

# Learning Objectives:

## A Primer from the National Council of Examiners for Engineering and Surveying's Registered Continuing Education Program

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### Some FAQs About Writing Learning Objectives...

#### 1. What are course *learning objectives*?

An objective is a statement of what learners should know and be able to do after successfully completing a course of instruction.

#### 2. How do we construct *learning objective* statements?

A well-constructed learning objective describes an intended learning outcome and contains three parts: 1) conditions under which the resulting behavior is to be performed, 2) an observable student behavior (such as a capability) that is attained, described in concrete terms, and 3) a criterion that shows how well the student can perform the behavior.

For example, if the learning objective stated: "Given a set of data, the student will be able to compute formulas to correctly balance the system."

Part 1 (conditions) of the sample learning objective are the tools, data or other assistance that will be provided to the student, as in "Given a set of data..."

Part 2 (behavior) of the sample learning objective is an action verb that connotes observable student behavior. In this case, the word "compute" is a clear word showing the learned behavior. Words such as "know," "understand," or "grasp" are insufficient or vague and should not be used in a learning objective.

Part 3 (criterion) of the sample learning objective specifies how well the student must perform the behavior, such as through a degree of accuracy, or a number of correct responses. In our example, the word "correctly" sets the criterion for measurement. The example learning objective could have had further detail, such as a stipulation for "velocity balancing" or "thermal balancing," and the course instruction would include modules on how to interpret data sets and calculate formulas focusing on those outcomes.

3. What is the academic basis for types of learning, learning objectives and instruction activities that reflect this approach?

Professor Benjamin Bloom proposed his taxonomy for learning in 1956, which divided educational objectives into three domains: affective, psychomotor and cognitive. Skills in the affective domain describe the way people react emotionally and their empathy toward others. Affective aspects of learning objectives are focused on awareness and growth in attitudes, emotions and feelings. Skills in the psychomotor domain describe the ability to physically manipulate a tool or instrument, and psychomotor aspects of learning objectives concentrate on development of skills or change in behavior related to physical activities. Skills in the cognitive domain include knowledge, comprehension, analysis, and “thinking through” a topic or challenge.

The following chart lists levels of learning (adapted from Bloom):

| General Learning Levels | Specific Learning Levels | Action Verbs Used for Learning Objectives (partial list)  | Behavioral Outcome for Students    |
|-------------------------|--------------------------|---|------------------------------------|
| Lower                   | Knowledge                | define, memorize, repeat, record, list, recall, name, collect, label, specify, cite, enumerate, recount   | Remember                           |
|                         | Comprehension            | restate, summarize, discuss, describe, recognize, explain, express, identify, locate, report, review, translate   | Understand                         |
|                         | Application              | exhibit, solve, interview, simulate, apply, employ, use, demonstrate, practice, illustrate, calculate   | Operate<br>Apply<br>Experiment     |
|                         | Analysis                 | interpret, classify, arrange, differentiate, group, compare, organize, examine, survey, categorize, dissect, probe, inventory, investigate, discover, distinguish, diagram, inspect | Compare<br>Analyze<br>Distinguish  |
|                         | Synthesis                | compose, plan, prepare, imagine, produce, incorporate, develop, design, originate, formulate, predict, contrive, assemble, construct, synthesize                                    | Systemize<br>Evaluate<br>Formulate |
| Higher                  | Evaluation               | judge, assess, measure, appraise, estimate, evaluate, infer, deduce, compare, score, value, choose, conclude, recommend, select, determine  | Conclude<br>Create<br>Innovate     |

Almost every learning objective is likely to have affective, psychomotor and cognitive aspects, but they

can be classified according to which one of the three is emphasized in the learning activity. For example, if the activity is “Planting a tree so that it survives for at least two years,” the activity is primarily within the psychomotor domain but still requires ecological knowledge and attitudinal behaviors.