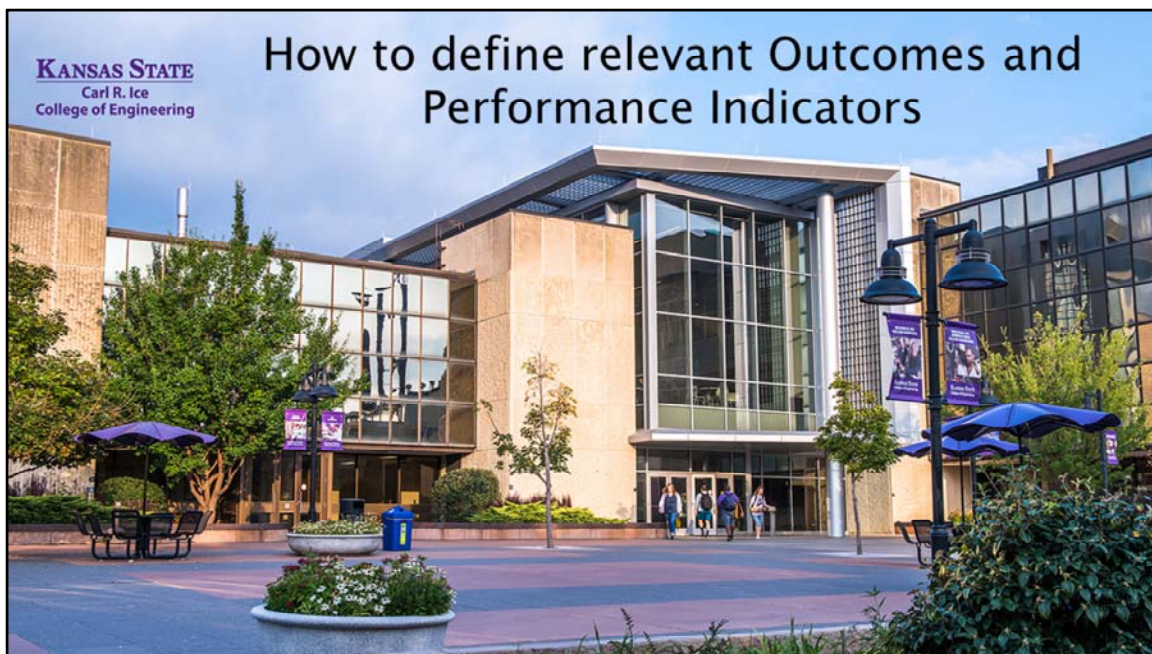



Video #2 - How to define relevant Outcomes and Performance Indicators



Video #2 - How to define relevant Outcomes
and Performance Indicators

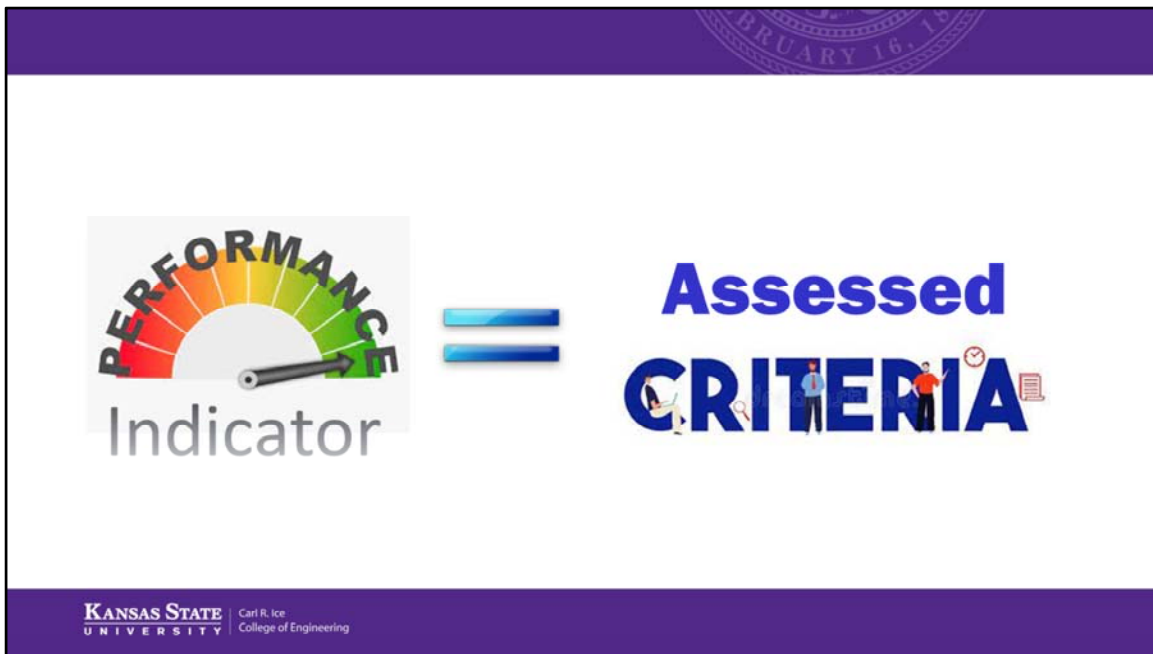
Student Outcomes

1. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. communicate effectively with a range of audiences
4. recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. acquire and apply new knowledge as needed, using appropriate learning strategies.

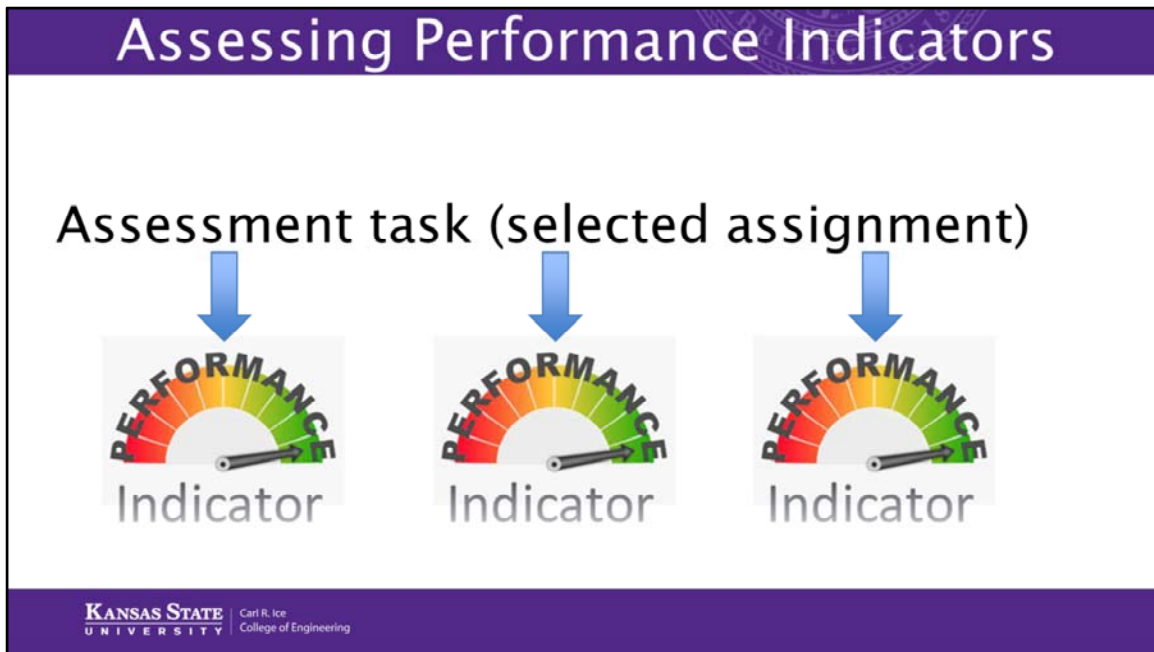
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The seven Student Outcomes defined by ABET are provided to guide in the decision as to what must be taught, learned, and assessed. They are also used to specifically define performance indicators.

Video #2 - How to define relevant Outcomes
and Performance Indicators



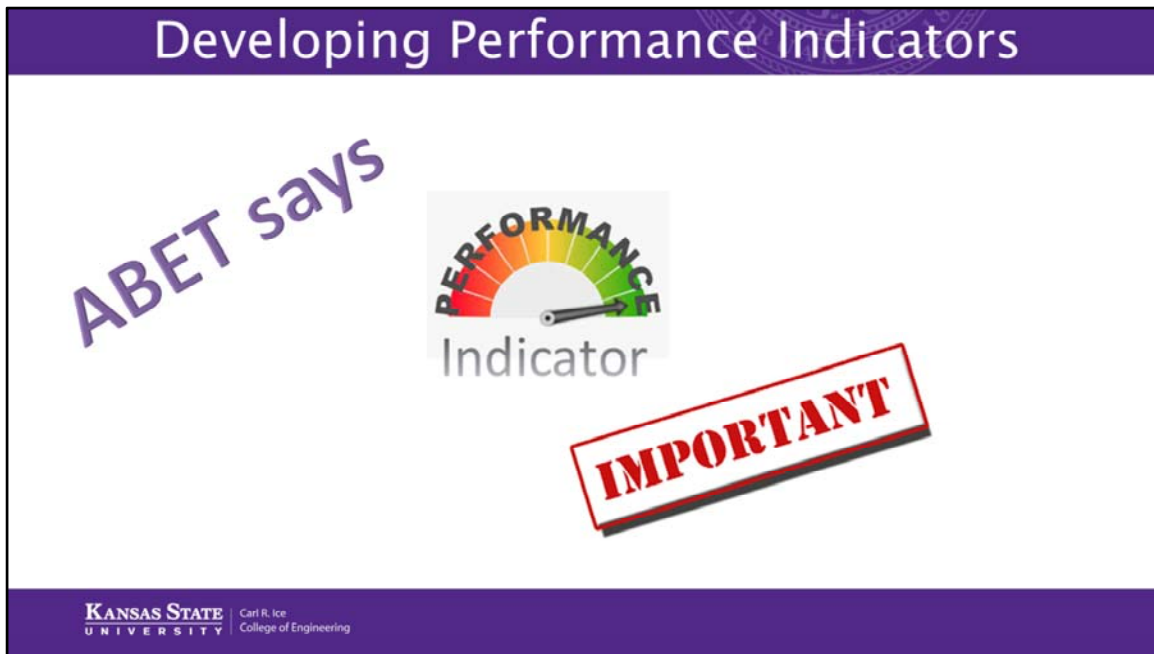
A Performance Indicator is the terminology used in Engineering to refer to the criteria that will be used to assess student achievement of learning. These criteria are what guides the decision as to which assessment task will appropriately allow students to demonstrate their level of learning. They are also used to create an appropriate scoring device that clearly differentiates the quality of learning of the Student Outcome.



Each assessment task (or selected assignment) might be designed for students to demonstrate a single performance indicator, although realistically what we ask students to do often includes multiple performance indicators.

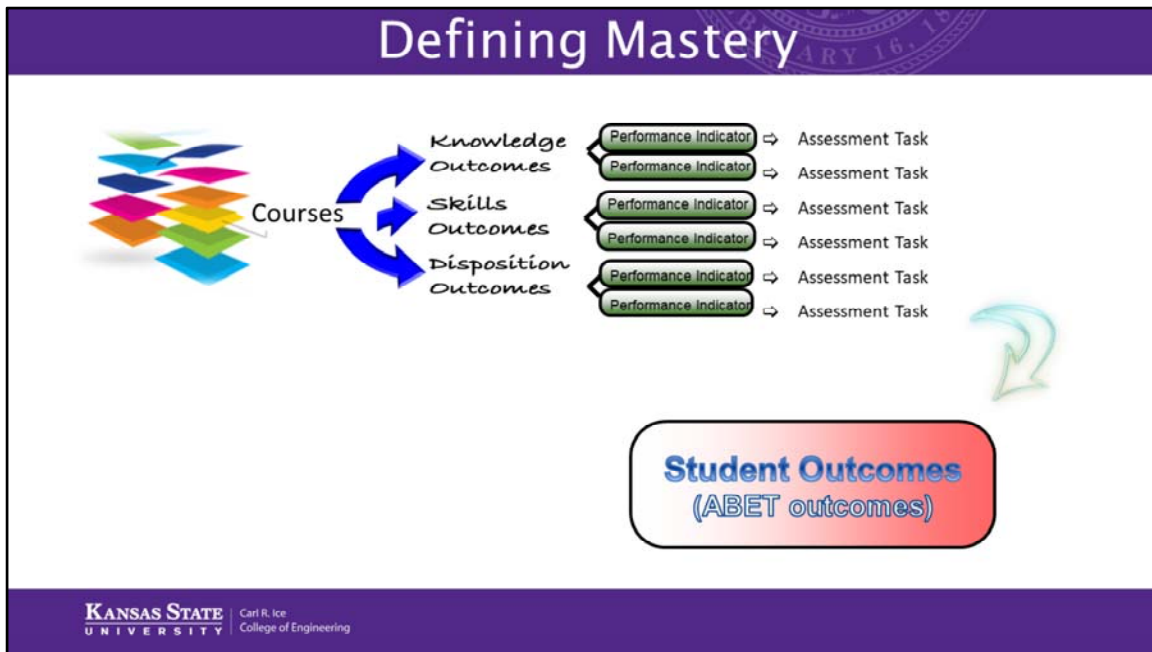
For validity in assessment, it is most important that the measure used to score a performance indicator isolates the indicator score from the other components that may be included in an overall assignment score.

Video #2 - How to define relevant Outcomes and Performance Indicators



As described in the ABET accreditation manual, the development of performance indicators is unquestionably the most critical part of a systematic and meaningful data collection process focused on program assessment and student learning improvement.

Video #2 - How to define relevant Outcomes and Performance Indicators



When aligned with Student Outcomes, the specific skills and knowledge developed throughout your curricular sequence will guide the development of your Performance Indicators. In an assessment processes, what is assessed are the performance indicators, not the Student Outcomes. The scores are used to indicate competency of a component that exists within the Student Outcomes. There are often multiple components that make up a Student Outcome, so it is common that there are more than one performance indicators in complex fields of study.

The reference of mastery refers to the level students are expected to demonstrate of the Performance Indicator.

The expected competency of the Performance Indicator will define the thoughtfully selected assignments (or assessment task). Thoughtfully selecting assignments or assessment tasks provide the opportunity for students to demonstrate their competency. The results assessment data must uniquely represents the quality of learning within your program.

Video #2 - How to define relevant Outcomes and Performance Indicators

Performance Indicators				
Outcome 2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.				
Criteria	Unacceptable	Needs Improvement	Meets Expectations	Exceeds Expectations
2.1. Define design specifications and constraints and Utilize proven design methodologies and practices and available resources to achieve design intent.	Fails to Define design specifications and constraints and Utilize proven design methodologies and practices and available resources to achieve design intent.	Shows limited and less than adequate ability to Define design specifications and constraints and Utilize proven design methodologies and practices and available resources to achieve design intent.	Demonstrates satisfactory ability to Define design specifications and constraints and Utilize proven design methodologies and practices and available resources to achieve design intent.	Understands and applies properly and accurately Define design specifications and constraints and Utilize proven design methodologies and practices and available resources to achieve design intent.

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As described in the ABET manual, it is essential to consider the level of complexity (or rigor) expected of students as they demonstrate their competency in the performance task.

What is defined as Meeting ABET Student Outcomes is the level expected of all programs to be accredited. It is also important to identify the extent to which student exceed the expectations of the Performance Indicator in order to expose specific Performance Indicators that are achieving at high levels. Identifying levels below meeting will also expose areas that possibly require attention to enhance learning.


Video #2 - How to define relevant Outcomes and Performance Indicators

Knowledge-based Student Outcome	
Level	Illustrative Verbs
Knowledge	arrange, define, describe, duplicate, identify, label, list, match, memorize, name, recognize, relate, recall, repeat, reproduce, select,
Comprehension	classify, defend, describe, discuss, distinguish, explain, express, generalize, give examples, indicate, infer, paraphrase, summarize
Application	apply, change, choose, compute, demonstrate, discover, employ, illustrate, interpret, manipulate, modify, operate, practice, predict
Analysis	analyze, appraise, break down, categorize, compare, contrast, criticize, diagram, differentiate, discriminate, distinguish, examine
Synthesis	assemble, categorize, combine, construct, create, design, develop, devise, design, formulate, modify, organize, summarize, synthesize
Evaluation	appraise, argue, assess, choose, conclude, contrast, defend, discriminate, evaluate, explain, judge, justify, interpret, relate, predict

If the Student Outcome demonstrates knowledge attained, understood, and applied, the Performance Indicators must define the rigor of expectations through the verb used as seen in this table copied from the ABET manual.

Video #2 - How to define relevant Outcomes and Performance Indicators

Skill-based Student Outcome	
Level	Illustrative Verbs
Perception	chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects, separates
Set	begins, displays, explains, moves, proceeds, reacts, responds, starts, starts, volunteers
Guided response	assembles, builds, calibrates, constructs, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches
Adaptation	adapts, alters, changes, rearranges, reorganizes, revises, varies
Origination	arranges, combines, composes, constructs, creates, designs, originates


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If the Student Outcome demonstrates a skill, it is essential to assess the skill in action. The performance rigor is defined by the verb used in the Performance Indicators, which in turn defines the assignment or assessment task and scoring measure used to score achievement.

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Disposition-based Student Outcome	
Level	Illustrative Verbs
Receiving	asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, replies, uses
Responding	answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells
Valuing	completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares
Organization	adheres, alters, arranges, combines, compares, defends, explains, generalizes, integrates, modifies, organizes, relates, synthesizes
Characterization	acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, uses, verifies

If the Student Outcome demonstrates a disposition expected of a graduate from your program, the Performance Indicator can often be observed through a performance task or skill-based assignment. Dispositions or qualities of mind / character that are observed and assessed as things like teamwork, application of ethical principles, openness to new idea, professionalism, social responsibility, or similar characteristics. The level of rigor are defined in the verbs similar to what you see on this table.

When defining the rigor of your Performance Indicators, you can find the list of verbs in the ABET manual online or on the Office of Assessment Tool Kit.

Video #2 - How to define relevant Outcomes
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Continue to Next Video #3

Bringing Performance Indicators into a
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The next video will provide guidance to bringing your programs' Performance Indicators into your Canvas course.