

Introducing...

**ABET Webinars**



## **“Defining Student Outcomes”**

**Dr. Gloria Rogers,  
Managing Director, Professional Services**

**We will begin promptly at 2:00 EST**

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**ABET Webinars**



**Welcome to  
“Defining Student Outcomes”**

**Gloria Rogers, ABET, Inc.**

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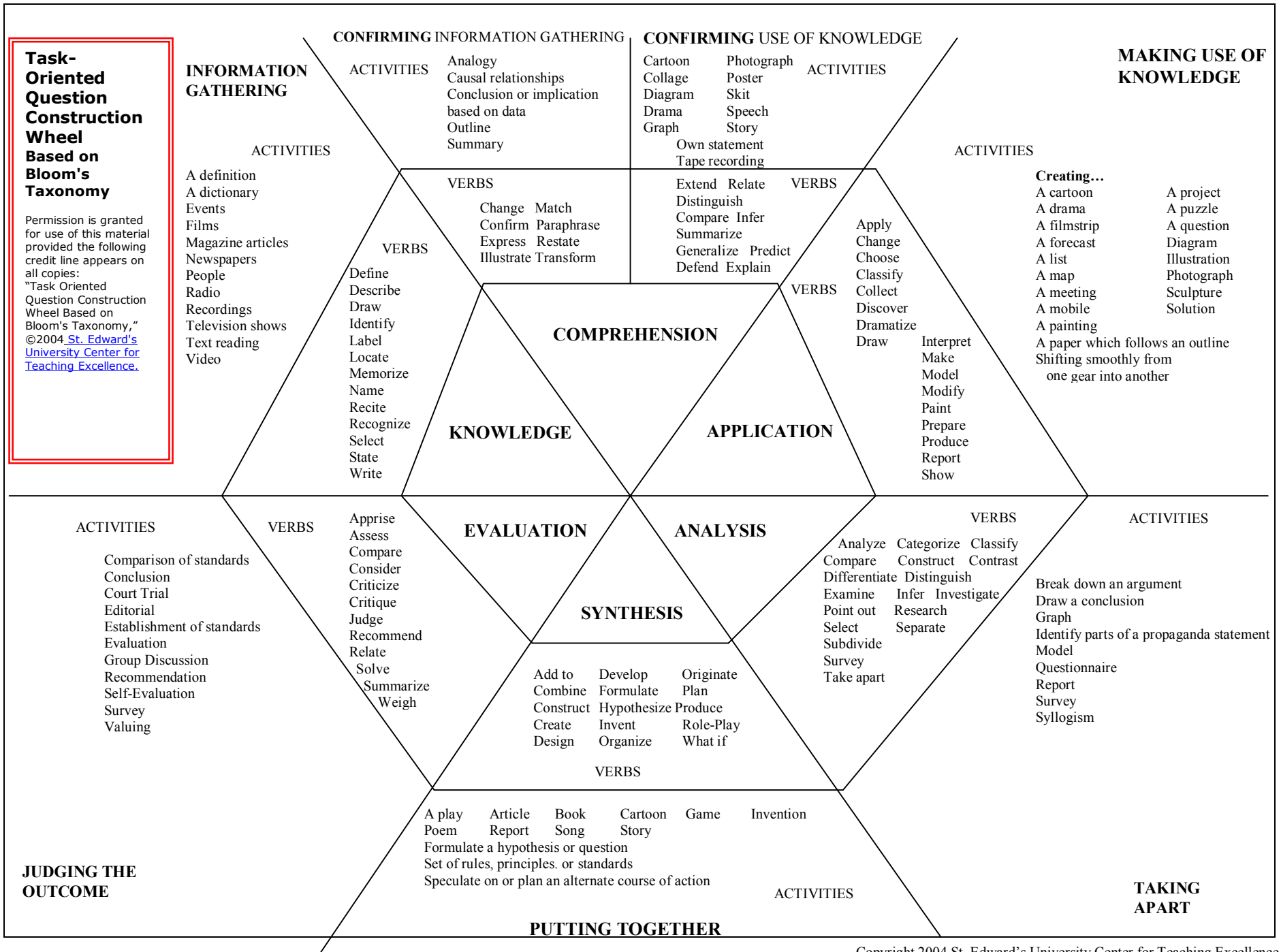
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**Task-Oriented Question Construction Wheel Based on Bloom's Taxonomy**

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# 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 experiment plan (knowledge)
- Acquire data on appropriate variables (application)
- Compare experimental data and results to appropriate theoretical models (analysis)
- Explain observed differences between model and experiment and offer very basic explanations (evaluation)

The tables below provide examples of action verbs associated with various levels of learning and have been compiled from multiple sources. These table are designed to help guide the development of performance indicators.

---

Cunningham, G. K. (1986). *Educational and psychological measurement*. 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.

**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

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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, snobs, 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.

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## Webinar Outline

- Definition of terms
- Importance of defining program outcomes
- Examples of defined outcomes
- Reporting your results
- Criterion 4: continuous improvement
- Mapping outcomes to curriculum
- Process implementation
- Differences between objectives and outcomes

## Compliance with criteria

Putting key words into practice



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## ABET Criteria revised and out for comment 2008-09

- Renumbered criteria for all ABET commissions (ASAC, CAC, EAC, TAC)
- Some reorganization of content
- Definitions
  - Objectives
  - Outcomes
  - Assessment
  - Evaluation



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**Definition of terms provided are same for all commissions**



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ABET Terms	2010 Definitions
Program Educational Objectives	Broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.
Program Outcomes	Statements that describe what students are expected to know and able to do by the time of graduation.
Performance Indicators	Specific, <u>measurable</u> statements identifying the performance(s) required to meet the outcome; confirmable through evidence.
Assessment	Processes that identify, collect, and prepare data that can be used to evaluate achievement.
Evaluation	Process of reviewing the results of data collection and analysis and making a determination of the value of findings and action to be taken.

ABET Terms	Definitions Beginning 2011
Program Educational Objectives	Broad statements that describe what graduates are expected to attain within a few years after graduation.
Student Outcomes	Student outcomes describe what students are expected to know and able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program.
Performance Indicators	Specific, <u>measurable</u> statements identifying the 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 and program educational objectives. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the objective or 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 and program educational objectives are being attained. Evaluation results in decisions and actions regarding program improvement.

### Criterion 3. Student Outcomes (2010-2011)

- Each program must **demonstrate** that graduates have: (TAC)
- Engineering programs must **demonstrate** that their **students attain** the following outcomes: (EAC)
- Program has **documented measurable** outcomes that are based on the needs of the program's constituencies. The program **enables students to achieve**, by the time of graduation: (CAC)
- Baccalaureate degree programs must **demonstrate** that graduates have: (ASAC)



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## Interpretation

- Largely program-based assessment
- Demonstrate:
  - Programs must provide evidence of student outcomes
- Focus is on student performance
  - Measurable attainment = derived from evidence from the examination or observation of student performance
  - Cannot be based on indirect measures alone
    - In particular, self-assessment is the self-report or opinion of a student's ability to “demonstrate” and not the evidence of performance.
  - Evidence-based process that drives action

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# Questions & Answers



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# Developing Measurable Student Outcomes



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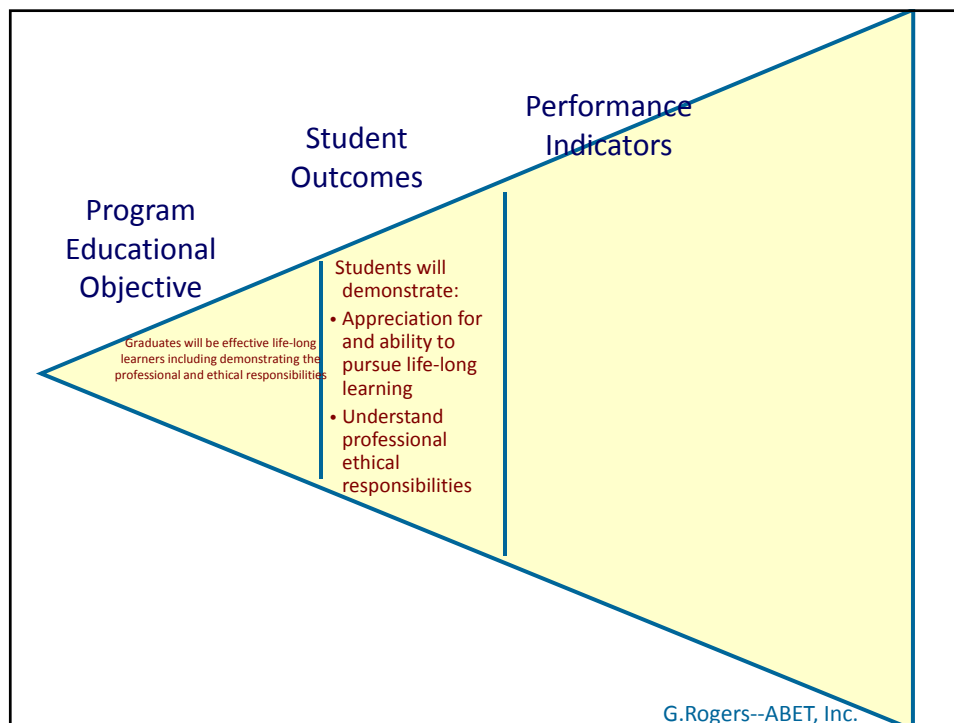
## Writing measurable outcomes

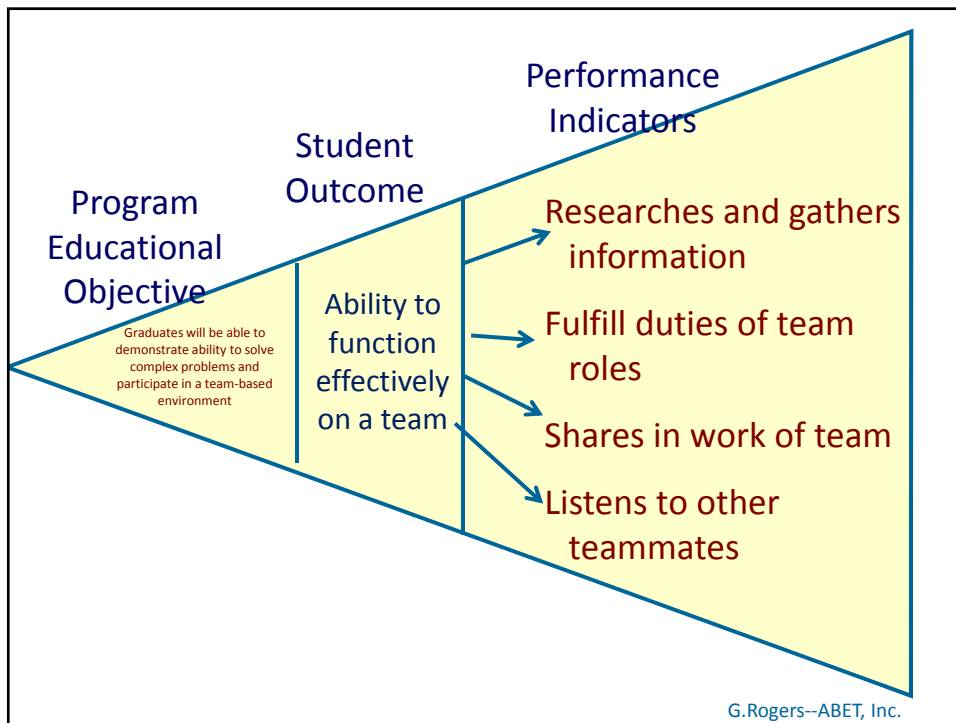
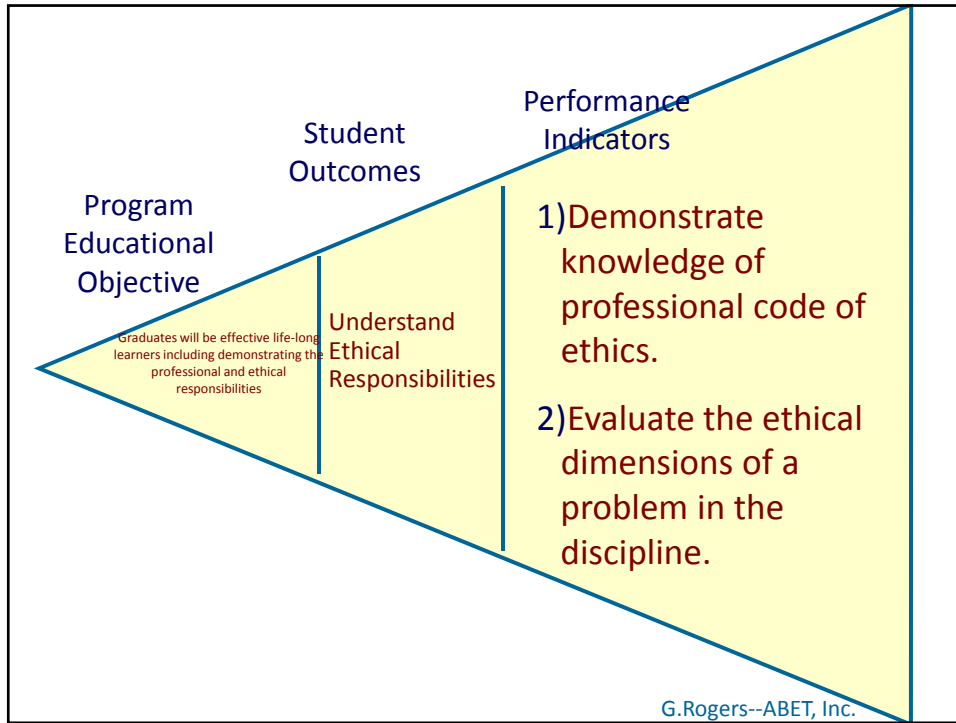
- ABET criteria are silent about defining outcomes—both good news and bad news
- If you can't define it, you can't measure it
- What are faculty going to look for in student performance to have confidence that, by the end of the program, students can demonstrate the learning outcome

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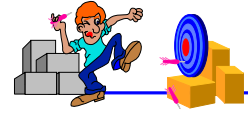
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## Developing performance indicators

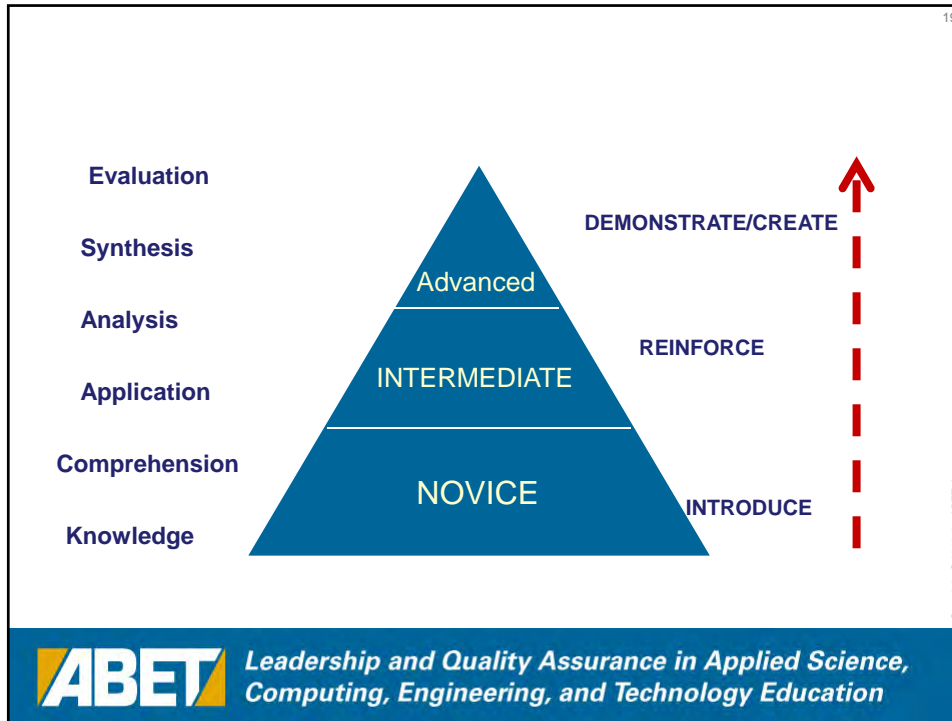
- Two essential parts
  - Content referent
    - Subject content that is the focus of instruction (e.g., steps of the design process, chemical reaction, scientific method)
  - Action verb
    - Direct students to a specific performance (e.g., “list,” “analyze,” “apply”)



## Clarity of performance indicators

- Use of action verbs consistent with appropriate level of learning





#### Student Outcomes and Performance Indicators

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

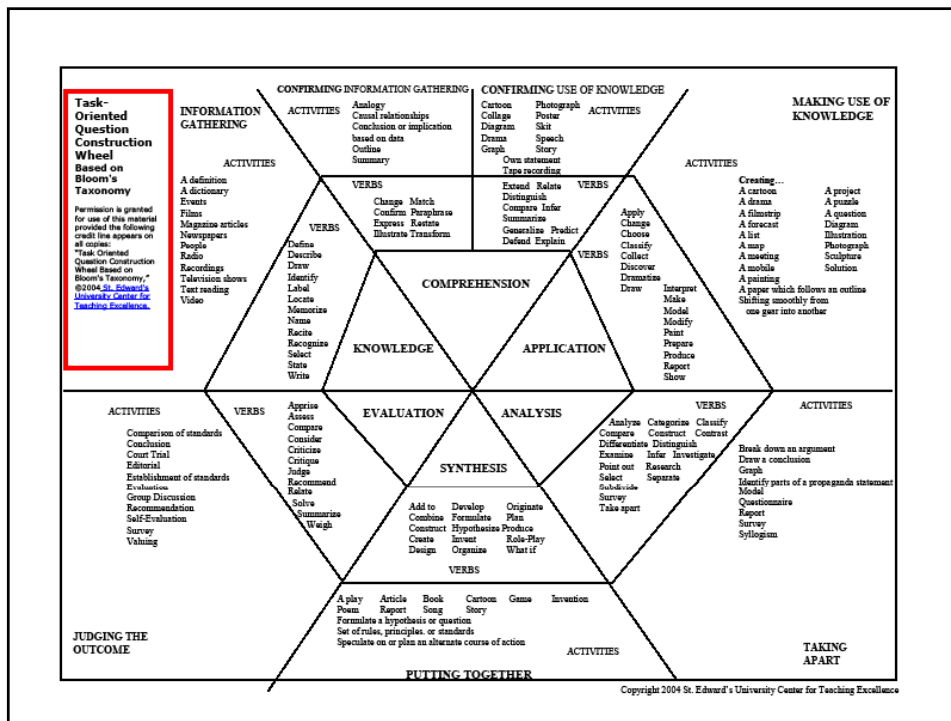
- Performance indicators:** Students will be able to demonstrate the ability to:
- Follow the design of experiment plan (knowledge)
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The tables below provide examples of action verbs associated with various levels of learning and have been compiled from multiple sources. These tables are designed to help guide the development of performance indicators.

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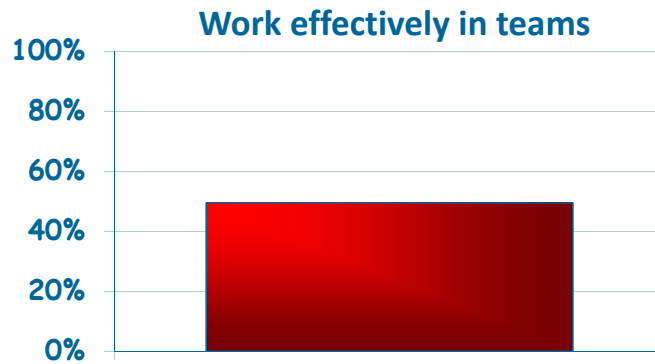
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Level	Illustrative Verbs	Definition	Example
Knowledge	arrange, define, describe, duplicate, identify, label, list, match, memorize, name, order, outline, recognize, relate, recall, repeat, reproduce, select, state	remembering previously learned information	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
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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
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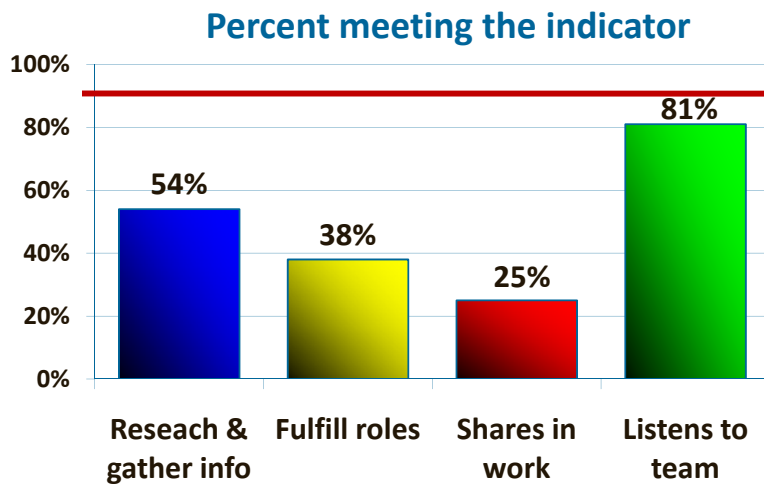


## Example of Results



At a level expected for a student who will graduate?

Sample of 58 students (52% of 2009 cohort) were assessed. This represents 2 of 4 sections of ME412 (which is the second semester of a two-semester team experience).



Please rate each member of the team on the following scale:

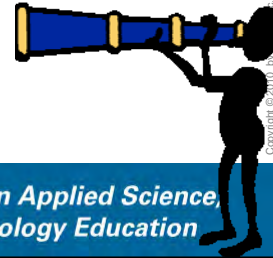
		Unsatisfactory 1	Developing 2	Satisfactory 3	Exemplary 4
Name	Attribute	1	2	3	4
Carlos	Researched and gathered information				
	Fulfilled team roles when assigned				
	Shared in the work of the team				
	Demonstrated good listening skills				
Sara	Researched and gathered information				
	Fulfilled team roles when assigned				
	Shared in the work of the team				
	Demonstrated good listening skills				
Jeffrey	Researched and gathered information				
	Fulfilled team roles when assigned				
	Shared in the work of the team				
	Demonstrated good listening skills				
Rima	Researched and gathered information				
	Fulfilled team roles when assigned				
	Shared in the work of the team				
	Demonstrated good listening skills				

Outcome: Work Effectively in Teams

Performance Indicators	Unsatisfactory 1	Developing 2	Satisfactory 3	Exemplary 4
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.
Shares 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.
<b>Student</b>	<b>Research &amp; Gather Information</b>	<b>Fulfill Team Role's Duties</b>	<b>Share in work of team</b>	<b>Listen to Other Teammates</b>
Marcus Wellman	3	3	3	3
Juan Gonzales	3	2	3	4
Dottie Whitely	2	2	2	3
...n...	...	...	...	...

## Importance of well-stated performance indicators

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



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## Questions & Answers



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## Evidence-based assessment of student work is key

*Should be done by faculty*



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## Criterion 4. Continuous Improvement

- A documented process to regularly assess its program educational objectives and student outcomes
- evaluate the extent to which they are being met or attained
- results of these used to effect continuous improvement of the program through a documented plan
- These actions should be based on available information (EAC); relevant data (CAC, ASAC, TAC)



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## Interpretation

- Documented process
  - Regular and systematic; not *ad hoc*
- Use assessment data to make judgments about the achievement of the performance indicators
  - With experience, set benchmarks and thresholds
- Guide program improvement efforts
  - Based on evidence and information analyzed from data
  - Document, document, document



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## Role of curriculum mapping

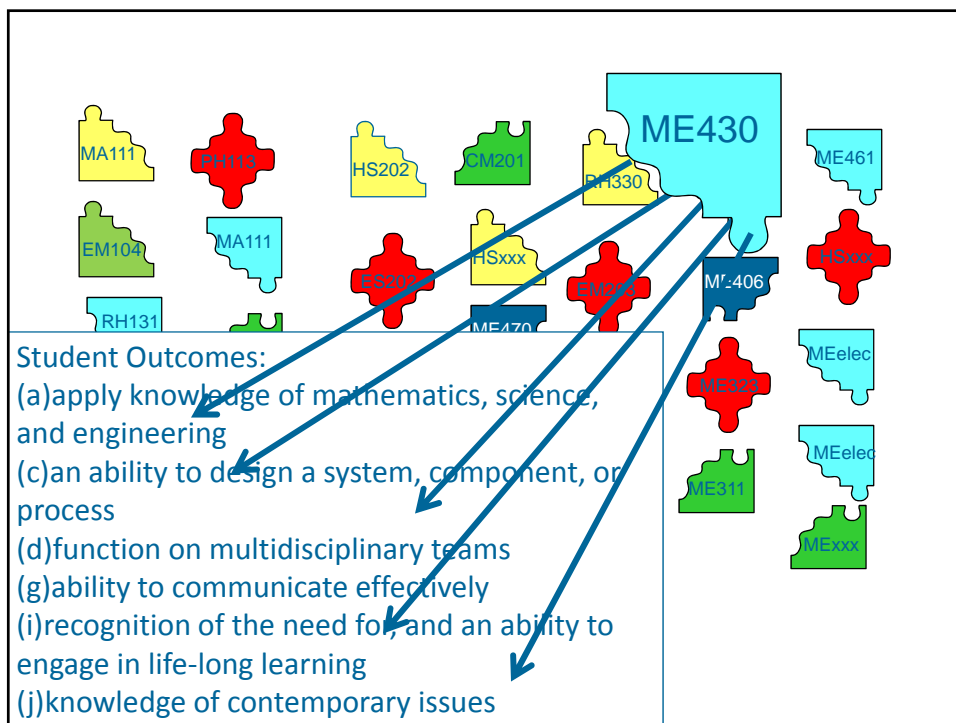
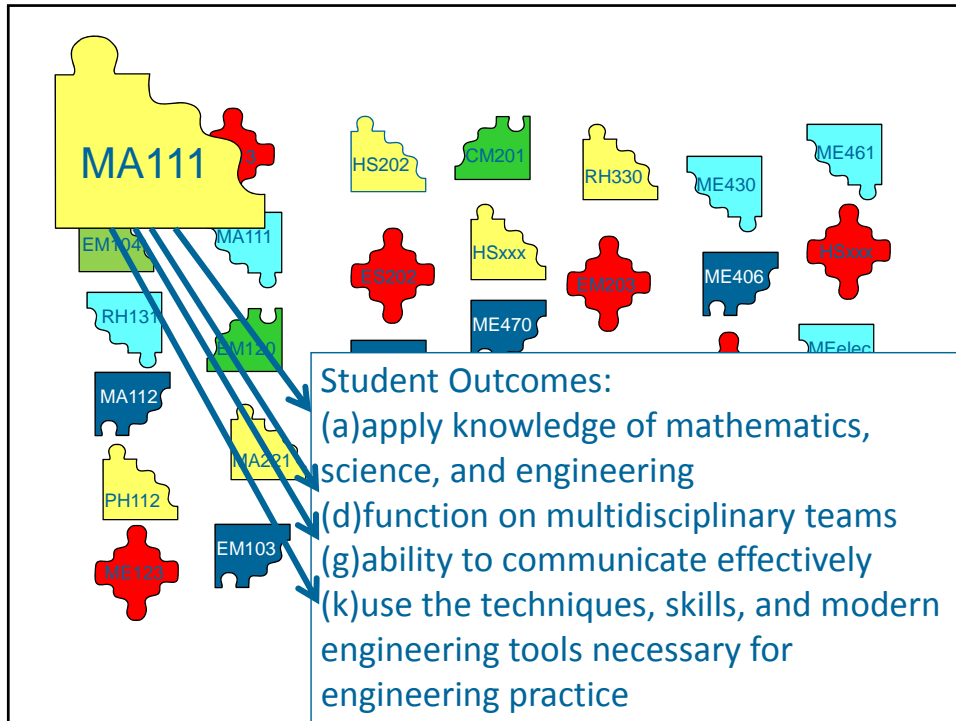


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**Performance Indicator Explicit.** This indicator is explicitly stated as performance for this course.  
**Demonstrate Competence.** Students are asked to demonstrate their competence on this performance indicator through homework, projects, tests, 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 Criteria	Indicator is Explicit	Demonstrate Competence	Formal Feedback	Not Covered
<b>Recognition of ethical and professional responsibilities.</b>				
1. Demonstrate knowledge of professional codes of ethics. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
2. Evaluate the ethical dimensions of professional engineering, mathematical, and scientific practices. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
<b>An ability to work effectively in team</b>				
1. Share responsibilities and duties, and take on different roles when applicable <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
2. Analyze ideas objectively to discern feasible solutions by building consensus <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
3. Develop a strategy for action. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
<b>An ability to communicate effectively in oral, written, graphical, and visual forms</b>				
1. Identify the readers/audience, assess their previous knowledge and information needs, and organize/design information to meet those needs. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
2. Provide content that is factually correct, supported with evidence, explained with sufficient detail, and properly documented. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
3. Test readers/audience response to determine how well ideas have been relayed. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>
4. Submit work with a minimum of errors in spelling, punctuation, grammar, and usage. <a href="#">View rubric</a> or make a <a href="#">comment (optional)</a>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/>

	Macro-Economics	Micro-Economic	Microcomp App for Bus	Writing for Bus	Pre-Cal (Bus)	Intro to Bus	Bus Statistics	Prin Mgmt	Prin Mktg	Internati onal Bus	Prin Acctg I	Prin Acctg II	Bus Law I	Mtg Finance
<b>Business Administration Map</b>														
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
<b>Writing Competencies</b>														
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	
<b>Critical Thinking Competencies</b>														
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.											R	R	E	E
<b>Quantitative Reasoning Competencies</b>														
Apply quantitative methods to solving real-world problems.											R	R		E
Perform necessary arithmetic computations to solve quantitative problems.											R	R		E
Evaluate information presented in tabular, numerical, and graphical form.														
Recognize the reasonableness of numeric answers.														E
<p>I = Introduce            R = Reinforce            E = Emphasize</p> <p>'Assessing for Learning' by Peggy L Maki, Stylus Publishing, 2004            Source: New Jersey City University Business Administration Program</p>														



For each test/exam item and homework problem, faculty map to outcomes and enter data for each student on each item/assignment. Acceptable performance level =75%

Outcome Course	A	B	C	D	E	F	G	H	I	J	K
112	77	---	81	---	---	90	78	---	76	82	91
204	75	78	---	82	81	---	75	---	---	75	75
222	79	79	79	---	79	79	---	79	---	---	79
252	---	82	82	82	82	82	---	80	---	82	---
299	91	---	87	---	91	83	---	76	76	---	72
301	77	---	81	---	---	90	78	---	74	82	---
312	81	76	---	88	83	---	90	76	---	---	78
316	---	73	76	---	84	82	---	87	73	77	75
318	76	70	---	75	81	---	75	---	76	76	---
322	74	77	74	---	81	88	---	77	74	---	89
399	---	---	77	---	---	---	---	---	74	---	---
415	84	82	77	---	82	77	86	77	---	---	91
499	---	80	---	92	81	76	92	---	75	92	---
<b>Average</b>	<b>79.3</b>	<b>77.4</b>	<b>79.3</b>	<b>83.8</b>	<b>82.5</b>	<b>83.0</b>	<b>82.0</b>	<b>78.86</b>	<b>74.8</b>	<b>80.9</b>	<b>81.3</b>

Three different levels of achievement:

- Exceeds Expectations (EE): more than 80% of the students have achieved an average score of 75% or more;
- Meets Expectations (ME): between 70% and 80% of the students have achieved an average score of 75% or more;
- Does Not Meet Expectations (DNME): less than 70% of the students have achieved an average score of 75% or more.

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

Performance Indicator	Educational Strategies	Method(s) of Assessment	Where data are collected	Length of assessment cycle (yrs)	Year(s)/semester of data collection	Target for Performance
1. Produces research information for the team	ME113, EM213, ME213, ME235, ME333, ME412	Peer Evaluations Faculty Evaluations Senior Surveys	ME 412 ME 412 On-line survey	3 years	2006, 2009	90%
2. Demonstrates understanding of team roles when assigned	ME113, EM213, ME213, ME235, ME333, ME412	Peer Evaluations Faculty Evaluations Senior Surveys	ME 412 ME 412 On-line survey	3 years	2006, 2009	90%
3. Shares in the work of the team	ME113, EM213, ME213, ME235, ME333, ME412	Peer Evaluations Faculty Evaluations Senior Surveys	ME 412 ME 412 On-line survey	3 years	2006, 2009	90%
4. Demonstrates good listening skills	ME113, EM213, ME213, ME235, ME333, ME412	Peer Evaluations Faculty Evaluations Senior Surveys	ME 412 ME 412 On-line survey	3 years	2006, 2009	90%

**Assessment Results (direct measures) 2006:** A sample of 56 students (52% of 2005 senior class cohort) were assessed. This represents 2 of 4 sections of ME412 (which is the second semester of a two-semester team experience.) The decision was made to alternate the data collection in the 4 sections to reduce the faculty data collection load. The sample was representative of the total senior class cohort in terms of student grade point average, and student diversity. The decision was also made to focus on the direct assessment of faculty evaluations as the primary assessment data. The percent of the sample that demonstrated each indicator were as follows: Indicator 1 - 72%; Indicator 2 - 65%; Indicator 3 - 62%; Indicator 4 - 89%.

**Evaluation and Actions 2006:** The assessment results were evaluated by the faculty at a retreat held in August of 2006. Based on the analysis of the results, the faculty who were implementing teaming in their courses were asked to provide the teaming evaluation rubrics to students with the course assignments where the students were provided opportunities to demonstrate their teaming skills as defined by the indicators. A sub-committee of the department Curriculum Committee was assigned to meet and review the performance indicators. The sub-committee recommended not to make any changes at this time. Faculty integrating teaming skills agreed to review their assignments to be sure that students were given adequate opportunities to demonstrate the performance identified for teaming and to make students performance on the indicators a part of their grade for the activity. The Teaching/Learning Center was also asked to provide a seminar for faculty on how to integrate effective teaming into the classroom.

**Second-Cycle Results 2009:** A sample of 59 students (51% of senior class cohort) were assessed. This represents 2 of 4 sections of ME 412 (which is the second semester of a two-semester team experience.) Based on actions taken as a result of the 2006 evaluation process, the following improvements were seen in 2008: Indicator 1 - +12% (84%); Indicator 2 - +7% (72%); Indicator 3 - +13% (75%); Indicator 4 - +2% (91%).

**Evaluation and Actions 2009:** During the August 2009 department retreat, the faculty agreed that, although progress was made on all performance indicators, the department Curriculum Committee was asked to review all the performance indicators related to teaming. The Teaching/Learning Center was asked to provide the Department some feedback on the performance indicators and provide other examples of teaming performance indicators that might be more representative of desired teaming skills. This will be one of the issues that will be discussed at the spring 2010 department retreat.



## Process Implementation



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## A Realistic Process for Sustainability

- **Process characteristics**
  - Faculty are at the heart
    - Must be involved and informed
    - Workload must be minimized and meaningful
  - Requires leadership
  - Familiar and sustainable
    - Synchronized (academic calendar/ABET cycle)
    - Flexible and open to revision
    - Capitalize on what faculty are already doing



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## Assessment Tools

- Provide faculty with tools for knowledgeable, consistent assessment
- Assessment should provide useful information, not just “bulk” averages



Performance Indicators  
and Rubrics



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## Questions & Answers



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## Objectives/Outcomes Different or Same?

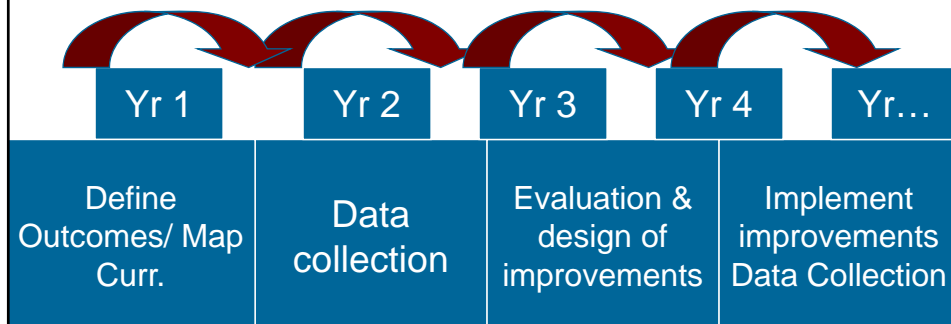
- Program Educational Objectives and Student Outcomes
  - Similar but not the same
  - What are some of the differences?
    - Degree of specificity
    - Role of constituents
    - Types of measurements possible
    - Cycles of data collection
- Importance of systematic processes

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## Data collection



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Student Outcomes:	08-09	09-10	10-11	11-12	12-13	13-14
A recognition of ethical and professional responsibilities	★			★		
An understanding of how contemporary issues shape and are shaped by mathematics, science, & engineering		★			★	
An ability to recognize the role of professionals in the global society			★			★
An understanding of diverse cultural and humanistic traditions	★			★		
An ability to work effectively in teams		★			★	
An ability to communicate						

## Summary

- ✓ You can't do everything
- ✓ You can't do everything all the time
- ✓ Well-defined outcomes are critical to focusing your assessment process
- ✓ Prioritize focus on high-level indicators of outcome achievement
- ✓ Get faculty consensus
- ✓ Go for the early win



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## Questions & Answers

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- Symposium Resource Room for reviewing sample self-studies
- The latest developments in accreditation practice
- The opportunity to find out how others are using technology to enhance their assessment and accreditation experience

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- Webinar: Preparing the EAC Self-Study  
October 18
- Webinar: Preparing the EAC Site Visit  
October 19
- Webinar: Defining Learning Outcomes  
October 21
- See full list of ABET Webinars
- Faculty Workshop on Sustainable Assessment Processes  
October 27
- 2010 ABET Annual Conference  
October 28-29
- Fall Board of Directors Meeting  
October 30
- IMCOSE International Conference on Self-Study



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October 30
- INCOSE International

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- Thank you for your participation
- Please fill out the closing evaluation
- Watch for upcoming webinars:
  - Preparing the Site Visit, ASAC – November 2
  - Developing Rubrics – November 3
  - Preparing the Site Visit, CAC – November 4
  - How to Develop A Survey – November 9
  - OTHERS at <http://www.abet.org/webinar.shtml>

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