Writing Learning Outcomes

Purpose of the learning outcome is to:

1. Learning outcomes can be articulated and assessed at the course level, the program level, and the institutional level.
2. Learning outcomes are concerned with the achievements of the learner rather than the intentions of the teacher.
3. Cognitive Abilities: Learning outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course.
4. Performance/Skill: An outcome should identify what the learner will know and be able to do outside of the classroom with the information that they have learned.

Learning Outcomes Guidelines:

1. A course or program should be described in three to six outcomes statements.
2. When writing outcomes statements, think about how you will assess each one.
3. Outcome statements should be written in language that students (and those outside the field) can understand.
4. Care should be taken to distinguish outcomes from a large set of skills or competencies.
5. Skills and competencies can be mastered by repetition; outcomes are more complex, and speak to the aggregate of skills mastered, concepts understood and knowledge acquired.
6. A good Learning Outcome Statement consists of 3 main components:
   - An **action verb** (ex: explores, identifies, examines, introduces, enhances, promotes awareness of, expands)
   - A *learning statement* that specifies what learning will be demonstrated in the performance
   - A broad statement of the *criterion* or standard for acceptable performance

Examples of Learning Outcomes

- *Understand Newton's three laws of motion.*
  - Understand is not an action work and does not describe what students will be able to do differently as a result of the course.
  - **A better outcome might be:** Apply Newton's three laws of motion to predict motion in three dimensions.

- *Express numbers in scientific notation using the correct number of significant digits.*
  - This statement describes a discrete skill, but not an overarching goal of a class.

- **A better outcome might be:**
  Express and manipulate numbers effectively using the concepts of scientific notation, significant digits, and SI unit measurements.

- *Diagnose failures in the vacuum, mechanical components, and controls of HVAC systems and determine necessary action for repairs.*
  - This statement meets all the criteria

- *Identify unknown bacteria using gram stain, biochemical, and other microbiological methods for identification.*
  - This statement meets all the criteria

- *Diagnose failures in the vacuum, mechanical components, and controls of HVAC systems and determine necessary action for repairs.*
  - This statement meets all the criteria

- *Appreciate the difference between various forms of graphical representation.*
  - This statement is vague and is not measurable.
  - **A better outcome might be:** Using a set of data, construct a time series, scatter-plot, or histogram to show relationships between quantities.

Category	Example and Key Words
Knowledge: Recall data or information.	**Examples**: Recite a policy. Quote prices from memory to a customer. Knows the safety rules. **Key Words**: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.
Comprehension: Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	**Examples**: Rewrites the principles of test writing. Explain in oneís own words the steps for performing a complex task. Translates an equation into a computer spreadsheet. **Key Words**: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives **Examples**, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.
Application: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	**Examples**: Use a manual to calculate an employeeís vacation time. Apply laws of statistics to evaluate the reliability of a written test. **Key Words**: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.

Analysis: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	**Examples**: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training. **Key Words**: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.
Synthesis: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	**Examples**: Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome. **Key Words**: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.
Evaluation: Make judgments about the value of ideas or materials.	**Examples**: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget. **Key Words**: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.