners perform best when they get feedback on their performance
  - Question: When I score student work, will students know their areas of strength and weakness and what they need to do to improve?

PRINCIPLES OF PROGRAM ASSESSMENT

- Student learning is cumulative over time
  - What students learn in one course, they use, practice, and develop in other courses.
- Focus of data collection in program assessment is on the cumulative effect of student learning and influences:
  - When to collect data
  - From whom to collect data
  - Interpretation of the results

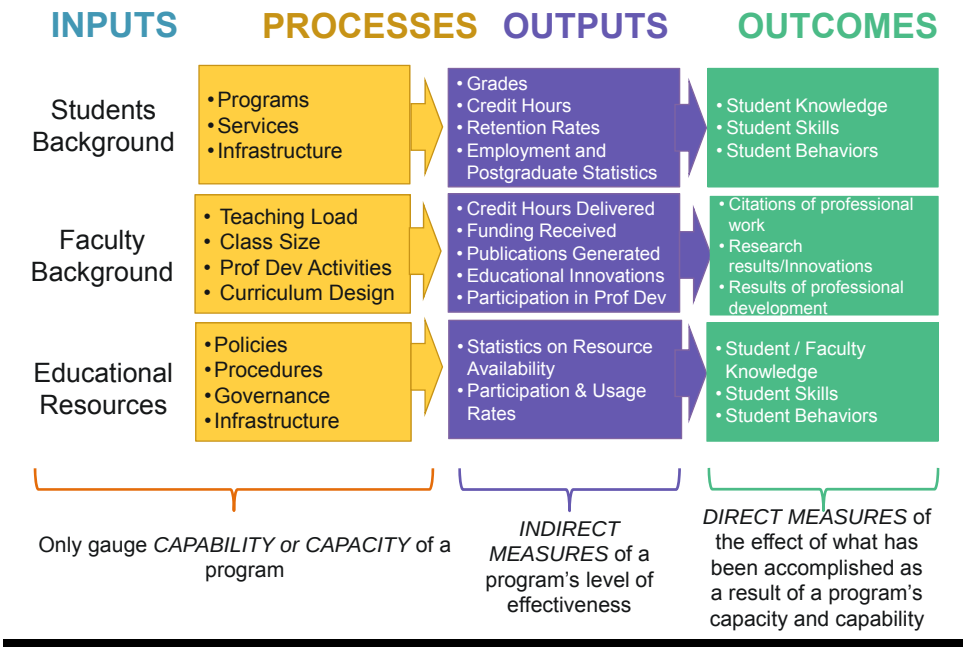
FOUNDATIONAL TRUTHS

- Programs are at different places in the maturity of their assessment processes
- Programs have different resources available to them (e.g., number of faculty, availability of assessment expertise, time)
- Each program has faculty who are at different places in their understanding of good assessment practice

Context of Assessment

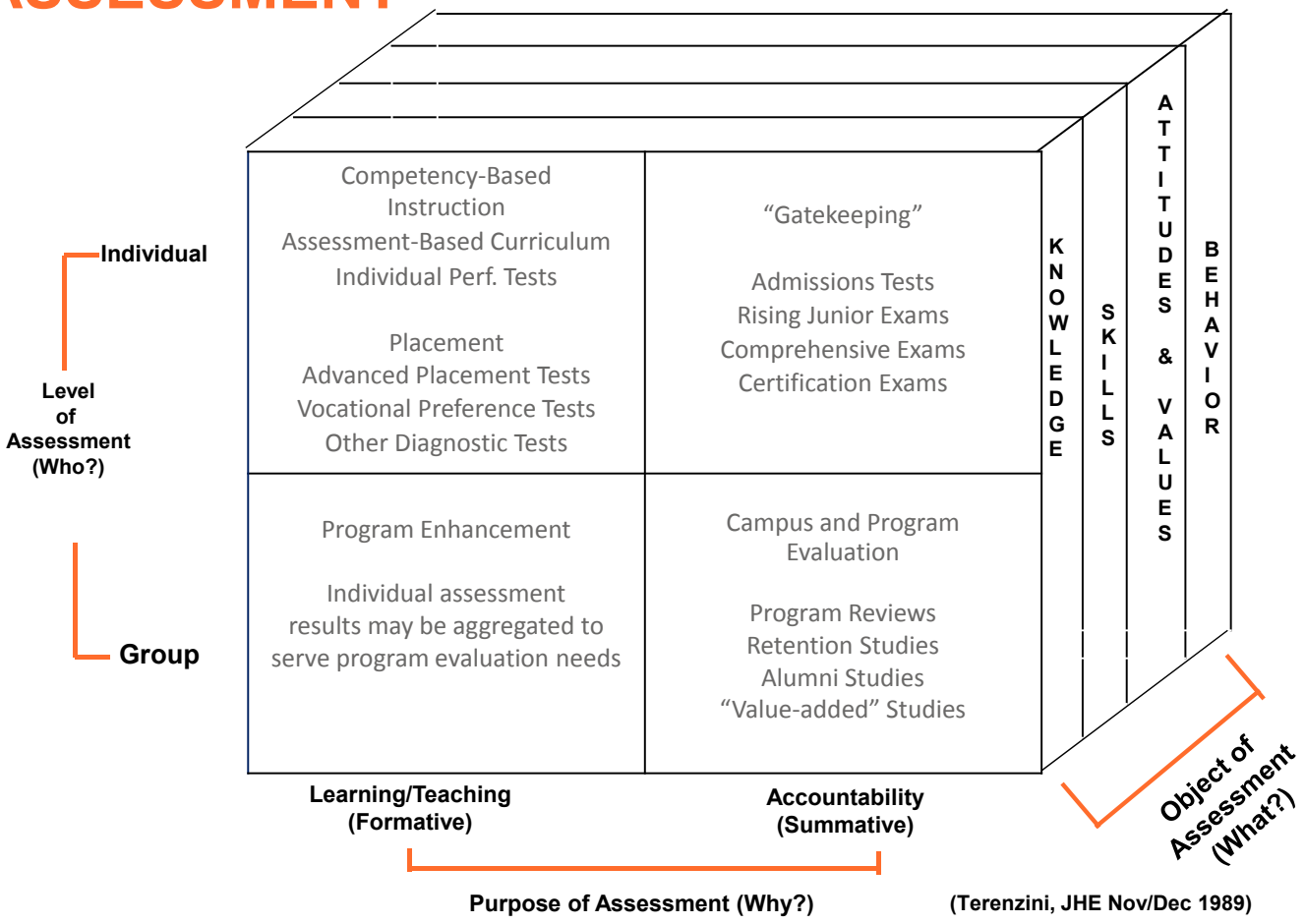
[redacted]

Each program is unique



The Assessment Process

TAXONOMY OF APPROACHES TO ASSESSMENT



(Terenzini, JHE Nov/Dec 1989)

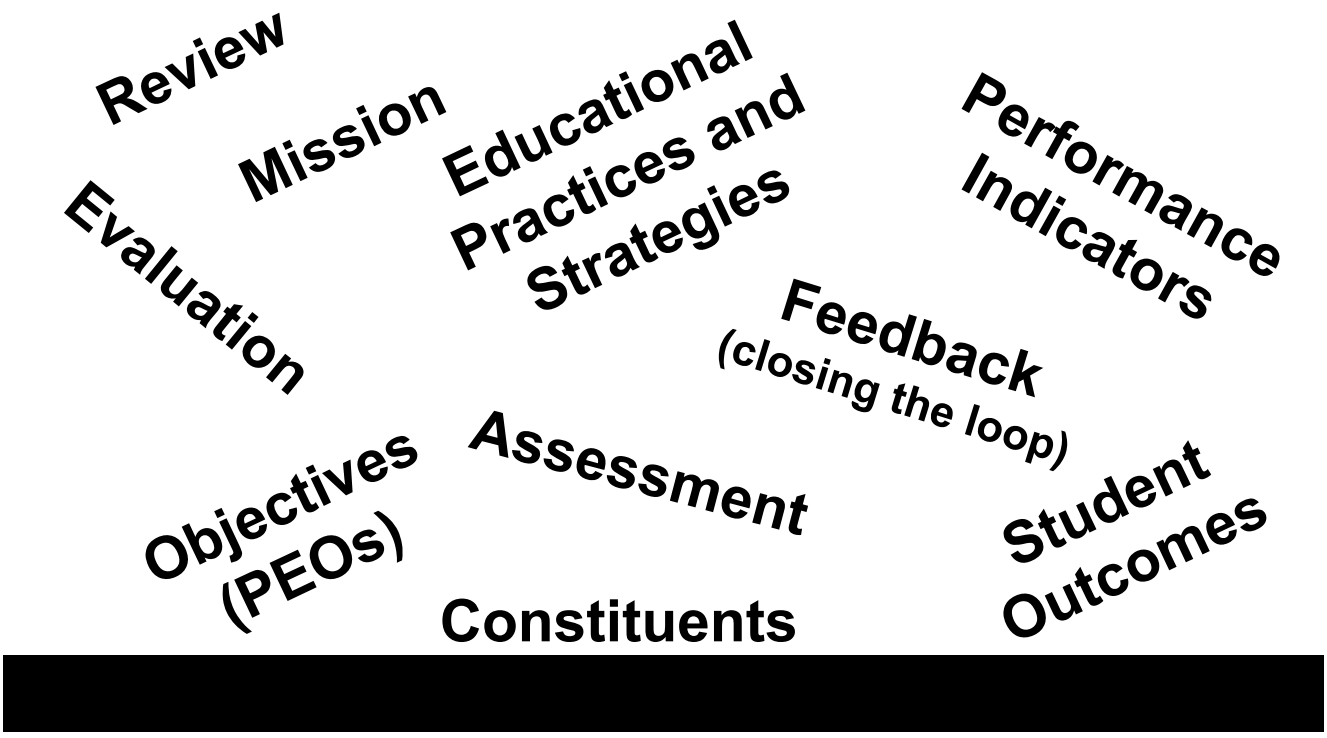
Importance of Language

TERMS	DEFINITIONS
Program Educational Objectives	Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program's constituencies.
Student Outcomes	Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.
Performance Indicators	Specific, measurable statements identifying student performance(s) required to meet the outcome; confirmable through evidence.
Assessment	Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process.
Evaluation	Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding program improvement.

ABET Terms	Other possible terms for the same concept
Program Educational Objectives	Goals, Outcomes, Purpose, Mission, etc.
Student Outcomes	Goals, Objectives, Competencies, Standards, etc.
Performance Indicators	Performance Criteria, Competencies, Outcomes, Standards, Rubrics, Specifications, Metrics, etc.
Assessment	Evaluation
Evaluation	Assessment

ASSESSMENT FOR CONTINUOUS QUALITY IMPROVEMENT

How do all the pieces fit together?



Program Educational Objectives

PROGRAM EDUCATIONAL OBJECTIVES

- Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program's constituencies.

PEO's answer the question: *What should the graduates of our program be able to do early in their careers that meet the needs of our constituents?*

ABET

Self-Study Questionnaire – Guidelines for Criterion 2: Program Educational Objectives

Mission Statement

- Provide the institutional mission statement.

Program Educational Objectives

- List the program educational objectives and state where these can be found by the general public.

Consistency of the Program Educational Objectives with the Mission of the Institution

- Describe how the program educational objectives are consistent with the mission of the institution.

Program Constituencies

- List the program constituencies. Describe how the program educational objectives meet the needs of these constituencies.

Process for Revision of the Program Educational Objectives

- Describe the process that periodically reviews and revises, as necessary, the program educational objectives including how the program's various constituencies are involved in this process. Include the results of this process and provide a description of any changes that were made to the program educational objectives and the timeline associated with those changes since the last general review.

CHARACTERISTICS OF GOOD PROGRAM EDUCATIONAL OBJECTIVES

- Align with constituents' needs and institutional mission
- Clearly defined
- Serve as targets for early career development
- Relevant to the profession
- Achievable and realistic

ABET NO LONGER REQUIRES ASSESSMENT OF ATTAINMENT OF PROGRAM EDUCATIONAL OBJECTIVES

	OLD DEFINITIONS	NEW DEFINITIONS
Program Educational Objectives	Program educational objectives are broad statements that describe what graduates are expected to attain within a few years after graduation. Program educational objectives are based on the needs of the program's constituencies.	
Assessment	Assessment is one or more processes that identify, collect, and prepare data to evaluate the **attainment of student outcomes and program educational objectives**…	Assessment is one or more processes that identify, collect, and prepare data to evaluate the **attainment of student outcomes**…
Evaluation	Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the **extent to which student outcomes and program educational objectives are being attained**...	Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the **extent to which student outcomes are being attained**…

PEOS: MEETING YOUR CONSTITUENTS' NEEDS

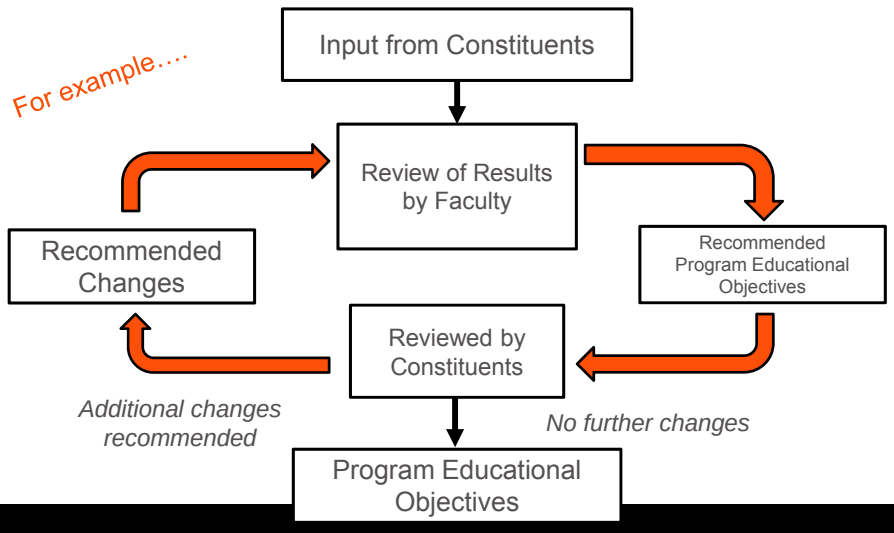
Who are my constituents?

- *Who has a stake in the quality and characteristics of your graduates?*
- *Examples ..*

How do I know their needs?

- *Advisory Boards*
- *Recruiters*
- *Alumni groups*
- *Conduct focus groups with constituents*
- *Written surveys*

REVIEWING AND REVISING PROGRAM EDUCATIONAL OBJECTIVES

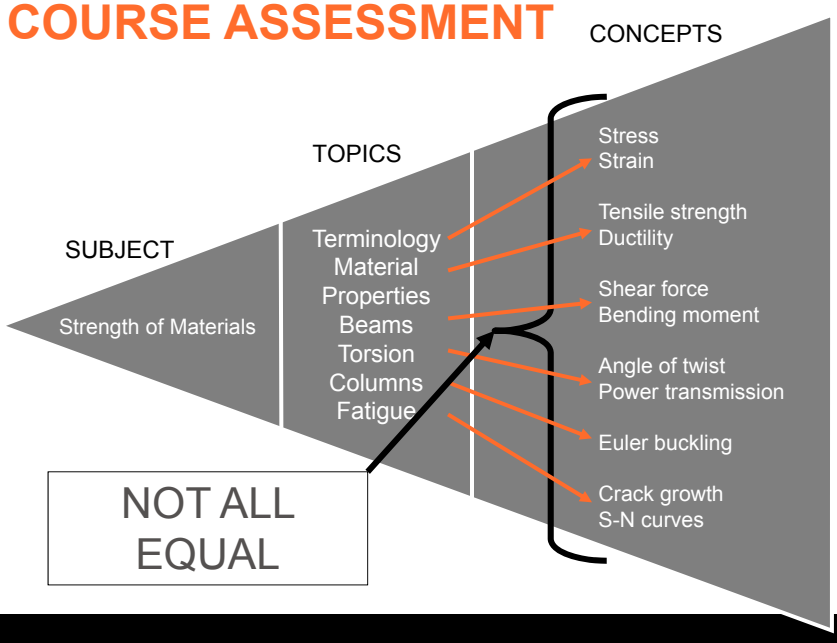


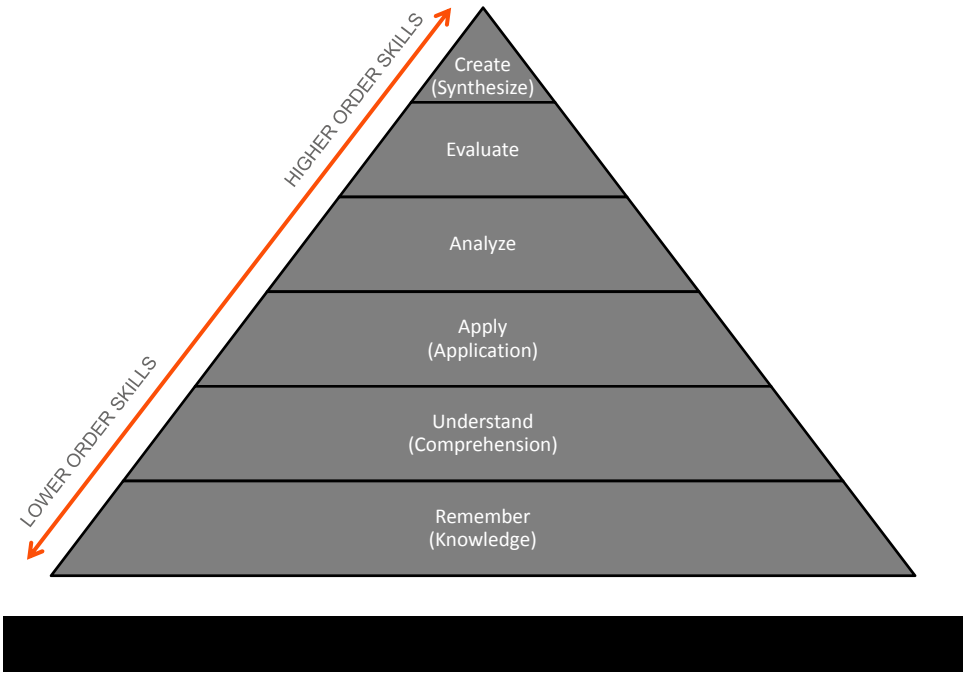
Similarities and differences between course assessment and program assessment

GRADES ≠ ASSESSMENT

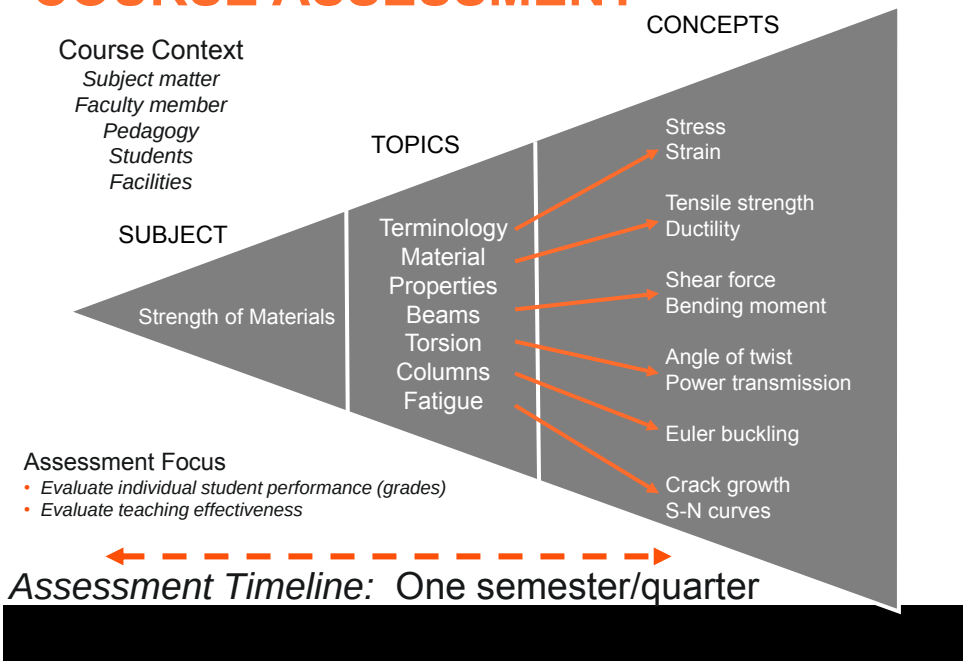
- Grades have limited use for program assessment as they do not have diagnostic value.
- Grades can be a 'flag,' but do not point to specific strengths and weaknesses of what students know or can do.
- A student's grade in a course or on a project or exam represents the student's performance on an set of aggregated knowledge/skills.

COURSE ASSESSMENT



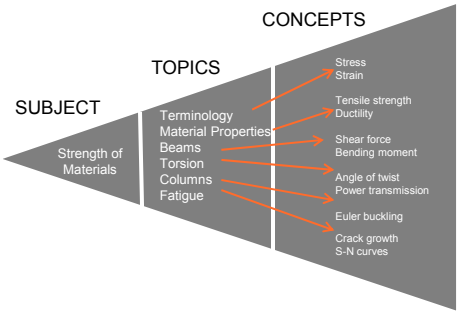


COURSE ASSESSMENT

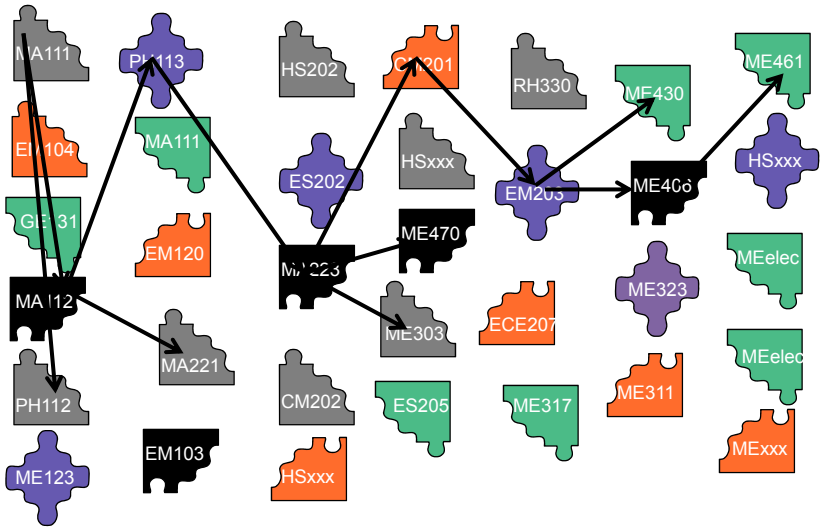


COURSE ASSESSMENT

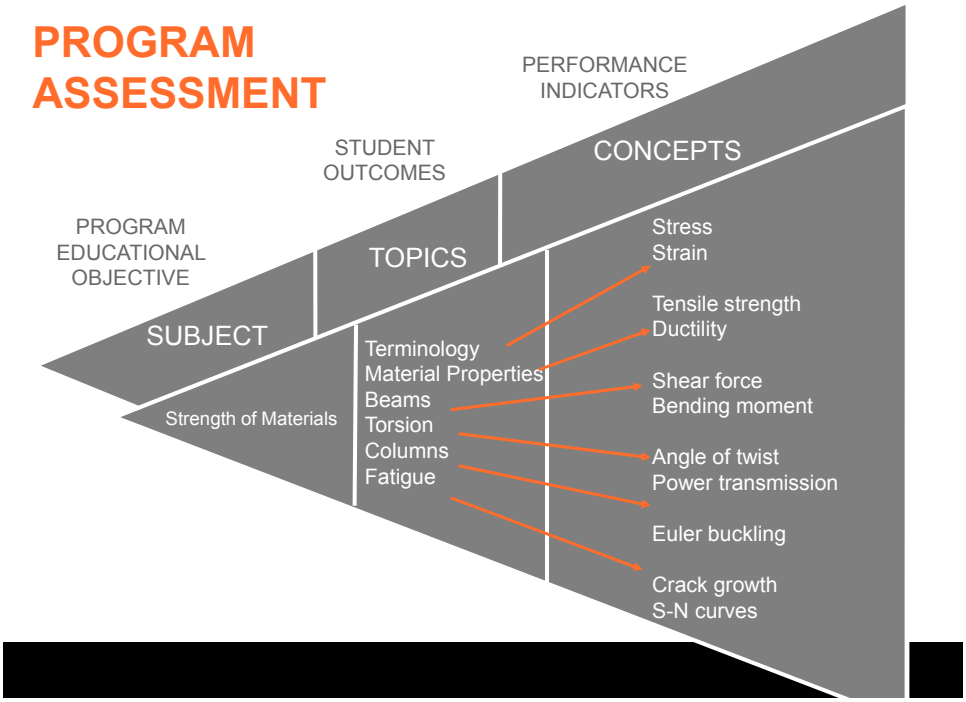
- Cannot "cover" all topics related to subject
- Cannot "cover" all concepts related to each topic
- Decisions made based on context of course and characteristics of students
- Not all concepts are at the same performance (cognitive) level
- Assessment data taken at the concept level
- Assumptions related to performance on topics based on performance on concepts



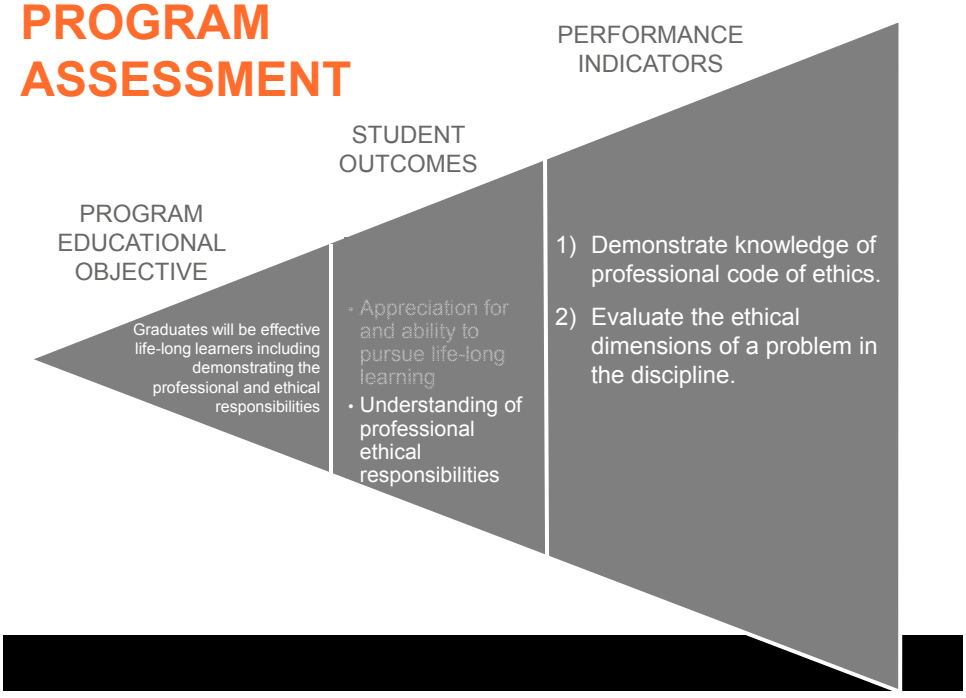
COURSE ASSESSMENT



PROGRAM ASSESSMENT

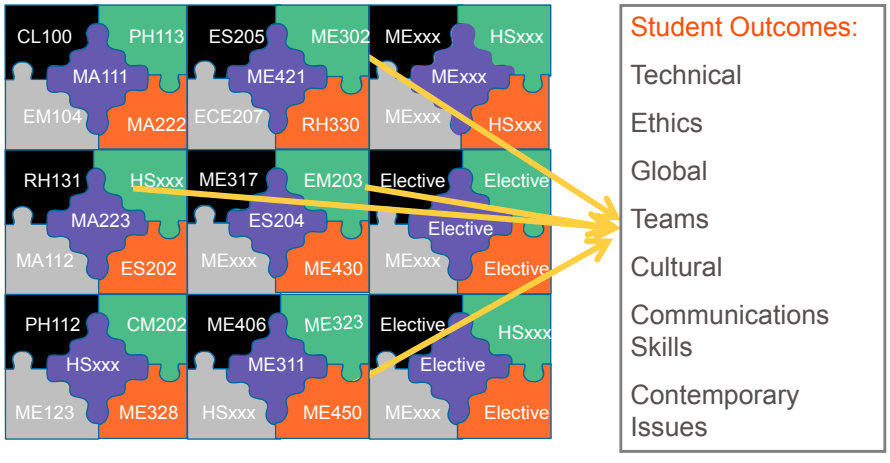


PROGRAM ASSESSMENT

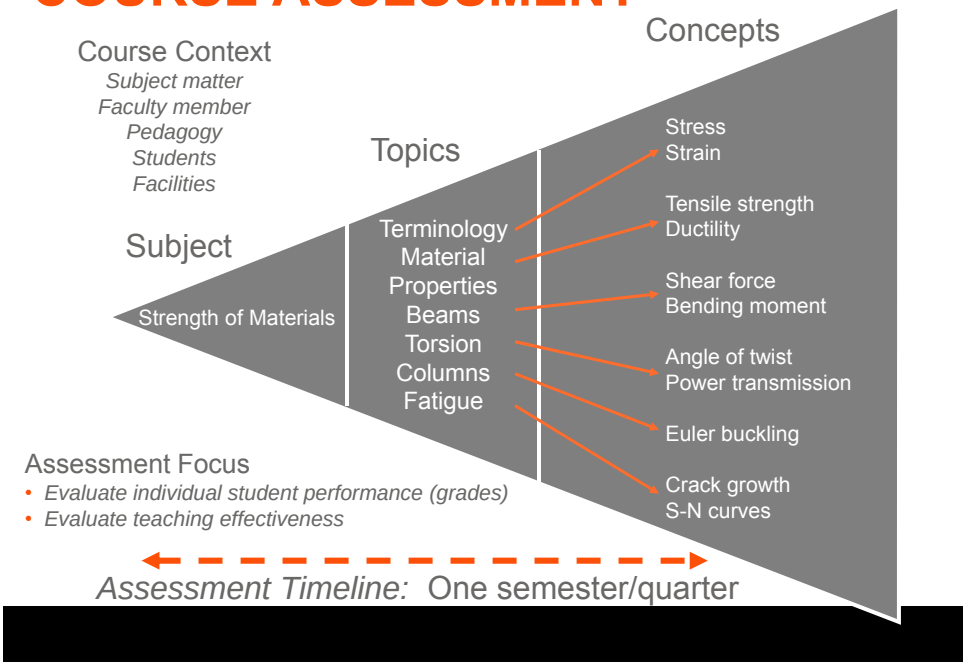


Course Assessment	Program Assessment
Cannot “cover” all Topics related to subject	Cannot “cover” all Outcomes related to Program Educational Objectives
Cannot “cover” all Concepts related to each Topic	Cannot “include” all possible Performance Indicators related to each Outcome
Decisions made based on context of course and characteristics of students	Decisions made based on context of your program and characteristics of students
Not all Concepts are at the same performance (cognitive) level	Not all Performance Indicators are at the same expectation (cognitive) level
Assessment data taken at the Concept level	Assessment data taken at the Performance Indicator level
Assumptions related to performance on Topics based on performance on Concepts	Assumptions related to performance on Student Outcomes based on demonstration of Performance Indicators

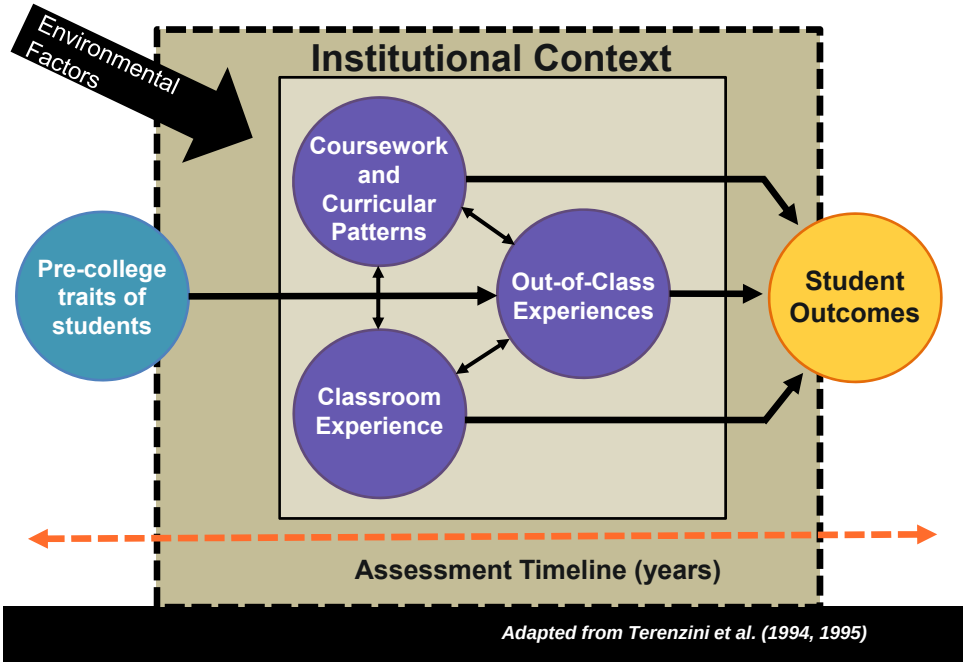
PROGRAM ASSESSMENT



COURSE ASSESSMENT

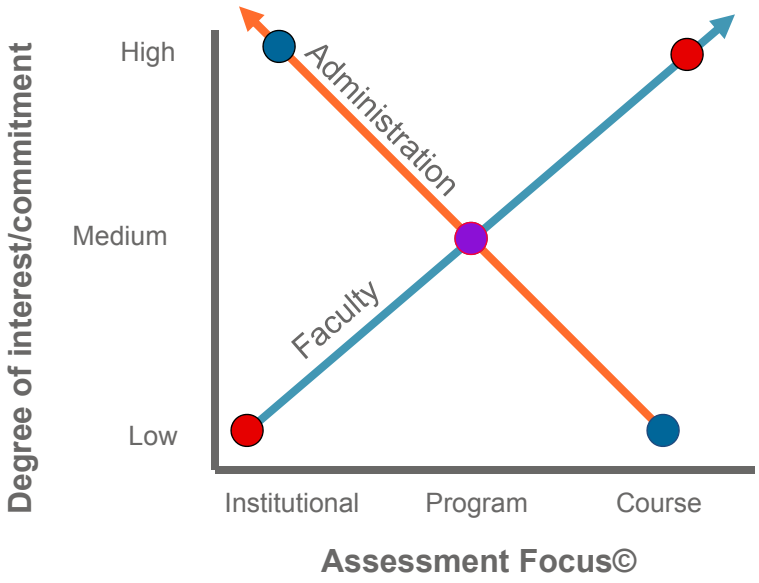


CONTEXT FOR PROGRAM LEVEL ASSESSMENT



DIFFERENCES BETWEEN CLASSROOM AND PROGRAM ASSESSMENT

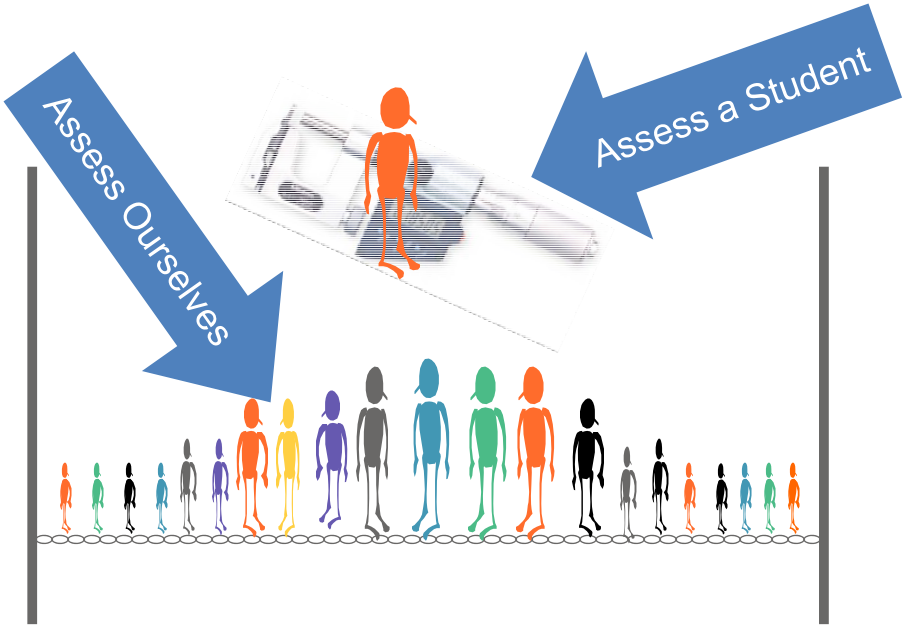
- Degree of complexity
- Time span
- Accountability for the assessment process
- Cost
- Level of faculty buy-in



G. Rogers - ABET, Inc.

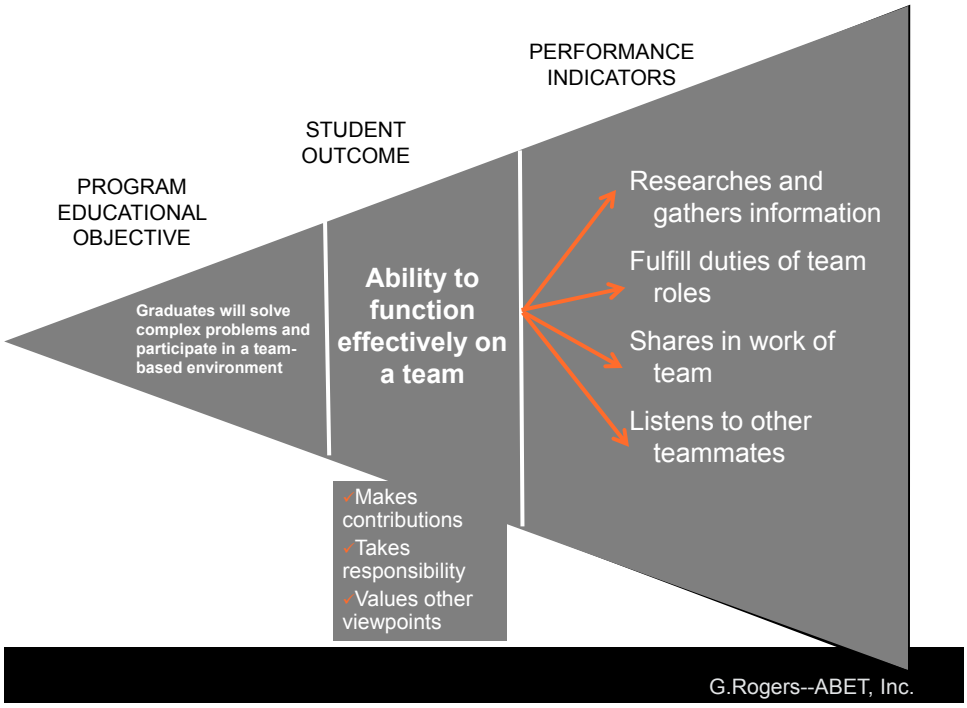
DIFFERENCES BETWEEN CLASSROOM AND PROGRAM ASSESSMENT

- Degree of complexity
- Time span
- Accountability for the assessment process
- Cost
- Level of faculty buy-in
- Level of precision of the measure



Developing Measurable Outcomes

- How do we know what students know?

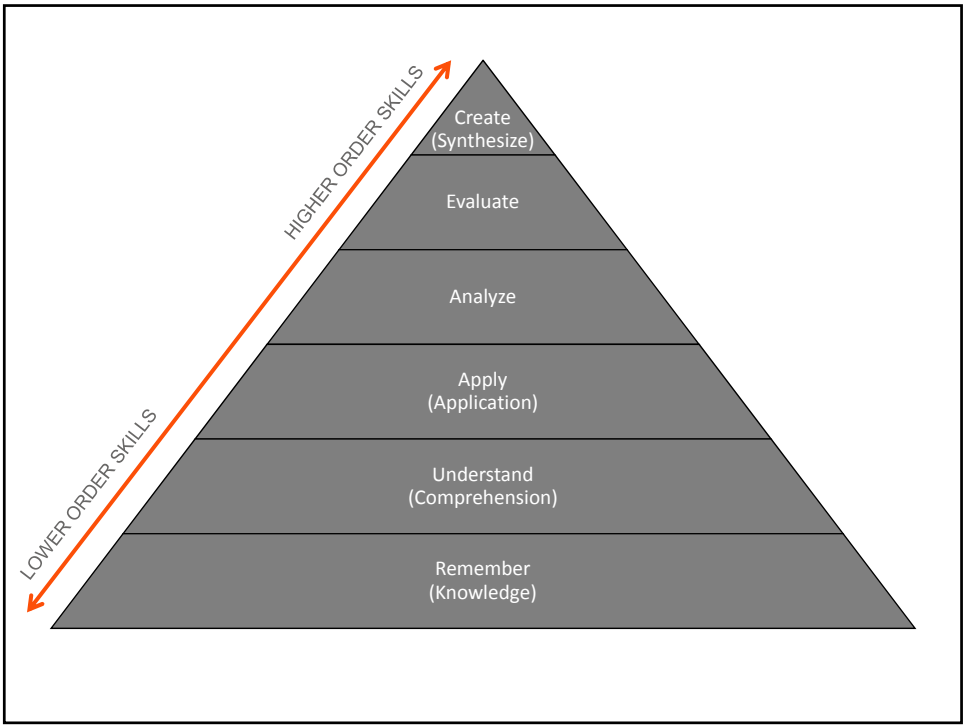


Performance Indicators are Comparable to Leading Economic Indicators

- Concept used in economics
- Identify specific characteristics of the economy that are significant indicators of the current state and predict future trends
  - Not everything
  - Those that are the most critical in predicting how well the economy is doing
  - Several characteristics taken together

Developing Performance Indicators

- Two essential parts
  - Subject content
    - Content that is the focus of instruction (e.g. steps of the design process, chemical reaction, scientific method)
  - Action verb
    - Direct students to a specific performance (e.g. list, analyze, apply, etc.)
  - Value free
    - Free from subjective values or standards



CHOOSE A STUDENT OUTCOME

1. An ability to communicate effectively (speaking)- (ANSAC, CAC, EAC)
2. Knowledge of contemporary issues
   (ANSAC, EAC)
3. Recognition of the need for, and an ability to engage in continued professional development (ANSAC, CAC, EAC, ETAC)
4. Ability to identify, formulate and solve technical problems (ANSAC, CAC, EAC, ETAC)
5. Ability to use current techniques, skills, and tools necessary for practice (ANSAC, CAC, EAC)
6. Knowledge of the impact of … solutions in a societal and global context (ANSAC, CAC, EAC, ETAC)

SILENT BRAINSTORMING (5 MINUTES)

- Without talking to anyone at your table (silent) write as many performance indicators as possible for the outcome chosen by your table
- ONLY ONE Per Post-it (if you write five performance indicators, you will have 5 post-its)

Performance Indicators have two essential parts:

- Subject Content
  - Content that is the focus of instruction (e.g., steps of the design process, chemical reaction, scientific method)
- Action verb
  - Direct students to a specific performance (e.g., "list," "analyze," "apply")

AFFINITY PROCESS (20 MINUTES)

1. Place all your post-its on the flip-chart paper
2. Because your table team was working on the same outcome, many of the performance indicators will be similar
3. Move the post-its around and group all the ones with similar CONTENT together (do not group them by VERB)
4. After that is done, each grouping should represent one performance indicator "content"
5. Determine the appropriate level (action verb) for each grouping and label the grouping as one performance indicator
6. Use blank sheet at your table write the outcome and list the performance indicator (one per grouping) for the outcome

Student Outcomes and Performance Indicators

A performance indicator identifies the performances that the faculty will look for in order to determine whether or not a student outcome is met. Indicators facilitate the development of the curriculum and also focus the data collection process. In addition to the outcomes, the performance indicators should be communicated to students in the program description and stated in terms that inform the students about the general purpose of the program and expectations of the faculty. The primary difference between student outcomes and performance indicators is that student outcomes are intended to provide general information about the focus of student learning and are broad statements of the expected learning, while performance indicators are concrete measurable performances students must meet as indicators of achievement of the outcome. For example, student outcomes can be stated as follows:

- Students will work effectively as a member of a team.
- Students can apply the principles of math and science to a technical problem.
- Students will have the ability to engage in lifelong learning.
- Students will have effective communication skills.

Faculty can usually agree on the general outcomes that students should demonstrate by the end of the academic program. However, without a common agreement as to what specific performances should be expected from students around each of the outcomes there is no way to have a systematic, efficient nor meaningful process of data collection to determine if the outcomes have been met. The development of performance indicators is unquestionably the most critical part of developing a systematic and meaningful data collection process around program assessment and improvement.

Performance indicators identify what concrete actions the student should be able to perform as a result of participation in the program. Once program outcomes have been identified, the knowledge and skills necessary for the mastery of these outcomes should be listed. This will allow the desired behavior of the students to be described, and will eliminate ambiguity concerning demonstration of expected competencies. Performance indicators are made up of at least two main elements; an action verb, which identifies the depth to which students should demonstrate the performance, and the content referent, which is the focus of the instruction. The expected behavior must be specific, using an observable action verb such as demonstrate, interpret, discriminate, or define. The following is an example of an outcome with its performance indicators:

Outcome: Students should be able to conduct an experiment and interpret data

Performance indicators:
Students will be able to demonstrate the ability to:

- Follow the design of an experiment plan (knowledge)
- Acquire data on appropriate variables (application)
- Compare experimental results to appropriate theoretical models (analysis)
- Offer explanation of observed differences between model and experiment (evaluation)

Further Reading:

1. Cunningham, G. K. (1986). Educational and psychological measurement. New York: MacMillan Publishing.
2. McBeath, R. J., Ed. (1992). Instructing and evaluating in higher education: A guidebook for planning learning outcomes. Englewood Cliffs, NJ: Educational Technology Publications.
3. Olds, B. M., Miller, R. L. (1998) An Assessment Matrix for Evaluating Engineering Programs. J Engineering Education 87 (2): 173-178.
4. Shuman, L. J., Besterfield-Scare, M., McGourty, J. (2005) The ABET "Professional Skills" – Can they be taught? Can they be assessed? J Engineering Education 94 (1): 41-55.

COGNITIVE learning is demonstrated by knowledge recall and the intellectual skills: comprehending information, organizing ideas, analyzing and synthesizing data, applying knowledge, choosing among alternatives in problem-solving, and evaluating ideas or actions.

Level	Illustrative Verbs	Definition	Example
Knowledge	arrange, define, describe, duplicate, identify, label, list, match, memorize, name, order, outline, recognize, relate, recall, repeat, reproduce, select, state	remembering previously learned information	memory of specific facts, terminology, rules, sequences, procedures, classifications, categories, criteria, methodology, principles, theories, and structure
Comprehension	classify, convert, defend, describe, discuss, distinguish, estimate, explain, express, extend, generalize, give examples, identify, indicate, infer, locate, paraphrase, predict, recognize, rewrite, report, restate, review, select, summarize, translate	grasping the meaning of information	stating problem in own words, translating a chemical formula, understanding a flow chart, translating words and phrases from a foreign language
Application	apply, change, choose, compute, demonstrate, discover, dramatize, employ, illustrate, interpret, manipulate, modify, operate, practice, predict, prepare, produce, relate, schedule, show, sketch, solve, use, write	applying knowledge to actual situations	taking principles learned in math and applying them to figuring the volume of a cylinder in an internal combustion engine
Analysis	analyze, appraise, break down, calculate, categorize, compare, contrast, criticize, diagram, differentiate, discriminate, distinguish, examine, experiment, identify, illustrate, infer, model, outline, point out, question, relate, select, separate, subdivide, test	breaking down objects or ideas into simpler parts and seeing how the parts relate and are organized	discussing how fluids and liquids differ, detecting logical fallacies in a student's explanation of Newton's 1st law of motion
Synthesis	arrange, assemble, categorize, collect, combine, comply, compose, construct, create, design, develop, devise, design, explain, formulate, generate, integrate, manage, modify, organize, plan, prepare, propose, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, synthesize, tell, write	rearranging component ideas into a new whole	writing a comprehensive report on a problem-solving exercise, planning a program or panel discussion, writing a comprehensive term paper
Evaluation	appraise, argue, assess, attach, choose, compare, conclude, contrast, defend, describe, discriminate, estimate, evaluate, explain, judge, justify, interpret, relate, predict, rate, select, summarize, support, value	making judgments based on internal evidence or external criteria	evaluating alternative solutions to a problem, detecting inconsistencies in the speech of a student government representative

Gronlund, N. E. (1981). Measurement and evaluation in teaching, 4th ed. New York, Macmillan Publishing. McBeath, R. J., (Ed.). (1992). Instructing and evaluating in higher education: A guidebook for planning learning outcomes. Englewood Cliffs, NJ: Educational Technology

AFFECTIVE learning is demonstrated by behaviors indicating attitudes of awareness, interest, attention, concern, and responsibility, ability to listen and respond in interactions with others, and ability to demonstrate those attitudinal characteristics or values which are appropriate to the test situation and the field of study.

Level	Illustrative Verbs	Definition	Example
Receiving	asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits erect, replies, uses	willingness to receive or attend	listening to discussions of controversial issues with an open mind, respecting the rights of others
Responding	answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes	active participation indicating positive response or acceptance of an idea or policy	completing homework assignments, participating in team problem-solving activities
Valuing	completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works	expressing a belief or attitude about the value or worth of something	accepting the idea that integrated curricula is a good way to learn, participating in a campus blood drive
Organization	adheres, alters, arranges, combines, compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes	organizing various values into an internalized system	recognizing own abilities, limitations, and values and developing realistic aspirations
Characterization by a value or value complex	acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, uses, verifies	the value system becomes a way of life	a person's lifestyle influences reactions to many different kinds of situations

Gronlund, N. E. (1981). Measurement and evaluation in teaching, 4th Ed. New York, Macmillan Publishing.
McBeath, R. J., (Ed.). (1992). Instructing and evaluating in higher education: A guidebook for planning learning outcomes. Englewood Cliffs, NJ: Educational Technology Publications.

PSYCHOMOTOR learning is demonstrated by physical skills: coordination, dexterity, manipulation, grace, strength, speed; actions which demonstrate the fine motor skills such as use of precision instruments or tools, or actions which evidence gross motor skills such as the use of the body in dance or athletic performance.

Level	Illustrative Verbs	Definition	Example
Perception	chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects, separates	using sense organs to obtain cues needed to guide motor activity	listening to the sounds made by guitar strings before tuning them, recognizing sounds that indicate malfunctioning equipment
Set	begins, displays, explains, moves, proceeds, reacts, responds, snows, starts, volunteers	being ready to perform a particular action: mental, physical or emotional	knowing how to use a computer mouse, having instrument ready to play and watching conductor at start of a musical performance, showing eagerness to assemble electronic components to complete a task
Guided response	assembles, builds, calibrates, constructs, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches	performing under guidance of a model: imitation or trial and error	using a torque wrench just after observing an expert demonstrate a its use, experimenting with various ways to measure a given volume of a volatile chemical
Mechanism	(same list as for guided response)	being able to perform a task habitually with some degree of confidence and proficiency	demonstrating the ability to correctly execute a 60 degree banked turn in an aircraft 70 percent of the time
Complex or overt response	(same list as for guided response)	performing a task with a high degree of proficiency and skill	dismantling and re-assembling various components of an automobile quickly with no errors
Adaptation	adapts, alters, changes, rearranges, reorganizes, revises, varies	using previously learned skills to perform new but related tasks	using skills developed learning how to operate an electric typewriter to operate a word processor
Origination	arranges, combines, composes, constructs, creates, designs, originates	creating new performances after having developed skills	designing a more efficient way to perform an assembly line task

Gronlund, N. E. (1981). Measurement and evaluation in teaching, 4th Ed. New York, Macmillan Publishing.
McBeath, R. J., (Ed.). (1992). Instructing and evaluating in higher education: A guidebook for planning learning outcomes. Englewood Cliffs, NJ: Educational Technology Publications.

Learning levels	Level Indicators	Assessment Task
Knowledge	Define Describe Label Recite Select State Write Identify	**Remembering previous learned information:** -Complete multiple choice -Fill in the blank -Provide oral response -Complete true/false -Develop a list -Choose among alternatives (could be a list)
Comprehension	Match Paraphrase Restate Illustrate Compare Predict Defend Explain	**Grasping the meaning of Information previously presented:** -Give an analogy -Create an outline -Summarize in own words -Create a concept map -Draw a diagram -Graph the answer -Match term with a definition
Application	Apply Change Make Model Show Calculate Examine Solve Use	**Using principle/formula/processes previously learned:** -Compute an answer -Solve a problem similar to previous problems -Solve a problem in a new setting -Create a model -Write an essay that requires the use of the concepts/processes learned -Use theory or principle to explain an event or phenomena
Analysis	Analyze Compare/contrast Differentiate Categorize Distinguish Relate	**Breaking down objects or ideas into simpler parts and seeing how the parts relate and are organized:** -Deconstruct a model -Identify differences -Group like items together -Identify what is missing -Identify cause and effect -Perform a SWOT analysis -Discuss an event/ perspective from multiple perspectives -Present the potential impact resulting from a decision or choice
Evaluation	Evaluate Select Recommend Rank Critique Judge Assess	**Making judgments based on internal evidence or external criteria:** -Choose best among options and defend your choice -Rank from best to worse using establish criteria -Develop criteria for judgment and apply to a solution -Recommend and defend choice for action -Present the pros and cons of an approach -Determine the degree of success or failure of an action or event
Create	Make Generate Build Form Construct Design Fashion Produce	**Making or producing something based on previously learned information and processes:** -Create an end-of program capstone project -Complete a summative class project -Write a summative paper in a course -Write an end-of program thesis -Write an end-of program dissertation -Design an original approach to a situation or problem --Conduct independent research

IMPORTANCE OF WELL-STATED PERFORMANCE INDICATORS

- Provides faculty with clear understanding for implementation in the classroom
- Makes expectations explicit to students (great pedagogy)
- Focuses data collection

Rubrics

WHAT IS A RUBRIC?

- "Rubrics" are a way of explicitly stating the expectations for student performance. They may lead to a grade or be part of the grading process but they are more specific, detailed, and disaggregated than a grade.
- Rubrics provide a description of each level of performance as to what is expected.
- The rubric provides those who have been assessed with clear information about how well they performed and a clear indication of what they need to accomplish in the future to better their performance.

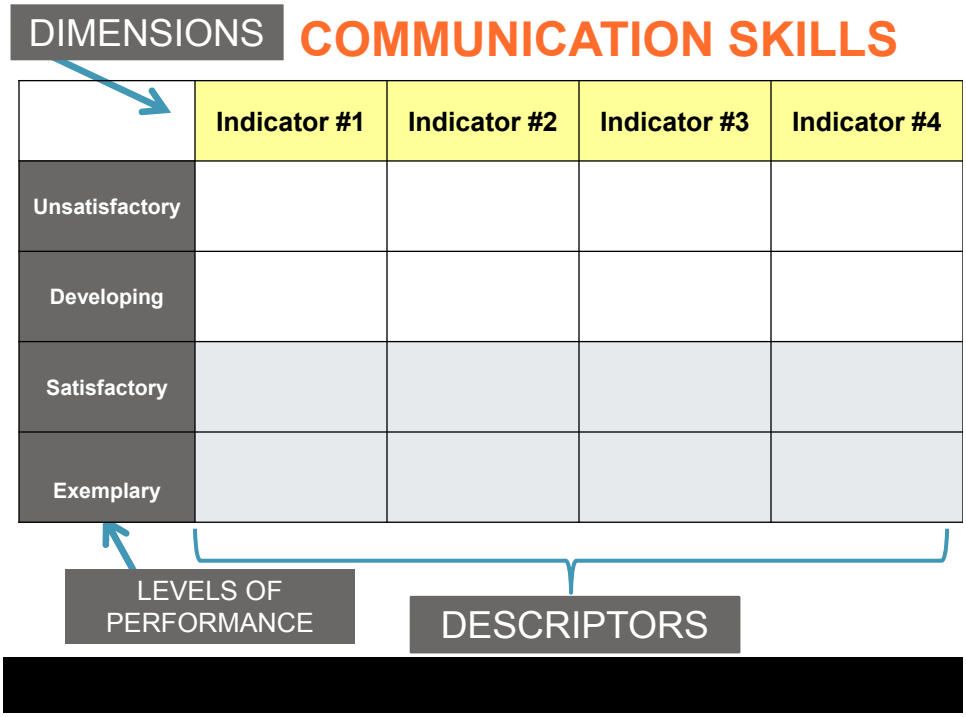
LEVELS OF PERFORMANCE

COMMUNICATION SKILLS

	Unsatisfactory	Developing	Satisfactory	Exemplary
Indicator #1				
Indicator #2				
Indicator #3				
Indicator #4				

DIMENSIONS

DESCRIPTORS



WHAT IS A RUBRIC?

- Tool to score student performance in an assessment environment (e.g., oral presentation, local exam, performance observation, etc.)
- Can be used for both formative and summative purposes
- Defines expectations, and especially useful when dealing with processes or abstract concepts
- Provides a common "language" to help faculty and students talk about expected learning
- Increases reliability of the assessment when using multiple raters

PURPOSE OF RUBRIC

- How you are going to use the results drives decisions about rubrics
  - What kind of feedback do you want?
    - Individual student/program
    - General/specific
  - How will data be collected?
    - Formative/summative
    - Developmental over time/single point in time
  - For whom?
    - Student
    - Faculty member
    - Program

HOW ARE YOU GOING TO USE RESULTS?

- Do you want general information about student performance?
- Do you want specific information about student competence?

TYPES OF RUBRICS

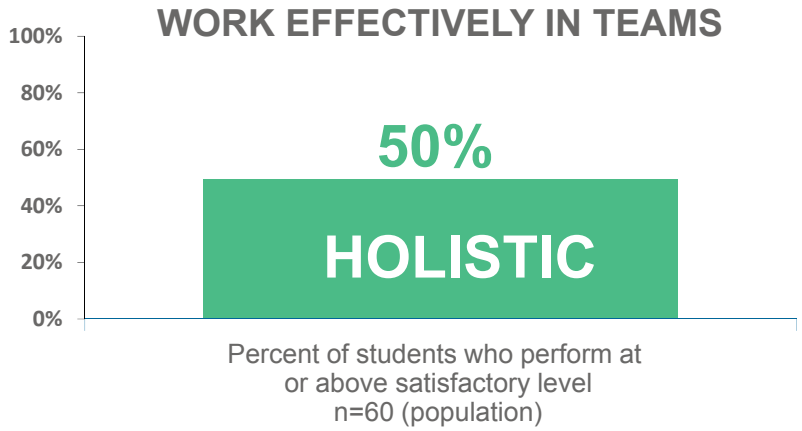
Holistic rubric provides general information about student learning

- Raters make judgments by forming an overall impression of a performance and matching it to the best fit from among the descriptions on the performance levels
- Each category of the performance levels describes performance on several performance indicators

WORK EFFECTIVELY IN TEAMS

UNSATISFACTORY	DEVELOPING	SATISFACTORY	EXEMPLARY
• Does not collect any information that relates to the topic. • Does not perform any duties of assigned team role. • Always relies on others to do the work. • Is always talking--never allows anyone else to speak.	• Collects some information relate to the topic but incomplete. • Inconsistently performs duties that are assigned • Rarely does the assigned work--often needs reminding. • Usually doing most of the talking--rarely allows others to speak.	• Collects basic information related the topic. • Performs duties that are assigned • Usually does the assigned work--rarely needs reminding. • Listens most of the time	• Collects a great deal of information which goes beyond the basics. • Performs all duties assigned and actively assists others. • Always does the assigned work without having to be reminded. • Consistently listens and responds to others appropriately.

EXAMPLE OF RESULTS - FORMATIVE



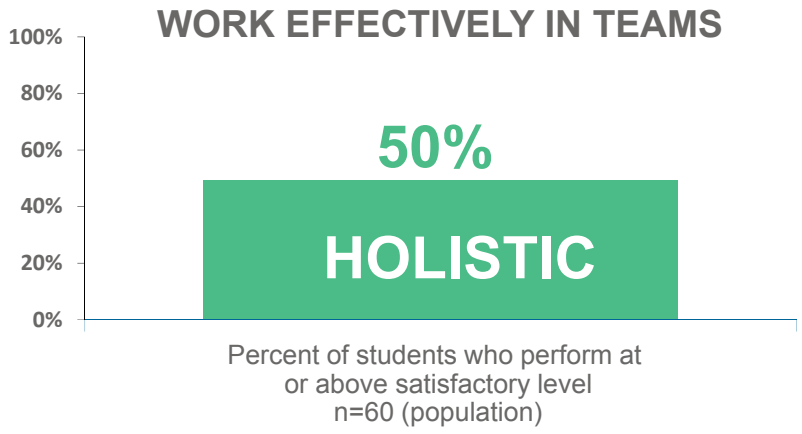
ANALYTIC RUBRIC

- Analytic performance levels focus on specific dimensions of student performance related to performance indicators.
- Dimensions are presented in separate categories and rated individually.
- Each performance indicator is rated separately.

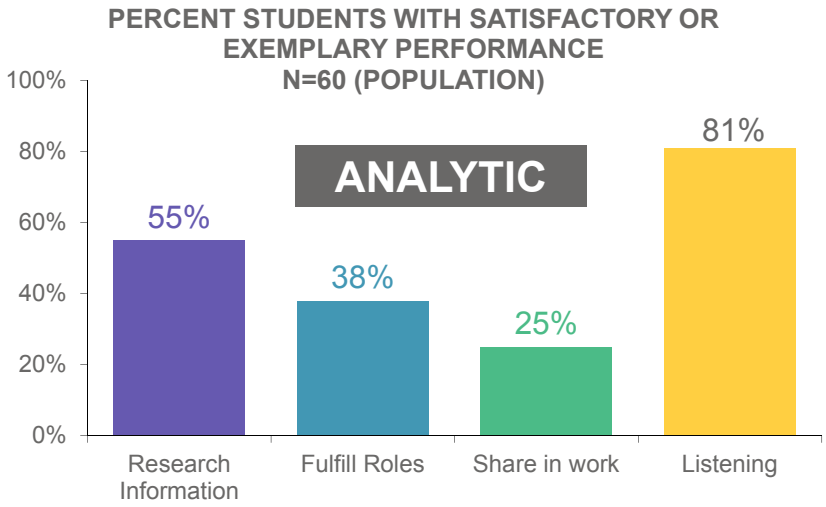
WORK EFFECTIVELY IN TEAMS

	UNSATISFACTORY	DEVELOPING	SATISFACTORY	EXEMPLARY
RESEARCH & GATHER INFORMATION	Does not collect any information that relates to the topic.	Collects very little information--some relates to the topic.	Collects some basic information--most relates to the topic.	Collects a great deal of information--all relates to the topic.
FULFILL TEAM ROLE'S DUTIES	Does not perform any duties of assigned team role.	Performs very little duties.	Performs nearly all duties.	Performs all duties of assigned team role.
SHARE IN WORK OF TEAM	Always relies on others to do the work.	Rarely does the assigned work--often needs reminding.	Usually does the assigned work--rarely needs reminding.	Always does the assigned work without having to be reminded.
LISTEN TO OTHER TEAMMATES	Is always talking--never allows anyone else to speak.	Usually doing most of the talking--rarely allows others to speak.	Listens, but sometimes talks too much.	Listens and speaks a fair amount.

EXAMPLE OF RESULTS - FORMATIVE

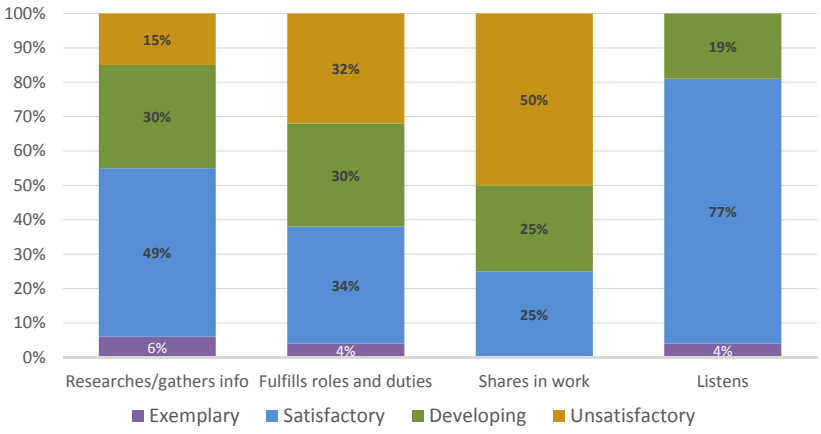


TEAMING SKILLS - FORMATIVE



TEAMING SKILLS - FORMATIVE

n=60 (population)



STRENGTH OF ANALYTIC RUBRIC

- Provides information about relative strengths and weaknesses of student performance related to an outcome.
- Provides detailed feedback which can be used to promote curricular enhancements
- Useful for assessment of abstract concepts or processes
- Provides students an opportunity to self-assess their understanding or performance

GENERIC OR TASK-SPECIFIC RUBRIC

- Generic
  - Rubric that can be used across similar performances (used across *all* communication tasks or problem-solving tasks)
- Task-specific
  - Rubric which is designed for a single task
  - Cannot be generalized across a wide variety of student work

HOW MANY LEVELS OF PERFORMANCE?

- Consider both the nature of the performance and purpose of scoring
- Recommend 3 to 5 levels to describe student achievement at a single point in time
- If focused on developmental curriculum (growth over time) more performance levels are needed (i.e., 6-???)
- More performance levels, the more difficult it is to get inter-rater reliability

DEVELOPING RUBRICS

- Be clear about how the rubric is to be used
  - Program assessment
  - Individual student assessment
- Analytic/Holistic
  - For process improvement, analytic rubric provides information that can be used to focus instruction in areas of weakness
- Can use student work as a guide in developing rubric
- Start with extremes and work toward middle
- Pilot test
- Rubric development is a process

PLEASE RATE EACH MEMBER OF THE TEAM ON THE FOLLOWING SCALE:

UNSATISFACTORY	DEVELOPING	SATISFACTORY	EXEMPLARY
1	2	3	4

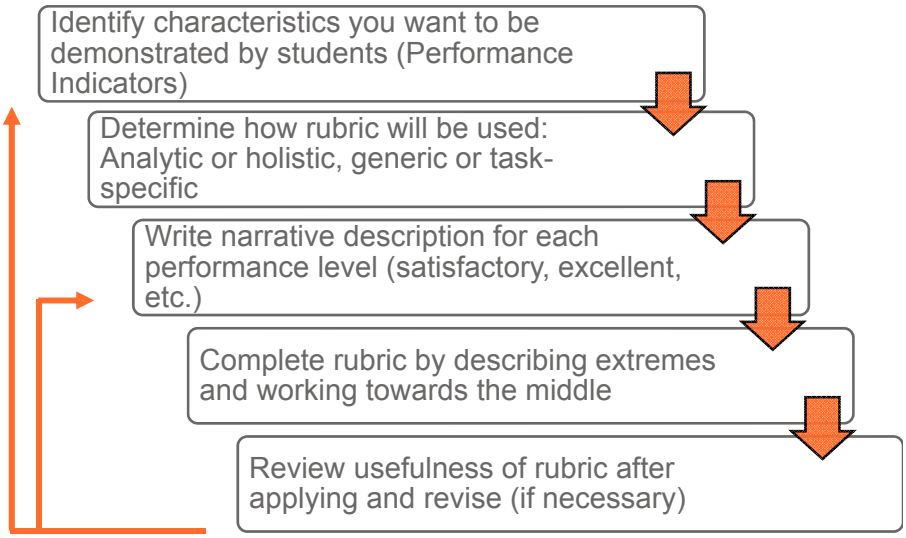
NAME	PERFORMANCE INDICATORS	1	2	3	4
	Produces research information for team				
	Demonstrates understanding of team roles when assigned				
	Shares in the work of the team				
	Demonstrates good listening skills				
	Produces research information for team				
	Demonstrates understanding of team roles when assigned				
	Shares in the work of the team				
	Demonstrates good listening skills				
	Produces research information for team				
	Demonstrates understanding of team roles when assigned				
	Shares in the work of the team				
	Demonstrates good listening skills				
	Produces research information for team				
	Demonstrates understanding of team roles when assigned				
	Shares in the work of the team				
	Demonstrates good listening skills				

OUTCOME: WORK EFFECTIVELY IN TEAMS

	UNSATISFACTORY	DEVELOPING	SATISFACTORY	EXEMPLARY
RESEARCH & GATHER INFORMATION	Does not collect any information that relates to the topic.	Collects some information relate to the topic but incomplete.	Collects basic information related the topic.	Collects a great deal of information which goes beyond the basics.
FULFILL TEAM ROLE'S DUTIES	Does not perform any duties of assigned team role.	Inconsistently performs duties that are assigned	Performs duties that are assigned	Performs all duties assigned and actively assists others.
SHARE IN WORK OF TEAM	Always relies on others to do the work.	Rarely does the assigned work--often needs reminding.	Usually does the assigned work--rarely needs reminding.	Always does the assigned work without having to be reminded.
LISTEN TO OTHER TEAMMATES	Is always talking--never allows anyone else to speak.	Usually doing most of the talking--rarely allows others to speak.	Listens most of the time	Consistently listens and responds to others appropriately.

STUDENT	RESEARCH & GATHER INFORMATION	FULFILL TEAM ROLE'S DUTIES	SHARE IN WORK OF TEAM	LISTEN TO OTHER TEAMMATES
Marcus Wellman	Satisfactory	Satisfactory	Satisfactory	Satisfactory
David Willison	Satisfactory	Developing	Satisfactory	Exemplary
Dottie Whitely	Developing	Developing	Developing	Satisfactory
...n...	…	…	…	…

DEVELOPING RUBRICS



Test your knowledge:
Analytic or Holistic?

TEAMWORK RUBRIC

Modified from: http://edweb.sdsu.edu/triton/tidepoolunit/Rubrics/collrubric.html

CONTRIBUTE	BEGINNING	DEVELOPING	ACCOMPLISHED	EXEMPLARY
RESEARCH & GATHER INFORMATION	Does not collect any information that relates to the topic.	Collects very little information--some relates to the topic.	Collects some basic information--most relates to the topic.	Collects a great deal of information--all relates to the topic.
SHARE INFORMATION	Does not relay any information to teammates.	Relays very little information--some relates to the topic.	Relays some basic information--most relates to the topic.	Relays a great deal of information--all relates to the topic.
BE PUNCTUAL	Does not hand in any assignments.	Hands in most assignments late.	Hands in most assignments on time.	Hands in all assignments on time.
TAKE RESPONSIBILITY	**BEGINNING**	**DEVELOPING**	**ACCOMPLISHED**	**EXEMPLARY**
FULFILL TEAM ROLE'S DUTIES	Does not perform any duties of assigned team role.	Performs very little duties.	Performs nearly all duties.	Performs all duties of assigned team role.
PARTICIPATE IN SCIENCE CONFERENCE	Does not speak during the science conference.	Either gives too little information or information which is irrelevant to topic.	Offers some information--most is relevant.	Offers a fair amount of important information--all is relevant.
SHARE EQUALLY	Always relies on others to do the work.	Rarely does the assigned work--often needs reminding.	Usually does the assigned work--rarely needs reminding.	Always does the assigned work without having to be reminded.
VALUE OTHERS' VIEWPOINTS	**BEGINNING**	**DEVELOPING**	**ACCOMPLISHED**	**EXEMPLARY**
LISTEN TO OTHER TEAMMATES	Is always talking--never allows anyone else to speak.	Usually doing most of the talking--rarely allows others to speak.	Listens, but sometimes talks too much.	Listens and speaks a fair amount.
COOPERATE WITH TEAMMATES	Usually argues with teammates.	Sometimes argues.	Rarely argues.	Never argues with teammates.
MAKE FAIR DECISIONS	Usually wants to have things their way.	Often sides with friends instead of considering all views.	Usually considers all views.	Always helps team to reach a fair decision.

TEAMWORK RUBRIC

4 – THOROUGH UNDERSTANDING

- Consistently and actively works towards group goals
- Is sensitive to the feelings and learning needs of all group members
- Willingly accepts and fulfills individual role within the group
- Consistently and actively contributes knowledge, opinions, and skills
- Values the knowledge, opinion, and skills of all group members and encourages their contribution

3 – GOOD UNDERSTANDING

- Works toward group goals without prompting
- Accepts and fulfills individual role within the group
- Contributes knowledge, opinions, and skills without prompting
- Shows sensitivity to the feelings of others
- Willingly participates in needed changes

2 – SATISFACTORY UNDERSTANDING

- Works toward group goals with occasional prompting
- Contributes to the group with occasional prompting
- Shows sensitivity to the feelings of others
- Participates in needed changes, with occasional prompting

1 – NEEDS IMPROVEMENT

- Works toward group goals only when prompted
- Contributes to the group only when prompted
- Needs occasional reminders to be sensitive to the feelings of others
- Participates in needed changes when prompted and encouraged

WRITING SKILLS RUBRIC

http://www.kent.k12.wa.us/KSD/KR/CP/WritingSkillsRubric.doc

PERFORMANCE		4 EXCEEDS STANDARD	3 MEETS STANDARD	2 PROGRESSING TO STANDARD	1 BELOW STANDARD
CONTENT	FOCUS	Maintains exceptional focus on the topic	Maintains consistent focus on the topic	Provides inconsistent focus on the topic	Demonstrates little or no focus
	SUPPORTING DETAILS	Provides ample supporting details	Provides adequate supporting details	Includes some details, but may include extraneous or loosely related material	Includes inconsistent or few details which may interfere with the meaning of the text
ORGANIZATION	COHERENCE	Organizational pattern is logical; conveys completeness & wholeness	Organizational pattern is logical; conveys completeness & wholeness with few lapses	Achieves little completeness & wholeness though organization attempted	Little evidence of organization or any sense of wholeness & completeness
	TRANSITIONS	Provides transitions that eloquently serve to connect ideas	Provides transitions which serve to connect ideas	Provides transitions which are weak or inconsistent	Uses poor transitions or fails to provide transitions
STYLE	VOICE	Allows the reader to sense the person behind the words	Some sense of the person behind the words is evident	Some sense of the person behind the words is attempted	Little or no sense of the person behind the words is evident
	WORD CHOICE	Uses effective language; makes engaging, appropriate word choices for audience & purpose	Uses effective language & appropriate word choices for intended audience & purpose	Limited & predictable vocabulary, perhaps not appropriate for intended audience & purpose	Has a limited or inappropriate vocabulary for the intended audience & purpose
	SENTENCE FLUENCY	Sentences/phrases appropriately varied in length & structure	Sentences/phrases somewhat varied in length & structure	Shows limited variety in sentence length & structure	Has little or no variety in sentence length & structure
	CONVENTIONS	Consistently follows the rules of Standard English for conventions	Generally follows the rules for Standard English for conventions	Generally does not follow the rules of Standard English for conventions	Does not follow the rules of Standard English for conventions

EXERCISE: RUBRIC DEVELOPMENT

1. Using the outcome and performance indicators you developed, create an analytic rubric (at least four rows).
2. Determine how many performance levels
3. Description of each performance level
4. Remember:
   - How will the findings be used?
   - Will findings enable you to make decisions about program improvement?
5. Use the template provided (p.89) or develop your own using a blank piece of paper. Please use a dark pen or fine-tipped marker so that your rubric can be seen using the document camera.

RUBRIC TEMPLATE

Student Outcome_____

	Performance Level (Descriptor)	Performance Level (Descriptor)	Performance Level (Descriptor)	Performance Level (Descriptor)
Performance Indicator				
Performance Indicator				
Performance Indicator				
Performance Indicator				

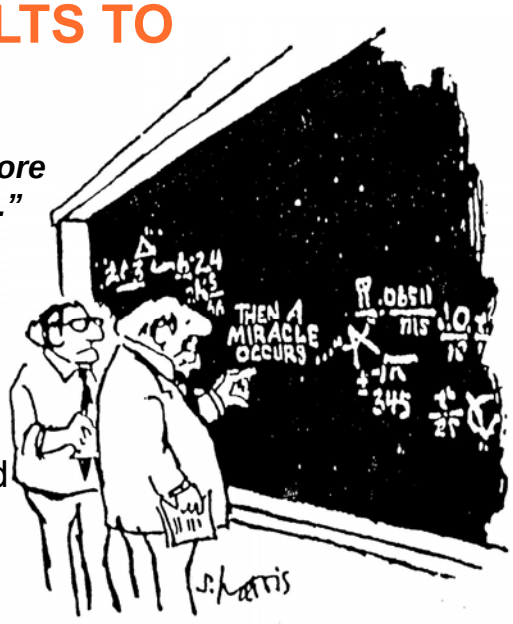
SUMMARY

- Need to be clear about how rubric is going to be used
- Rubrics are not required for outcomes
- Rubrics guide faculty in the assessment process and provide understanding of areas of strength and weakness in student performance related to specific performance indicators
- Importance of pilot testing the rubric
  - Increase inter-rater reliability and validity
- Rubrics will evolve over time as you gain experience and should be considered a part of your continuous improvement process

Curriculum Maps

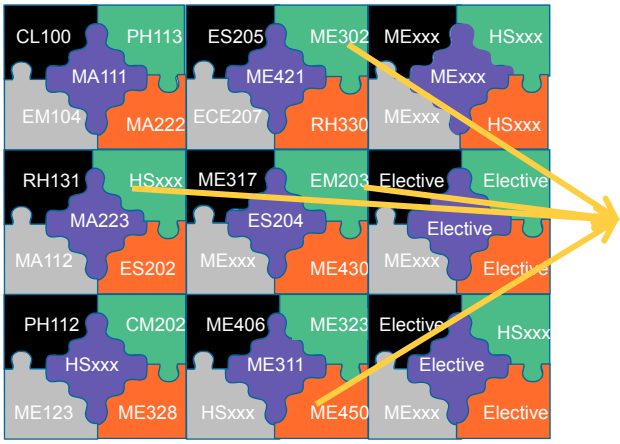
LINKING RESULTS TO PRACTICE

"I think you should be more explicit here in Step Two."



- Development of Curriculum Map
- Linking curriculum content/ pedagogy to knowledge, practice and demonstration of performance indicators.

PROGRAM ASSESSMENT



Student Outcomes:

- Technical
- Ethics
- Global
- Teams
- Cultural
- Communications Skills
- Contemporary Issues

Performance indicator Explicit. This indicator is explicitly stated as performance for this course.
Demonstrate Competence. Students are asked to demonstrate their competence on this performance indicator through homework, projects, tests, etc.
Formal Feedback. Students are given formal feedback on their performance on this indicator.
Not covered. This performance indicator is not addressed in this course.
Note: Clicking on the link 'view rubric' will show you the scoring rubric for that particular performance indicators related to the outcome.

PERFORMANCE INDICATORS	INDICATOR EXPLICIT	DEMONSTRATE COMPETENCE	FORMAL FEEDBACK		NOT COVERED
RECOGNITION OF ETHICAL AND PROFESSIONAL RESPONSIBILITIES.					
1. Demonstrate knowledge of professional codes of ethics. View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
2. Evaluate the ethical dimensions of professional engineering, mathematical, and scientific practices. View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
AN ABILITY TO WORK EFFECTIVELY IN TEAM					
1. Research & Gather Information . View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
2. Fulfill Team Role's Duties . View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
3. Share in work of team . View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
4, Listen to Other Teammates . View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
AN ABILITY TO COMMUNICATE EFFECTIVELY IN ORAL, WRITTEN, GRAPHICAL, AND VISUAL FORMS					
1. Identify the readers/audience, assess their previous knowledge and information needs, and organize/design information to meet those needs. View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
2. Provide content that is factually correct, supported with evidence, explained with sufficient detail, and properly documented. View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
3. Test readers/audience response to determine how well ideas have been relayed. View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐
4. Submit work with a minimum of errors in spelling, punctuation, grammar, and usage. View rubric or make a comment (optional)	☐ YES	☐ YES	☐ YES		☐

COMPILE THE MAP:

Curriculum map for communication skills

	FIRST YEAR	SOPHOMORE	JUNIOR	SENIOR
FALL	Intro to Eng	Statics	Materials	Design I
	Chem I	Physics II	Diff Eq	Biomech
	Composition I	Cacl III	Bio Instrum I	Biomaterials II
	Calc I	Comp Prog	Eng Elective	Phys Sys
	Biology I	Elective	Gen Ed	Tissue Eng
	Gen Ed			Seminar
SPRING	Intro Design	Dynamics	Thermo	Design II
	Chem II	Org Chem	Bio Instrum II	Fluids
	Physics I	Calc IV	Biomaterials I	Eng Elective
	Calc II	Sys Modeling	Biosystems	Elective
	Composition II	Eng Elective	Tech Writing	Gen Ed
	Gen Ed			

BUSINESS ADMINISTRATION MAP	MACRO - ECONOMICS	MICRO-ECONOMIC	MICROCOMP APP FOR BUS	WRITING FOR BUS	PRE-CAL (BUS)	INTRO TO BUS	BUS STATISTICS	PRIN MGMT	PRIN MKTG	INTERNATIONAL BUS	PRIN ACCTG I	PRIN ACCTG II	BUS LAW I	MTG FINANCE
I = Introduce; R = Reinforce; E = Emphasize	ECON 207	ECON 208	CS 214	ENG 200	MATH 1165	BUSI 201	BUSI 203	BUSI 211	BUSI 231	BUSI 241	BUSI 251	BUSI 252	BUSI 281	BUSI 371
WRITING COMPETENCIES														
Identify a subject and formulate a thesis statement.						I			R					
Organize ideas to support a position.				I		R			R				R	
Write in a unified and coherent manner appropriate to the subject matter.				I		R			R				R	
Use appropriate sentence structure and vocabulary.				I		R			R				R	
Document references and citations according to an accepted style manual.						I			R				R	
CRITICAL THINKING COMPETENCIES														
Identify business problems and apply creative solutions.								I	R	R	R		R	E
Identify and apply leadership techniques.								I					R	E
Translate concepts into current business environments.								I	R	R	R		R	E
Analyze complex problems by identifying and evaluating the components of the problem.								I			R	R	E	E
QUANTITATIVE REASONING COMPETENCIES														
Apply quantitative methods to solving real-world problems.					I		R				R	R		E
Perform necessary arithmetic computations to solve quantitative problems.					I		R				R	R		E
Evaluate information presented in tabular, numerical, and graphical form.					I		R				R	R		E
Recognize the reasonableness of numeric answers.					I		R				R	R		E

Assessment Methods

[redacted]

"…assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured."

ABET General Criteria - Definitions

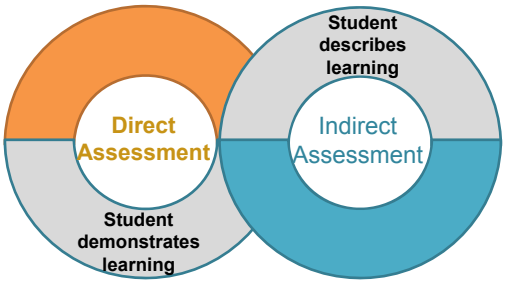
ASSESSMENT METHODS

context for data collection

- Written surveys and questionnaires
- Exit and other interviews
- Standardized exams
- Locally developed exams
- Archival records
- Focus groups
- Portfolios
- Simulations
- Performance Appraisal
- External examiner
- Oral exams

Direct Measures

Provide for the direct examination or observation of student knowledge or skills against measurable student outcomes



Indirect measures of student learning ascertain the opinion or self-report of the extent or value of learning experiences

INDIRECT MEASURES

[redacted]

DIRECT

- Exit and other interviews
- Standardized exams
- Locally developed exams
- Portfolios
- Simulations
- Performance Appraisal
- External examiner
- Oral exams

INDIRECT

- Written surveys and questionnaires
- Exit and other interviews
- Archival records
- Focus groups

Whether or not a particular assessment method is direct or indirect depends on the nature of what is being measured and how the method is being used.

[redacted]

APPLICATION

METHOD ASSIGNMENT

Count around the table:

#1= Methods 1 & 10
#2= Methods 2 & 8
#3= Methods 3 & 9
#4= Methods 4 & 7
#5= Methods 5 & 6
#6= Methods 11 & 5
#7= Methods 1 & 4

Assessment Methods*

1. **Written surveys and questionnaires** - Asking individuals to share their perceptions about a particular area of interest—e.g., their own or others' skills/attitudes/behavior, or program/course qualities and attributes.

2. **Exit and other interviews** - Asking individuals to share their perceptions about a particular area of interest—e.g., their own skills/attitudes, skills and attitudes of others, or program qualities—in a face-to-face dialog with an interviewer.

3. **Commercial, norm-referenced, standardized examinations** - Commercially developed examinations, generally group administered, mostly multiple choice, "objective" tests, usually purchased from a private vendor.

4. **Locally developed examinations** - Objective or subjective designed by local staff/faculty.

5. **Focus groups** - Guided discussion of a group of people who share certain characteristics related to the research or evaluation question, conducted by trained moderator.

6. **Portfolios** (collections of work samples, usually compiled over time and rated using scoring rubrics).

7. **Simulations** - A **competency-based** measure where a person's abilities are measured in a situation that approximates a "real world" setting. Simulation is primarily used when it is impractical to observe a person performing a task in a real world situation (e.g., on the job).

8. **Performance Appraisals** - Systematic measurement of overt demonstration of acquired skills, generally through direct observation in a "real world" situation—e.g., while student is working on internship or on project for client.

9. **External Examiner** - Using an expert in the field from outside your program – usually from a similar program at another institution – to conduct, evaluate, or supplement the assessment of students.

10. **Archival Records** - Biographical, academic, or other file data available from college or other agencies and institutions.

11. **Oral examinations** - Evaluation of student knowledge levels through a face-to-face dialogue between the student and the examiner—usually faculty.

*Except where noted, materials relating to the advantages and disadvantages of assessment methods have been modified by Gloria Rogers and used with permission. Prus, J. and Johnson, R., "Assessment & Testing Myths and Realities." New Directions for Community Colleges, No. 88, Winter 94. These materials cannot be duplicated without the expressed written consent of the authors.

GLOSSARY*

Backload (--ed, --ing): amount of effort required after the data collection.

Competency: level at which performance is acceptable.

Confounded: confused.

Convergent validity: general agreement among ratings, gathered independently of one another, where measures should be theoretically related.

Criterion-referenced: criterion-referenced tests determine what test takers can do and what they know, not how they compare to others. Criterion-referenced tests report how well students are doing relative to a pre-determined performance level on a specified set of educational goals or outcomes included in the curriculum.

Externality: Externality refers to the extent to which the results of the assessment can be generalized to a similar context.

External validity: External validity refers to the extent to which the results of a study are generalizable or transferable to other settings. Generalizability is the extent to which assessment findings and conclusions from a study conducted on a sample population can be applied to the population at large. Transferability is the ability to apply the findings in one context to another similar context.

Forced-choice: the respondent only has a choice among given responses (e.g., very poor, poor, fair, good, very good).

Formative assessment: intended to assess ongoing program/project activity and provide information to improve the project. Assessment feedback is short term in duration.

Frontload (--ed, --ing): amount of effort required in the early stage of assessment method development or data collection.

Generalization (generalizability): The extent to which assessment findings and conclusions from a study conducted on a sample population can be applied to the population at large.

Goal-free evaluation: Goal-free evaluation focuses on actual outcomes rather than intended program outcomes. Evaluation is done without prior knowledge of the goals of the program.

Inter-rater reliability: the degree to which different raters/observers give consistent estimates of the same phenomenon.

Internal validity: Internal validity refers to (1) the rigor with which the study was conducted (e.g., the study's design, the care taken to conduct measurements, and decisions concerning what was and wasn't measured) and (2) the extent to which the designers of a study have taken into account alternative explanations for any causal relationships they explore.

Longitudinal studies: Data collected from the same population at different points in time.

Norm (--ative): a set standard of development or achievement usually derived from the average or median achievement of a large group.

Norm-reference: A norm-referenced test is designed to highlight achievement differences between and among students to produce a dependable rank order of students across a continuum of achievement from high achievers to low achievers.

Observer effect: the degree to which the assessment results are affected by the presence of an observer.

Open-ended: assessment questions that are designed to permit spontaneous and unguided responses.

Operational (--ize): defining a term or object so that it can be measured. Generally states the operations or procedures used that distinguish it from others.

Reliability: Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials

Rubrics: A rubric is a set of categories that define and describe the important components of the work being completed, critiqued, or assessed. Each category contains a gradation of levels of completion or competence with a score assigned to each level and a clear description of what criteria need to be met to attain the score at each level.

Salience: a striking point or feature.

Stakeholder: Anyone who has a vested interest in the outcome of the program/project.

Summative assessment: assessment that is done at the conclusion of a course or some larger instructional period (e.g., at the end of the program). The purpose is to determine success or to what extent the program/project/course met its goals.

Third party: person(s) other than those directly involved in the educational process (e.g., employers, parents, consultants)

Triangulate (triangulation): The use of a combination of assessment methods in a study. An example of triangulation would be an assessment that incorporated surveys, interviews, and observations.

Topology: Mapping of the relationships among subjects.

Utility: usefulness of assessment results.

Variable (variability): Observable characteristics that vary among individuals responses.

Validity: Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. Validity has three components:

- relevance - the option measures your educational objective as directly as possible
- accuracy - the option measures your educational objective as precisely as possible
- utility - the option provides formative and summative results with clear implications for educational program evaluation and improvement

Written Surveys/Questionnaires

Definition: Asking individuals to share their perceptions about the curricular/co-curricular areas of interest—e.g., their own or others skills/attitudes/behavior, or program/course qualities and attributes.

Advantages:

- Typically yield the perspective that students, alumni, the public, etc., have of the program that may lead to changes especially beneficial to improving the program.
- Can cover a broad range of areas of interest within a brief period of time.
- Results tend to be more easily understood by lay persons.
- Can cover areas of interest, which might be difficult or costly to assess more directly.
- Can provide accessibility to individuals who otherwise would be difficult to include in assessment efforts (e.g., alumni, parents, employers).

  When **'third-parties'** are completing the survey/questionnaire there are additional advantages, as follows:
  - Can provide unique stakeholder input, valuable in its own right (especially employers and alumni). How is the program serving their purposes?
  - Offer different perspectives, presumably less biased than either student or faculty.
  - Can increase both internal validity (through "**convergent validity"/"triangulation**" with other data) and **external validity**.
  - Convey a sense of importance regarding the opinions of stakeholder groups.

Disadvantages:

- Results tend to be highly dependent on wording of items, **salience** of survey or questionnaire, and organization of instrument. Thus, good surveys and questionnaires are more difficult to construct than they appear.
- Frequently rely on volunteer samples, which can be biased.
- Mail surveys tend to yield low response rates.
- Require careful organization in order to facilitate data analysis via computer for large samples.
- Commercially prepared surveys tend not to be entirely relevant to an individual institution and its students.
- Forced response choices (**forced-choice**) may not provide opportunities for respondents to express their true opinions.
- Results reflect perceptions, which individuals are willing to report and thus tend to consist of indirect data.
- Locally developed instrument may not provide for **externality** of results.

  Third party disadvantages also include:
  - As with any indirect data, inference and reports can contain a high degree of interpretation error.
  - Third-parties can be biased too, in directions more difficult to anticipate than self-reports.
  - Less investment by third-parties in assessment processes often means lower response rates, even lower than student/alumni rates.
  - Usually requires logistical details (e.g., identifying sample, making contact, getting useful responses, etc.), therefore more costly than it appears.
  - If information about specific individuals is requested, confidentiality becomes an important and sometimes problematic issue that must be addressed carefully.

Ways to Reduce Disadvantages:

- Use only carefully constructed instruments that have been reviewed by survey experts.
- Include open-ended, respondent worded items along with forced-choice.
- If random sampling or surveying of the entire target population is not possible, obtain the maximum sample size possible and follow-up with non-respondents (preferably in person or by phone).
- If commercially prepared surveys are used, add locally developed items of relevance to the program.
- If locally developed surveys are used, attempt to include at least some externally-referenced items (e.g., from surveys for which national data are available).
- Word reports cautiously to reflect the fact that results represent perceptions and opinions respondents are willing to share publicly.
- Use pilot or "try out" samples in local development of instruments and request formative feedback from respondents on content clarity, sensitivity, and format.
- Cross-validate results through other sources of data through **triangulation**.

Ways to Reduce **Third Party** Disadvantages:

- Very careful, explicit directions for types of responses requested can reduce variability.
- Attain informed consent in cases where information about specific individuals is being requested.
- Coordinate contacts with other campus organizations contacting the same groups, to reduce ("harassment" syndrome) and increase response rates.

Bottom Lines:

A relatively inexpensive way to collect data on important evaluative topics from a large number of respondents. Must always be treated cautiously, however, since results only reflect what subjects are willing to report about their perception of their attitudes and/or behaviors.

Exit and Other Interviews

Definition: Asking individuals to share their perceptions of their own attitudes and/or behaviors or those of others. Evaluating student reports of their attitudes and/or behaviors in a face-to-face dialogue.

Advantages:
Student interviews tend to have most of the attributes of surveys and questionnaires with the exception of requiring direct contact, which may limit accessibility to certain populations. Exit interviews provide the following advantages:

- Allow for more individualized questions and follow-up probes/questions based on the responses of interviewees.
- Provide immediate feedback to interviewer.
- Include same observational and **formative** advantages as oral examinations.
- Frequently yield benefits beyond data collection that comes from opportunities to interact with students and other groups.
- Can include a greater variety of items than is possible on surveys and questionnaires, including those that provide more direct measures of learning and development.

  When **'third-parties'** are making the reports there are additional advantages, as follows:
  - Can provide unique stakeholder/constituent input, valuable in its own right (especially employers and alumni). How is the program/course serving the purposes of the stakeholder group?
  - Offer different perspectives, presumably less biased than either student or the faculty.
  - Can increase both internal validity (through "**convergent validity"/"triangulation**" with other data) and **external validity** (by adding more "natural" perspective).

Disadvantages:

- Requires direct contact, which may be difficult to arrange.
- May be intimidating to interviewees, thus biasing results in the positive direction.
- Results tend to be highly dependent on wording of items and the manner in which interviews are conducted.
- Time consuming, especially if large numbers of persons are to be interviewed.

  Third party report disadvantages:
  - As with any indirect data, inference and reports risk high degree of error in interpretation.
  - Third parties can be biased too, in directions more difficult to anticipate than self-reports.
  - Usually requires logistical details (e.g., identifying sample, making contact, getting useful responses, etc.), therefore more costly than it appears.
  - If information about specific individuals is requested, confidentiality becomes an important and sometimes problematic issue that must be addressed carefully.

Ways to Reduce Disadvantages:

- Plan the interviews carefully with assistance from experts.
- Provide training sessions for interviewers that include guidance in putting interviewees at ease and related interview skills.
- Interview purposeful samples of students when it is not feasible to interview all.
- Conduct telephone interviews when face-to-face contact is not feasible.
- Develop an interview format and questions with a set time limit in mind.

- Conduct pilot testing of interview questions and process and request feedback from interviewee to improve the interview process.
- Utilize focus groups when individual interviewing is not possible or is too costly.

Ways to Reduce **Third Party** Disadvantages:

- Conduct face-to-face or phone interviews wherever possible, increasing validity through probing during dialogue.
- Very careful, explicit directions for types and perspectives of responses requested can reduce variability. Attain informed consent in cases where information about individuals is being requested.
- Coordinate contacts with other campus organizations contacting the same groups, to reduce "harassment" syndrome and increase response rates.

Bottom Lines:

Interviews provide opportunities to cover a broad range of content and to interact with respondents. Opportunities to follow-up responses can be very valuable. Direct contact may be difficult to arrange, costly, and potentially threatening to respondents unless carefully planned.

Commercial, Norm-Referenced, Standardized Exams

Definition: Group administered mostly or entirely multiple-choice, "objective" tests in one or more curricular areas. Scores are based on comparison with a reference or norm group. Typically must be purchased from a private vendor.

Target of Method: Used primarily on students in individual programs, courses or for a particular student cohort.

Advantages:

- Can be adopted and implemented quickly.
- Reduce/eliminate faculty time demands in instrument development and grading (i.e., relatively low **"frontloading"** and **"backloading"** effort).
- Objective scoring.
- Provide for **externality** of measurement (i.e., **externality validity** is the degree to which the conclusions in your study would hold for other persons in other places and at other times—ability to **generalize** the results beyond the original test group)
- Provide **norm** group(s) comparison often required by mandates outside the program/ institution (e.g., accreditation agency, state or federal regulations).
- May be beneficial or required in instances where state or national standards exist for the discipline or profession.
- Very valuable for benchmarking and cross-institutional comparison studies.

Disadvantages:

- May limit what is measured.
- Eliminates the process of learning and clarification of goals and objectives typically associated with local development of measurement instruments.
- Unlikely to completely measure or assess the specific objectives and outcomes of a program, department, or institution.
- "Relative standing" (i.e., how student performance compares with others) results tend to be less meaningful than **criterion-referenced** (i.e., what students know or can do without comparison to others) results for program/student evaluation purposes.
- **Norm-referenced** data is dependent on the institutions in comparison group(s) and methods of selecting students to be tested. (Caution: unlike many **norm-referenced** tests such as those measuring intelligence, present **norm-referenced** tests in higher education do not utilize, for the most part, randomly selected or well stratified national samples.)
- Group administered multiple-choice tests always include a potentially high degree of error, largely uncorrectable by "guessing correction" formulae (which lowers **validity**).
- Results unlikely to have direct implications for program improvement or individual student progress.
- Results highly susceptible to misinterpretation/misuse both within and outside the institution.
- Someone must pay for obtaining these examinations; either the student or program.
- If used repeatedly, there is a concern that faculty may teach to the exam as is done with certain AP high school courses.

Ways to Reduce Disadvantages:

- Choose the test carefully, and only after faculty have reviewed available instruments and determined a satisfactory degree of match between the test and the learning outcomes of the curriculum.

- Request and review technical data, especially **reliability** and **validity** data and information on **normative** sample from test publishers.
- Utilize on-campus measurement experts to review reports of test results and create more customized summary reports for the institution/program, faculty, etc.
- Whenever possible, choose tests that also provide **criterion-referenced** results
- Assure that such tests are only one aspect of a multi-method approach in which no firm conclusions based on **norm-referenced** data are reached without **validation** from other sources (**triangulation**).

Bottom Lines:

Relatively quick, and easy, but useful mostly where group-level performance and external comparisons of results are required. Not as useful for individual student or program evaluation. May not only be ideal, but many times the only alternative for benchmarking studies.

Locally Developed Exams

4

Definition: Objective and/or subjective assessments designed by faculty in the program or course sequence being evaluated.

Advantages:

- Content and style can be geared to specific outcomes, objectives, and student characteristics of the program, curriculum, etc.
- Specific indicators for performance can be established in relationship to curriculum.
- Process of development can lead to clarification/crystallization of what is important in the process/content of student learning.
- Local scoring by program faculty can provide relatively rapid feedback.
- Greater faculty/institutional control over interpretation and use of results.
- More direct implication of results for program improvements.

Disadvantages:

- Require considerable leadership/coordination, especially during the various phases of development.
- Cannot be used for benchmarking, or cross-institutional comparisons.
- Costly in terms of time and effort (more **"frontloaded"** effort for objective assessments; more **"backloaded"** effort for subjective assessments).
- May not provide for **externality**.

Ways to Reduce Disadvantages:

- Enter into consortium with other programs, departments, or institutions with similar outcomes and objectives as a means of reducing costs associated with developing assessments. An element of **externality** is also added through this approach.
- Utilize on-campus assessment experts whenever possible for construction of assessments and **validation**.
- Contract with faculty "consultants" to provide development and scoring.
- Incorporate outside content experts, into development and grading process.
- Embed in program requirements for maximum relevance with minimum disruption (e.g., a "capstone" course).
- Validate results through use of multi-method approach (**triangulation**).

Bottom Lines:

Most useful for individual coursework or program evaluation, with careful adherence to assessment principles. Must be supplemented for **external validity**.

FOCUS GROUPS**

Definition:

Typically conducted with 7-12 individuals who share certain characteristics that are related to a particular topic related to a research or evaluation question. Group discussions are conducted by a trained moderator with participants (several times, if possible) to identify trends/patterns in perceptions. Moderator's purpose is to provide direction and set the tone for the group discussion, encourage active participation from all group members, and manage time. Moderator must not allow own biases to enter, verbally or nonverbally. Careful and systematic coding and analysis of the discussions provides information that can be used to evaluate and/or improve the desired outcome.

Advantages:

- Useful to gather ideas, details, new insights and to improve question design.
- Helpful in the design of surveys.
- Can be used to get more in-depth information on issues identified by a survey.
- Can inform the interpretation of results from mail or telephone surveys.
- Can be used in conjunction with quantitative studies to confirm/broaden one's understanding of an issue.
- Interaction among focus group participants often leads to new insights.
- Allows the moderator to probe and explore unanticipated issues.

Disadvantages:

- Not suited for **generalizations** about population being studied.
- Not a substitute for systematic evaluation procedures.
- Moderators require training.
- Differences in the responses between/among groups can be troublesome.
- Groups can be difficult to assemble.
- Moderator has less control than in individual interviews.
- Data are complex to code and analyze.

Ways to Reduce Disadvantages:

- Offer an incentive for participants if possible.
- Over-recruit participants.
- Train moderators to use **open-ended** questions, pauses and probes, and learn when and how to move into new topic areas.

Example of Applications:

- Focus groups can be used as a follow-up to survey data. In cases where the results of a survey do not meet the expected standard on a particular outcome, a focus group of participants who are representative of the population surveyed (e.g., students, alumni, females) could be held to further investigate the results.
- Focus groups can be used to get input from alumni or business partners on the strengths and weaknesses in the knowledge and/or skills of graduates. Focus groups are a particularly helpful tool to use to **"triangulate"** or validate the results from other assessment methods.

Bottom Lines:

Focus groups are a quick and, if locally done, inexpensive method of gathering information. They should be conducted by someone who has training and experience in conducting Focus Groups and analysis of Focus Group data. They are very useful for triangulation to support other assessment methods but they are not a substitute for systematic evaluation procedures. Focus Groups should meet the same rigor as other assessment methods and should be developed and analyzed according to sound qualitative practices.

**Prepared by Gloria Rogers, ABET, Inc.

Portfolios

Definition: Collections of multiple student work samples usually compiled over time and scored using rubrics. The design of a portfolio is dependent upon how the scoring results are going to be used.

Advantages:
- Can be used to view learning and development **longitudinally** (e.g. samples of student writing over time can be collected), which is a useful perspective.
- Multiple components of a curriculum can be assessed (e.g., writing, critical thinking, research skills) at the same time.
- The process of reviewing and scoring portfolios provides an excellent opportunity for faculty exchange and development, discussion of curriculum objectives and outcomes, review of scoring criteria, and program feedback.
- Greater faculty control over interpretation and use of results.
- Results are more likely to be meaningful at all levels (i.e., the individual student, program, or institution) and can be used for diagnostic/prescriptive purposes as well.
- Avoids or minimizes “test anxiety” and other “one shot” assessments.
- Increases “power” of maximum performance measures over more artificial or restrictive “speed” measures on test or in-class sample.
- Increases student participation (e.g., selection, revision, evaluation) in the assessment process.

Disadvantages:
- Can be costly in terms of evaluator time and effort.
- Management of the collection and scoring process, including the establishment of reliable and valid scoring rubrics, is likely to be challenging.
- May not provide for **externality**.
- If samples to be included have been previously submitted for course grades, faculty may be concerned that a hidden agenda of the process is to validate their grading.
- Security concerns may arise as to whether submitted samples are the students’ own work, or adhere to other measurement criteria.

Ways to Reduce Disadvantages:
- Consider having portfolios submitted as part of a course requirement, especially a “capstone course” at the end of a program.
- Investigate the use of electronic portfolios as a means to increase process efficiency.
- Utilize portfolios from representative samples of students rather than having all students participate (this approach may save considerable time, effort, and expense but be problematic in other ways).
- Have more than one rater for each portfolio; establish **inter-rater reliability** through piloting designed to fine-tune rating criteria.
- Educate the raters about the process.
- Recognize that portfolios in which samples are selected by the students are likely represent their best work.
- Cross-validate portfolio products with more controlled student work samples (e.g., in-class tests and reports) for increased **validity** and security.

Bottom Lines:
Portfolios are a potentially valuable option adding important longitudinal and “qualitative” data, in a more natural way. Particular care must be taken to maintain validity. Especially good for multiple-learning outcomes assessment.

Simulations 7

Definition: A **competency based** measure where a person's abilities are measured in a situation that approximates a "real world" setting. Simulation is primarily used when it is impractical to observe a person performing a task in a real world situation (e.g., on the job).

Advantages:
- Better means of evaluating depth and breadth of student skill development than tests or other performance-based measures **(internal validity)**.
- More flexible; some degree of simulation can be arranged for most student target skills.
- For some skills, can be group administered, thus providing an excellent combination of quality and economy.

Disadvantages:
- For difficult skills, the higher the quality of simulation the greater the likelihood that it will suffer from same problems as "Performance Appraisals."
  - Ratings of student performance is typically more subjective than standardized tests.
  - Sample of behavior observed or performance appraised may not be typical, especially because of the presence of others.
  - Usually requires considerable **"frontloading"** effort; i.e., planning and preparation.
- More expensive than traditional testing options in the short run.

Ways of Reducing Disadvantages:
- Reducing problems is relatively easy, since degree of simulation can be matched for maximum **validity** practicable for each situation.
- Can often be "standardized" through use of computer programs (and enhance **external validity**).

Bottom Lines:

An excellent means of increasing the **external and internal validity** of skills assessment at minimal long-term costs.

Performance Appraisals 8

Definition: A competency-based method whereby abilities are measured in most direct, real-world approach. Systematic measurement of overt demonstration of acquired skills.

Advantages:
- Provide a more direct measure of what has been learned (presumably in the program).
- Go beyond paper-and-pencil tests and most other assessment methods in assessing skills.
- Preferable to most other methods in measuring the application and **generalization** of learning to specific settings, situations, etc.
- Particularly relevant to the objectives and outcomes of professional training programs and disciplines with well defined skill development.

Disadvantages:
- Rating of student performance is typically more subjective than standardized tests.
- Requires considerable time and effort (especially **front-loading**), thus being costly.
- Sample of behavior observed or performance appraised may not be typical, especially because of the presence of observers.

Ways to Reduce Disadvantages:
- Develop specific, **operational** (measurable) indicators for observing and appraising performance.
- Provide training for observers/appraisers.
- Conduct pilot-testing in which rate of agreement (**inter-rater reliability**) between observers/appraisers is determined. Continue training and/or alter performance indicators for more specificity until acceptable consistency of measurement is obtained.
- Conduct observations/appraisals in the least intrusive manner possible
- Observe/appraise behavior in multiple situations and settings.
- Consider training and utilizing graduate students, upper level students, etc. as a means of reducing the cost and time demands on faculty.
- Cross-**validate** results with other measures, multiple methods should be used to **validate** the results of appraisals.

Bottom Lines:

Generally the most highly valued but costly form of student outcomes assessment. However, it is usually the most valid way to measure skill development.

9

External Examiner

Definition: Using an expert in the field from outside your program such as someone from a similar program at another institution or a capstone project client to evaluate, or supplement assessment of your students. Information can be obtained from external evaluators using many methods including feedback forms (including scoring rubrics), surveys, interviews, etc.

Advantages:
- Increases impartiality, **third party** objectivity (**external validity**)
- Feedback useful for both student and program evaluation. With a knowledgeable examiner it provides an opportunity for a valuable program consultation.
- May serve to stimulate other collaborative efforts between business partners or other programs.
- Incorporate the use of external **stakeholders**.
- Students may disclose to an outsider what they might not otherwise share.
- Outsiders can "see" attributes to which insiders have grown accustomed.
- Evaluators may have skills, knowledge, or resources not otherwise available.
- Useful in conducting **goal-free evaluation** (without prior expectations).

Disadvantages:
- Always some risk of a misfit between examiner's expertise and/or expectations and program outcomes.
- For individualized evaluations and/or large programs, can be very costly and time consuming.
- Volunteers may become "donor weary" (tired from being asked multiple times to participate).

Way to Reduce Disadvantages:
- Share program philosophy and outcomes and agree on assessment procedure before the assessment.
- Form reciprocal external examiner "consortia" among similar programs to minimize costs, swapping external evaluations back and forth.
- Limit external examiner process to program areas where externality may be most helpful.

Bottom Lines:

Best used as a supplement to your own assessment methods to enhance external validity, but not as the primary assessment option. Other benefits can be accrued from the cross-fertilization that often results from using external examiners.

Archival Records

Definition: Biographical, academic, or other file data available from the college or other agencies and institutions.

Advantages:
- Tend to be accessible, thus requiring minimal effort.
- Build upon data collection efforts that have already occurred.
- Can be cost efficient if required date is readily retrievable in desired format.
- Constitute non-intrusive measurement, not requiring additional time or effort from students or other groups.
- Very useful for **longitudinal studies**.
- Good way to establish a baseline for before and after comparisons.

Disadvantages:
- Especially in large institutions, may require considerable effort and coordination to determine exactly what data are available campus-wide and to then get that information in desired format.
- To be most helpful, datasets need to be combined. This requires an ability to download and combine specific information for multiple sources. It may require designing a separate database for this downloaded information.
- Typically the archived data are not exactly what is required, so that the evaluator must make compromises. In some cases, it may be a stretch to use such data as surrogates for the desired measures.
- If individual records are included, protection of rights and confidentiality must be assured; where applicable, Institutional Review Board approval should be obtained if there is doubt.
- Availability of data may discourage the development of other, more appropriate measures or data sources.
- May encourage attempts to "find ways to use data" rather than assessment related to specific outcomes and objectives.

Ways to Reduce Disadvantages:
- Early-on in the development of an assessment program, conduct a comprehensive review of existing assessment and evaluation efforts and data typically being collected throughout the institution and its units (i.e, "campus data map"). An Office of Institutional Research is found on many campuses and can be helpful in this process.
- Be familiar with the Family Educational Rights and Privacy Act (Buckley Amendment) and avoid personally identifiable data collection without permission. Assure security/protection of records.
- Only use archival records that are relevant to specific outcomes and objectives of learning.

Bottom Lines:

Can be quick, easy, and cost-effective method, if data are available and accessible. Usually limited data quality but integral to valuable longitudinal comparisons. Should be a standard component of all assessment programs.

Oral Examination

(This method may be inconsistent with campus policies that prohibit the use of oral examinations.)

Definition: An assessment of student knowledge levels through a face-to-face dialogue between the student and examiner—usually faculty.

Advantages:
- Content and style can be geared to specific objectives and outcomes, and student characteristics of the institution, program, curriculum, etc.
- Specific indicators for performance can be established in relationship to course/curriculum.
- Process of development can lead to clarification/crystallization of what is important in the process/content of student learning.
- Local scoring by faculty can provide immediate feedback related to material considered meaningful.
- Greater faculty/institutional control over interpretation and use of results.
- More direct implication of results for program improvements.
- Allows measurement of student knowledge in considerably greater depth and breadth through follow-up questions, probes, encouragement of detailed clarifications, etc. (increased **internal validity** and **formative evaluation** of student abilities)
- Non-verbal (paralinguistic and visual) cues aid interpretation of student responses.
- Dialogue format decreases miscommunications and misunderstandings, in both questions and answers.
- Rapport-gaining techniques can reduce "test anxiety," helps focus and maintain maximum student attention and effort.
- Dramatically increases "**formative evaluation**" of student learning; i.e., clues as to how and why they reached their answers.
- Provides process evaluation of student thinking and speaking skills, along with knowledge content.

Disadvantages:
- Requires considerable leadership/coordination, especially during the various phases of development.
- Can be difficult to document by note-taking and providing student feedback with a grade.
- Costly in terms of time and effort (more "**frontload**" effort for objective; more "**backload**" effort for subjective).
- May not provide for **externality** (degree of objectivity associated with review, comparisons, etc. external to the program or institution).
- Requires considerably more faculty time, since oral exams must be conducted one-to-one, or, at most, with very small groups of students.
- Can be inhibiting on student responsiveness due to intimidation, face-to-face pressures, oral (versus written) mode, etc. (May have similar effects on some faculty!)
- Inconsistencies of administration and probing across students reduce standardization and **generalizability** of results (potentially lower **external validity**).

Ways to Reduce Disadvantages:
- Prearrange "standard" questions, most common follow-up probes, and how to deal with typical students' problem responses; "pilot" training simulations.
- Take time to establish open, non-threatening atmosphere for testing.
- Electronically record oral exams for more detailed evaluation later.

Bottom Lines:

Oral exams can provide excellent results, but usually only with significant – perhaps prohibitive – additional cost. Definitely worth utilizing in programs with small numbers of students, and for the highest priority objectives in any program and local testing policies do not prohibit the testing method.

BECOMING AN "EXPERT"

- Prepare for "teach back"
  - Carefully read you assessment methods and make notes about the most important points.
  - After completing your study, you will teach your methods to the others at your table (2 minutes per method).

TEACH BACK

- Each table should choose a timekeeper who is responsible for limiting each person to 2 minutes per method
- It doesn't matter where you start (method 1 or 6 or ?)
- Each person will share what they have learned from studying their methods and serve as the table "expert" when discussing their method.

ASSIGNMENT

- After all methods have been shared (2 minutes per method only), choose **TWO** methods that are appropriate for the performance indicators you developed earlier
- At least one DIRECT measure should be chosen
- Record your findings
- You may choose from those methods that might not have been covered during “teach back”

VALIDITY

1. Relevance - the assessment option measures the student outcome as *directly* as possible

2. Accuracy - the option measures the student outcome with confidence that the findings represent the *true value* of student learning

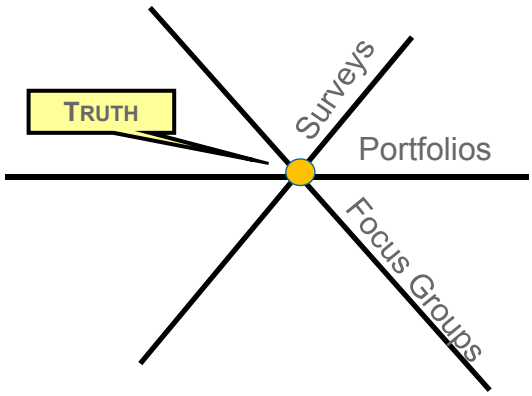
3. Utility - the option provides formative and summative results with *clear implications* for program evaluation and improvement

"BOTTOM LINES"

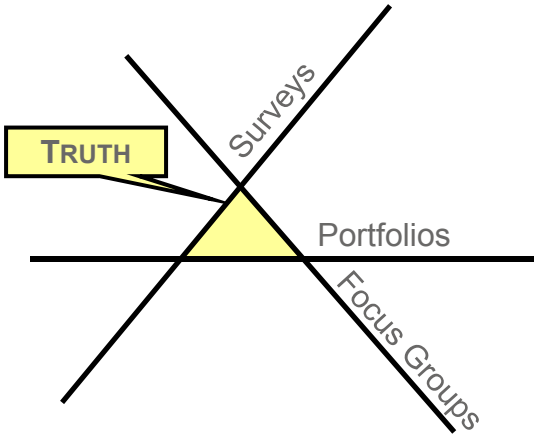
- All assessment options have advantages and disadvantages
- "Ideal" method means those that are best fit between program needs, satisfactory validity, and affordability (time, effort, and money)
- Crucial to use multi-method/multi-source approach to maximize validity and reduce bias of any one approach

TRIANGULATION

Mixed Methods



TRIANGULATION



Adapted from Joseph Hoey
Vice President, Accreditation Relations and Policy at Bridgepoint Education

ASSESSMENT METHOD TRUISMS

- There will always be more than one way to measure any student outcome
- No single method is good for measuring a wide variety of different student abilities
- There is generally an inverse relationship between the quality of measurement methods and their expediency
- It is important to pilot test to see if a method is appropriate for your program

USE OF TECHNOLOGY

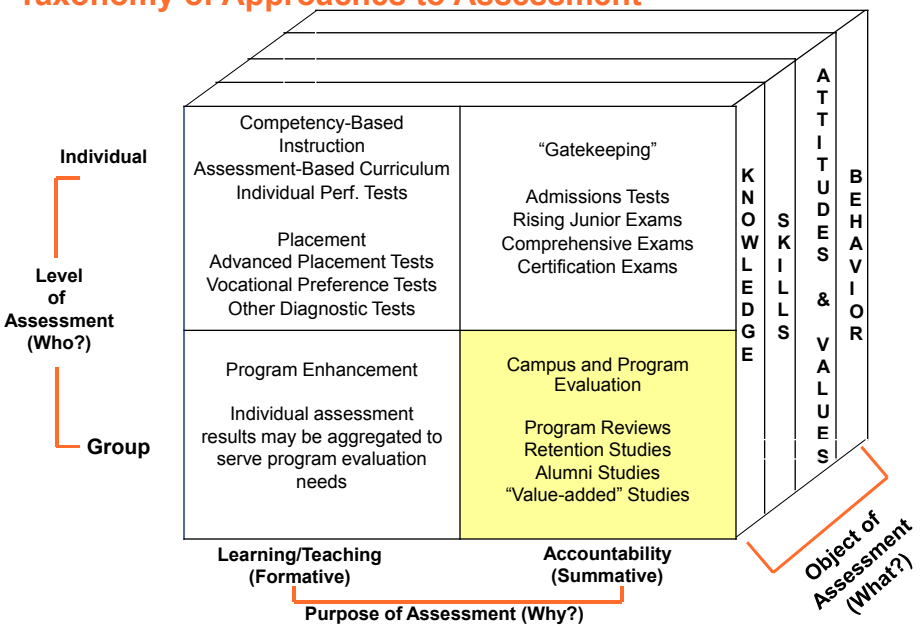
- Harness technology to enhance the efficiency and effectiveness of the assessment process.
  - What do you need to think about when making decisions about the use of technology?
    - How would we use technology that increase the effectiveness of what we are now doing?
    - What are the tradeoffs?
      - Cost/Benefit, Training, Maintenance, Quality of data/information

Developing Efficient Processes

DATA COLLECTION PROCESS

- Why?
  - Understand the focus of program assessment

Taxonomy of Approaches to Assessment

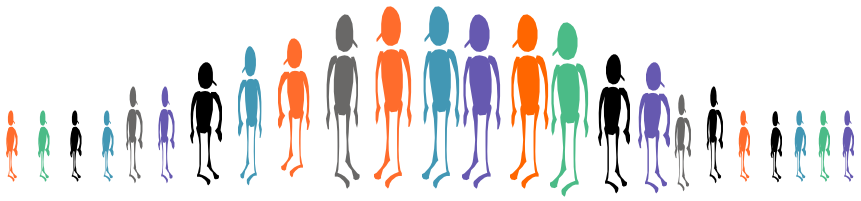


DATA COLLECTION PROCESS

- Why?
  - Know your question
- What?
  - Focus on few indicators for each outcome
- Who? Students (cohorts); faculty (some)

SAMPLING

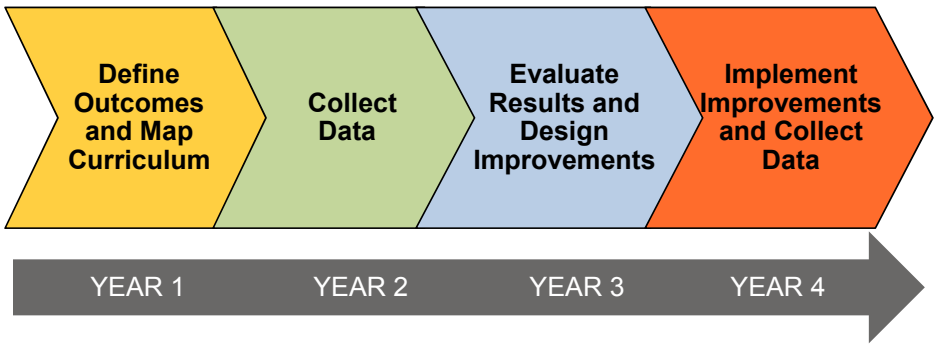
- For program assessment, sampling is acceptable and even desirable for programs of sufficient size.
  - Sample is representative of all students



http://www.surveysystem.com/sscalc.htm

DATA COLLECTION PROCESS

- Why?
  - Know your question
- What?
  - Focus on few indicators for each outcome
- Who? Students (cohorts); faculty (some)
- When?



STUDENT OUTCOMES	15-16	16-17	17-18	18-19	19-20	20-21
A recognition of ethical and professional responsibilities	A	E	C	A	E	C
An understanding of how contemporary issues shape and are shaped by mathematics, science, & engineering		A	E	C	A	E
An ability to recognize the role of professionals in the global society			A	E	C	A
An understanding of diverse cultural and humanistic traditions	A	E	C	A	E	C
An ability to work effectively in teams		A	E	C	A	E
An ability to communicate effectively oral, written, graphical, and visual fo	**A= Assess; E= Evaluate; C= Change (if necessary)**					

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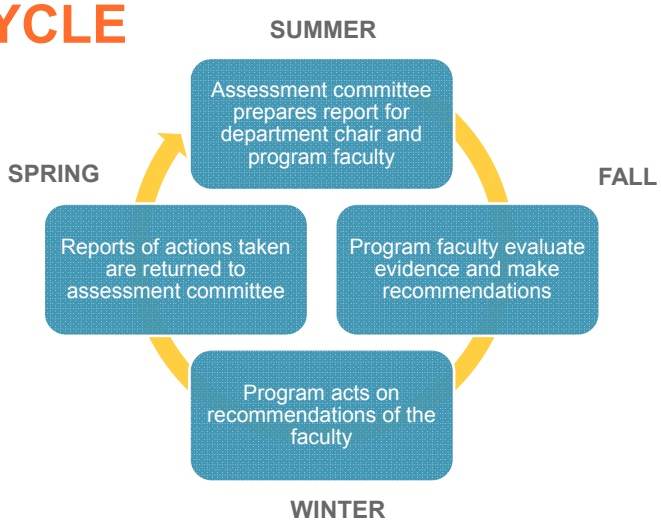
A recognition of ethical and professional responsibilities	A	E	C	A	E	C
An understanding of how contemporary issues shape and are shaped by mathematics, science, & engineering		A	E C	A	E C	A
An ability to recognize the role of professionals in the global society			A	E	C	A
An understanding of diverse cultural and humanistic traditions	A	E		A	E	C
An ability to work effectively in teams		A	E	C	A	E
An ability to communicate effectively in o written, graphical, and visual forms	**A= Assess; E= Evaluate; C= Change (if necessary)**					

ESTABLISH AN ANNUAL CYCLE



Preparing your report

BACK TO THE BASICS

REPORTING ON OBJECTIVES, OUTCOMES, CONTINUOUS IMPROVEMENT

- Know your audience
- Keep it simple
- If you haven't done it, you're not going to fool them

FOR GUIDANCE ONLY

The program may choose the means of representing its assessment and evaluation processes to the visiting team.

Consequently, the references to specific processes in the following are for guidance only.

The information on your continuous improvement processes may be presented in the manner that best represents the program's processes.

REPORTING YOUR RESULTS

- What (are you assessing)
- Who
- When
- What (are your results)
- What (did you do with the results)
- What (difference did it make)

Self-Study Guidelines

CRITERION 4. CONTINUOUS IMPROVEMENT

Student Outcomes: It is recommended that this section include (a table may be used to present this information):

- A listing and description of the assessment processes used to gather the data upon which the evaluation of each student outcome is based…
- The frequency with which these assessment processes are carried out
- The expected level of attainment for each of the student outcomes
- Summaries of the results of the evaluation process and an analysis illustrating the extent to which each of the student outcomes is being attained
- How the results are documented and maintained

Student Outcome: Students will demonstrate the ability to work effectively in teams.

Performance indicators	Educational Strategies	Method(s) of Assessment	Where summative data are collected	Where formative data collected	Summative data Cycle (yrs)	Time of data collection	Threshold for Performance
1. Produces research information for the team	1011, 2001, 2060, 3001, 4092	Peer Evaluations	4092	2001 (y2 of cycle), 3001 (y3 of cycle)	3 yrs	20012, 2015	80%
		Faculty Evals	4092				
		Senior Surveys	On-line survey				
2. Demonstrates understanding of team roles when assigned	1011, 2001, 2060, 3001, 4092	Peer Evaluations	4092	2001 (y2 of cycle), 3001 (y3 of cycle)	3 yrs	20012, 2015	80%
		Faculty Evals	4092				
		Senior Surveys	On-line survey				
3. Shares in the work of the team	1011, 2001, 2060, 3001, 4092	Peer Evaluations	4092	2001 (y2 of cycle), 3001 (y3 of cycle)	3 yrs	20012, 2015	80%
		Faculty Evals	4092				
		Senior Surveys	On-line survey				
4. Demonstrates good listening skills	1011, 2001, 2060, 3001, 4092	Peer Evaluations	4092	2001 (y2 of cycle), 3001 (y3 of cycle)	3 yrs	20012, 2015	80%
		Faculty Evals	4092				
		Senior Surveys	On-line survey				

Results Summary (direct measures) 2012: A sample of 56 students (52% of 2009 cohort) were assessed for the summative assessment. This represents 2 of 4 sections of 4092 (which is the second semester of a two-semester team experience.) The percent of the sample that demonstrated each indicator at satisfactory or exemplary were as follows: Indicator 1 - 72%; Indicator 2 - 65%; Indicator 3 - 62%; Indicator 4 - 89%

Actions 2013: The faculty who integrated teaming into their courses met in the fall of 2010 and 2011 to review the formative data and make recommendations for changes during those academic years. Based on the analysis of the summative results, the department asked faculty to provide the teaming scoring rubrics to students with the course assignments where the students were provided opportunities to demonstrate their teaming skills as defined by the performance indicators. A sub-committee of the department Curriculum Committee met to review the performance indicators. It was decided not to make any changes at this time. Faculty decided that they would review their assignments to be sure that students were given adequate opportunities to demonstrate the performance identified for teaming. Faculty also agreed to make student performance on the performance indicators a part of their grade for the activity. The Teaching/Learning Center will also provide a seminar for faculty on how to integrate effective teaming into the classroom.

Second-Cycle Results Summary 2015: A sample of 59 students (51% of cohort) were assessed for the summative assessment. This represents 2 of 4 sections of 4092 (which is the second semester of a two –semester team experience.) Based on changes made, the following improvements were seen: Indicator 1 – +12% (84%); Indicator 2 - +7% (72%); Indicator 3 - +13% (75%); Indicator 4 - +2% (91%).

Actions 2016: The faculty who integrated teaming into their courses met in the fall of 2013 and 2014 to review the formative data and make recommendations for changes during those academic years. Although progress was made on all indicators, the Curriculum Committee recommended that the department take another look at all the indicators related to teaming. The Teaching/Learning Center was asked to provide the department faculty some feedback on the indicators and also provide other examples of teaming indicators. This will be one of the issues that will be discussed at the Department retreat for possible revisions for the 2017 academic year.

Student Outcome: Students can work effectively in teams

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TABLE

Outcome	Performance Indicators	2009	2012	2015
Teaming	Research and Gather Information	61%	72%	84%
	Fulfill team roles	50%	65%	72%
	Share work	58%	62%	75%
	Listens	70%	89%	91%
Ethics	Know the code of ethics	45%	64%	77%
	Analyze ethical issues	32%	56%	74%
Life Long Learning	Conduct independent research	64%	68%	65%
	Identify opportunities for continued education in the field	57%	67%	86%
	Indicates interest in continuing education	65%	76%	87%

Student Outcome: Students will demonstrate the ability to work effectively in teams.

Performance indicators	Educational Strategies	Method(s) of Assessment	Where summative data are collected	Where formative data collected	Summative data Cycle (yrs)	Coordinator	Evaluation of Results
1. Produces research information for the team	1011, 2001, 2060, 3001, 4092	Peer Evaluations	4092	2001 (y2 of cycle), 3001 (y3 of cycle)	**3 yrs**	2009 - Wilson 2012- Al-Sayed	Department Curriculum Committee
		Faculty Evals	4092				
		Senior Surveys	On-line survey				
2. Demonstrates understanding of team roles when assigned	1011, 2001, 2060, 3001, 4092	Peer Evaluations	4092	2001 (y2 of cycle), 3001 (y3 of cycle)	**3 yrs**	2009 - Wilson 2012- Al-Sayed	Department Curriculum Committee
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		Faculty Evals	4092				
		Senior Surveys	On-line survey				
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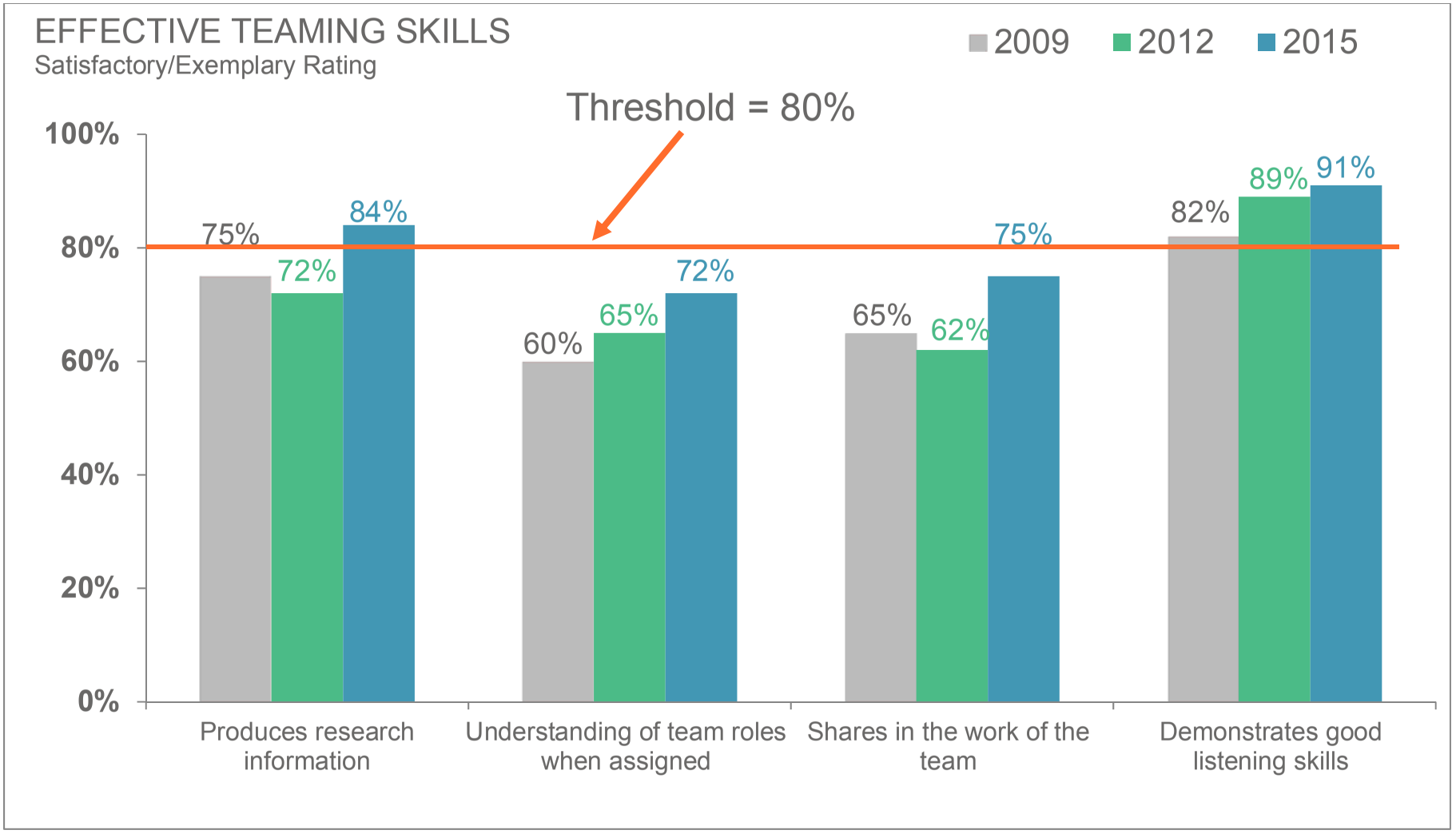
TREND LINE


EFFECTIVE TEAMING SKILLS
Satisfactory/Exemplary Rating
2009
2012
2015
Threshold = 80%
100%
80%
60%
40%
20%
0%
75%
72%
84%
60%
65%
72%
65%
62%
75%
82%
89%
91%
Produces research information
Understanding of team roles when assigned
Shares in the work of the team
Demonstrates good listening skills

TREND DATA

These data can be used for reporting purposes in three areas:

- Program review: Did the changes/recommendations make any difference? The answer to this question feeds back to improve the program.
- Institution: Is the program being effective in documenting student learning and improving learning over time?
- Accrediting agency: What is the evidence of student learning? Is there a process in place that enables the program to determine the level of student learning and the ability to continuously improve their educational processes?

PURPOSE OF THRESHOLDS

- Setting thresholds is important to the improvement process
- If improvement is needed (thresholds not achieved), curriculum mapping can help identify where improvements and changes can be made
- Enables evaluation of the EXTENT to which the student outcomes are being attained (Criterion 4)

EXAMPLES OF THRESHOLDS

- At least 85% of the students demonstrated *Competent* or *Exemplary* performance
- At least 80% of the students demonstrated *Competent* performance or above.
- At least 70% of the students demonstrated *Good* or *Excellence* performance, and at least 90% demonstrated *Developing* or above performance
- 70% of students demonstrated *Good* or *Excellent* performance, and no more than 5% demonstrated *Unsatisfactory* performance

REALISTIC THRESHOLDS

- It is recommended that you do NOT set thresholds until after the first cycle of data collection
  - Many factors can affect your results (including immature assessment processes)
  - Review your results and set your Threshold after you decide how you are going to improve your processes (i.e., where would you like to be with the next round of data collection?)
- Be realistic about your program's context
  - Inputs and outputs, Program Educational Objectives, type of institution will affect your expectations for the level of learning for your students and where you set Thresholds

REALISTIC THRESHOLDS

- Expectations for performance will vary depending upon:
  - the complexity of the task required for performance,
  - the cognitive level of the performance indicator
  - the degree to which the curriculum supports student learning for the performance indicator
- Note: It is acceptable to have different thresholds for different performance indicators for a single outcome.

An ability to design and conduct experiments, as well as to analyze and interpret data

Performance Indicators	Educational Strategies	Method(s) of Assessment	Where summative data are collected	Where formative data are collected	Length of assessment cycle (yrs)	Yr/Sem of data summative collection	Threshold for Performance
1. Observes good lab practice and operates instrumentation with ease	1010, 1015,1011, 2020, 2040, 2060,3010, 3013, 3050, 4090, 4092	Observations (rubrics)	3050	1015 (Yr1 cycle); 3013 (Yr 2 cycle)	3 years	2012, 2015	90%
		Senior Surveys	On-line survey				
2. Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data	1010, 1015,1011, 2020, 2040, 2060,3010, 3013, 3050, 4090, 4092	Lab report (rubrics)	3050	1015 (Yr1 cycle); 3013 (Yr 2 cycle)	3 years	2012, 2015	85%
		Senior Surveys	On-line survey				
3. Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	1010, 1015,1011, 2020, 2040, 2060,3010, 3013, 3050, 4090, 4092	Lab report (rubrics)	3050	1015 (Yr1 cycle); 3013 (Yr 2 cycle)	3 years	2012, 2015	75%
		Senior Surveys	On-line Survey				

Assessment Results Summary (direct measures) 2012: For the summative assessment (end of program), the decision was made to focus on direct assessment for all indicators. Summative data for Indicators were collected in the Fluid Mechanics and Lab (3050) course. In this course students completed four experiments where they were required to develop laboratory reports. The scoring rubrics for Indicator #1 was completed by the Graduate Lab Manager to assess student performance through observations and rubrics for Indicators # 2 and 3 were completed by the faculty. The percent of the students that demonstrated each criterion were as follows: Indicator #1-78%; Indicator #2-72%; and Indicator #3-66%.

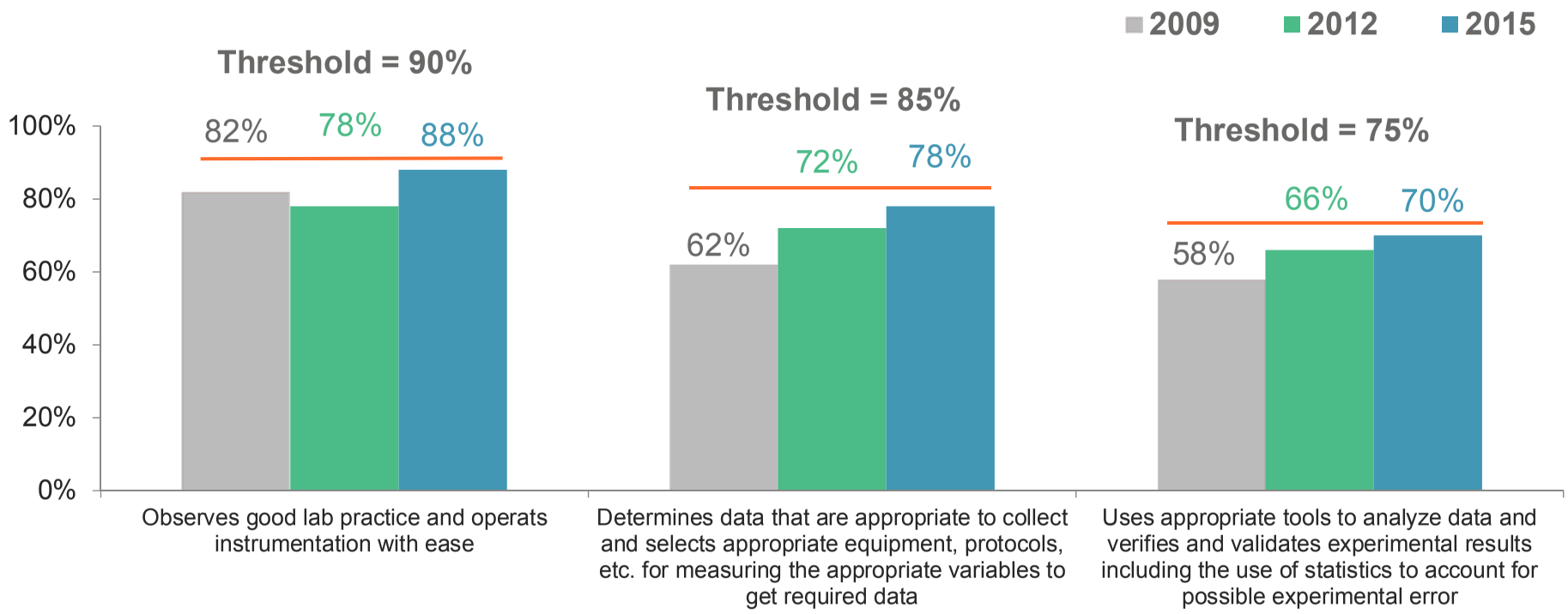
Evaluation and Actions 2013: : The faculty who used experiments in their courses met in the fall of 2007 and 2008 to review the formative data and make recommendations for changes during those academic years The assessment results were evaluated by the faculty at a retreat held in August of 2010. The summative assessment results were evaluated by the faculty at a retreat held in August of 2010. Based on the analysis of the results, the faculty recommended additional formative assessment asking faculty in Circuit Theory and Lab (2040) and Engineering Electronics and Lab (2016) to provide the students the rubrics for Indicators 2 & 3 and give them formal feedback making their scores a part of the grade where appropriate. For Indicator #1, the Graduate Lab Managers were asked to attend a seminar on how to observe students in the laboratory and complete the rubric for lab practices and the use of instrumentation. Based on results, faculty were asked to provide the scoring rubrics with the appropriate lab assignments so students could see how they would be evaluated.

Second-Cycle Results Summary (direct measures) 2015: The second cycle summative data were again taken in the 3050 course for all indicators. Based on actions taken as a result of the 2006 evaluation process, the following improvements were seen in 2012: Indicator #1 up 10% (88%); Indicator #2 up 6% (78%), Indicator #3 up 4% (70%).

Evaluation and Actions 2016: The faculty who used experiments in their courses met in the fall of 2013 and 2014 to review the formative data and make recommendations for changes during those academic years The assessment results were evaluated by the faculty at a retreat held in August of 2013 During the August 2016 department retreat, the faculty teaching the laboratory courses appointed a committee to review the scoring rubrics for clarity. The committee will also meet with the Graduate Lab Managers to review the rubrics for Indicator #1. Their findings will be reported to the laboratory courses faculty who will make recommendations to the faculty. As a result of these deliberations, minor adjustments were made in the scoring rubrics for clarity.

TREND LINE

DESIGN & CONDUCT EXP
ANALYZE & INTERPRET DATA
Satisfactory/Exemplary Rating



Display materials available at visit:

- Indicator #1, 2, 3 laboratory assignment sheets with rubrics and samples of lab reports for summative assessment
- Sample of Laboratory reports and results from 2013 formative assessments
- Copies of revised rubrics as a result of 2016 actions
- Senior Survey questions and results with faculty evaluation
- Minutes of department Laboratory sub-committee meetings where recommendations were made 2016
- Minutes of faculty retreat where actions were taken in 2013, 2016

COMMON MISTAKES

- Too many data, not enough information
  - Reporting numbers or percentages without putting them into context
    - How many students in cohort
    - How many students provided data
- Not describing how the data are evaluated
- Using very complex charts describing your assessment processes

COMMON MISTAKES

- Discussing all outcomes/objectives at once instead of one at a time.
- Using the terms “objectives” and “outcomes” interchangeably.
- Referencing the outcomes/objectives by numbers or letters that refer back to a chart. Don’t require the reader to go back in the self-study for the reference.

COMMON MISTAKES

MAPPING IN
SELF STUDY REPORT
Example

Program Educational Objectives	Supporting Student Outcomes
1.	a, b, c, e, k, j
2.	d, g , l
3.	e, f, l, j, l
4.	h, l, j

BEST PRACTICE

MAPPING IN
SELF STUDY REPORT
Example

Program Educational Objectives	Supporting Student Outcomes
1. Be effective in engineering design and the practical application of engineering theory	a) ability to apply knowledge of math & science b) ability to design and conduct experiments/ analyze data c) ability to design a system, component, or process to meet needs with realistic constraints e) ability to identify, formulate, and solve engineering problems k) ability to use the techniques, skills, and modern engineering tools needed for engineering practice j) knowledge of contemporary issues
2. Exhibit teamwork and effective communication skills	d) ability to function on multidisciplinary teams e) ability to communicate effectively f) a willingness to assume leadership roles and responsibilities
3. Be characterized by effective leadership skills and high standards of ethics	e) ability to identify, formulate, and solve engineering problems f) understanding of professional and ethical responsibility i) Recognition of and ability to engage in lifelong learning j) knowledge of contemporary issues l) a willingness to assume leadership roles and responsibilities
4. Expand their knowledge and capabilities	h) broad education to understand effect of engineering solutions in a global, economic, environmental, and societal context i) Recognition of and ability to engage in lifelong learning j) knowledge of contemporary issues

SUMMARY

- Keep the report focused.
- Have someone read your report that is unfamiliar with your program. If they don't understand it, chances are neither will the visiting team.
- There is elegance in simplicity.

LESSONS LEARNED

- Capitalize on what you are already doing
- You don't have to measure everything all the time
- More data are not always better
- Don't wait for perfection
- Go for the early win
- Decouple from faculty evaluation

Self-Assessment: Continuous Improvement of Program-Level Assessment of Student Learning [1]

0-not in place; 1-beginning stage of development; 2-beginning stage of implementation; 3-in place and implemented; 4-implemented and evaluated for effectiveness; 5-implemented, evaluated and at least one cycle of improvement

Stakeholder/Constituent Involvement (Those who have a vested interest in the outcome of the program)	RATING	**Program Educational Objectives** (Graduates performance after completing program)	RATING	**Student Outcomes** (Desired knowledge, skills, attitudes, behaviors, by the time students complete program)	RATING	**Student Outcomes aligned with educational practices**	RATING	**Assessment Processes**	RATING	**Evaluation**	RATING
Stakeholders are identified		Objectives are determined		Outcomes are identified		Desired performance is mapped to curricular practices and/or strategies (e.g., courses/ teaching methodology)		Assessment is on-going and systematic at the program level		Assessment data are systematically reviewed	
Primary stakeholders are involved in identifying/ affirming program educational objectives		Objectives are publicly documented		Number of outcomes are manageable		Practices/strategies are systematically evaluated using outcomes assessment data		Multiple methods are used to measure each outcome		Evaluation of results are done by those who can effect change	
Primary stakeholders are involved in periodic evaluation of educational objectives		Number of objectives are manageable		Outcomes are publicly documented		Where necessary, educational practices are modified based on evaluation of assessment data		Both direct and indirect measures of student learning are used to measure outcomes		Evaluation of assessment data is linked to curricular practices/strategies	
Sustained partnerships with stakeholders are developed		Objectives are aligned with mission statement		Outcomes are linked to educational objectives				Assessment processes are reviewed for effectiveness and efficiency		Evaluation leads to decision making/ action	
		Objectives are periodically evaluated for continued relevancy		Outcomes are defined by a manageable number of measurable performance indicators				When needed, assessment methods are modified based on evaluation processes			

[1] This tool is intended for self-assessment only to assist in understanding areas for improvement in the assessment process development. Assessment Planning Flowchart © 2004 Revised July 2014

Developed by Gloria Rogers (gloriarogers1@gmail.com)

WHAT NEXT?

- Additional opportunities for professional development
  - Advanced Program Assessment Workshop
    - For those who have attended this workshop, have implemented the principles learned and want to take their assessment processes to the next level
  - Institute for the Development of Assessment Leadership (IDEAL)
    - Four-day immersion in assessment and leadership principles is designed for leaders of the assessment process
  - Accreditation Workshop
  - ABET Symposium

More information and dates can be found on the ABET website (http://www.abet.org/workshops-and-events/)

FINAL COMMENTS

- Review *Accreditation Policy and Procedure Manual* for additional information about the accreditation process and visit

  http://www.abet.org/accreditation/

  Questions about the accreditation process or evaluation visit, please contact the Assistant to the Managing Director of Accreditation, Ms. Beth Mundy at bmundy@abet.org.
- Please put all of your materials together
  - Outcomes/Performance Indicators
  - Rubrics
  - Assessment Methods
- You will get copies of all

HELP US EVALUATE THE WORKSHOP

- Next week you will receive a very short survey to assist ABET in evaluating the usefulness of the workshop
- All responses will be anonymous and sent directly to the Professional Development department of ABET
- Please complete as soon as possible

Thank you!