Learning Outcomes
Easy as ABCD
Table of Contents

WHAT A LEARNING OUTCOME IS | ONE ......................................................................................... 2

WHAT A LEARNING OUTCOME IS NOT | TWO ........................................................................... 2

Result vs. Process | A .......................................................................................................................... 2
Specific vs. General | B ......................................................................................................................... 3
Measurable vs. Unmeasurable | C ................................................................................................................ 3
Students vs. Instructors | D ....................................................................................................................... 4

LEARNING OUTCOMES FOR WRITING PERFECT LEARNING OUTCOMES | THREE .............. 4

ABCD LEARNING OUTCOMES | FOUR ................................................................................ 4

Introduction | A .......................................................................................................................................... 4
ABCD is a Memory Aid | B ..................................................................................................................... 4

AUDIENCE, BEHAVIOR, CONDITION, AND DEGREE | FIVE ................................................ 5

REVIEW OF ABCD OBJECTIVES | SIX ................................................................................ 6

Questions to Test Your Knowledge | A .................................................................................................................. 6
Effective Learning Outcomes Checklist | B ......................................................................................... 7
Poor Learning Outcomes Checklist | C ........................................................................................................ 7
Guided Practice Exercises | D ...................................................................................................................... 8
Independent Practice Exercises – Identify the Learning Outcome Parts | E ................................ 9

PERFORMANCE ALIGNMENT AND EVALUATION | SEVEN ................................................... 10

Performance Alignment | A ................................................................................................................. 10
Evaluation | B ......................................................................................................................................... 10

ANSWERS TO SECTION TWO | B. SPECIFIC VS. GENERAL EXERCISE: ...................... 10

THREE DOMAINS OF LEARNING: COGNITIVE, AFFECTIVE, AND PSYCHOMOTOR | EIGHT .............................................................................. 11

Cognitive Domain | A ............................................................................................................................. 11
Affective Domain | B ........................................................................................................................................ 16
Psychomotor Domain | C ....................................................................................................................... 18

GLOSSARY ........................................................................................................................................ 20

REFERENCES ..................................................................................................................................... 29
WHAT A LEARNING OUTCOME IS | ONE

A learning outcome is a collection of words, pictures or diagrams intended to let others know what you intend for your students to achieve.

☐ It is related to intended results rather than the process for achieving those results.

☐ It is specific and measurable, rather than broad and intangible.

☐ It is concerned with what students need to know, or do, or feel not with what teachers need to know, or do, or feel.

WHAT A LEARNING OUTCOME IS NOT | TWO


Result vs. Process | A

A learning outcome is used to communicate the intended result of instruction rather than the process of instruction. For example, when a baker adds yeast to bread dough, that is part of the process of baking. But it isn’t the result of the baking. The bread itself is the result (outcome) of the baking. Lecturing is something an instructor does to help a student learn; it is part of the process of instruction. A lecture is not the purpose of the instruction. The purpose of the instruction is to facilitate learning. When teachers teach (process), they do it in the hope that students will learn (result).

The following are descriptions of instructional processes, rather than intended results (therefore, these types of statements do NOT make good learning outcomes):

☐ Provide a lecture series on the history of slavery.

☐ This course provides extensive practice exercises.

☐ Instructional scaffolding will support novice’s lack of subject matter expertise.

The following are descriptions of instructional outcomes, rather than processes (therefore these types of statements DO make good learning outcomes):

☐ Draw a duck.

☐ Make change without error.

☐ Given a map and latitude and longitude coordinates, place an “X” in the correct locations on the map.

☐ Describe in four paragraphs how you show compassion towards others.
Specific vs. General | B

Another characteristic of an outcome is that it is specific rather than general, broad, or ill-defined. If outcomes are fuzzy, they don’t do us any good and we might as well not bother with them. We want them to be specific, so they will help us to make good instructional decisions. A specific statement indicates what a student must do to meet it. Here are a few examples. Mark the statements that are specific then turn to p.10 to check your responses against the answers.

- Understand logic. ____________
- Know your enemy. ____________
- Thread this needle. ____________
- Reassemble this box. ____________
- Think critically. ____________
- Smile when talking to a customer. ____________

Measurable vs. Unmeasurable | C

An outcome is considered measurable when it describes a tangible result. For example, outcomes that describe intended results you can see or hear are measurable. An outcome that says, “Tie a bow,” is measurable, because we can see bow-tying behavior and therefore assess whether it meets our expectations. On the other hand, a statement that says, “Internalize a growing awareness of confidence,” is not only NOT measurable, it can’t even be called an outcome. What would you measure? What would you watch a student do to decide whether or not the internalizing had occurred to your satisfaction? The statement doesn’t say and therefore it is NOT measurable.

Statements that are NOT measurable:

- Perform well in a role-play situation.
- Develop confidence.
- Students will appreciate the value of outcomes assessments.
- Understand the American criminal justice system.
- Demonstrate ability to resolve personal conflicts and assist others in resolving conflicts.

Statements that ARE measurable:

- Given a previously unseen role play situation, the actor will respond in an improvised manner while demonstrating the attributes of active listening.
- The student will articulate how the election results made her feel in regard to confidence.
- List ways that outcome assessments create value for you as a student.
- Given a previously unseen case study, demonstrate the ability to analyze and respond to pro and con arguments about racial discrimination in the American criminal justice system.
- Assist classmates in resolving conflicts by helping them negotiate agreements.
LEARNING OUTCOMES – April 2017

Students vs. Instructors | D
Learning outcomes describe the student’s performance not the teacher’s performance. Refer to the Results vs. Process section for more details.

LEARNING OUTCOMES FOR WRITING PERFECT LEARNING OUTCOMES | THREE

Given previously unseen, outcome statements, identify each Audience (underline), Behavior (highlight), Condition (circle), and Degree (rectangle) parts with 100% accuracy.

[Far Transfer Outcome] Given any subject area with which you are familiar, write perfect learning outcomes that clearly communicate all the instructional results you think are important for your students to know, to feel, and to do.

ABCD LEARNING OUTCOMES | FOUR

Introduction | A
Learning outcomes tell the world what someone must do or know to demonstrate mastery. They are a vital part of instructional design because they provide the roadmap for designing, delivering, and assessing instruction. The relationship or alignment between learning outcomes, instructional content, and assessments is critical for ensuring instructional effectiveness. (More on Performance Alignment in Section SEVEN)

- Learning outcomes describe the student’s destination.
- The instructional content and activities are the vehicles the teacher designs and the student uses to try to get to her destination.
- The test items (formative and summative) are the ways both the teacher and student verify she is heading towards and arrives where the teacher intended her to go.

ABCD is a Memory Aid | B

[A] stands for Audience……one per outcome
[B] stands for Behavior……one per outcome two, if using an indicator behavior
[C] stands for Condition……one or many
[D] stands for Degree……one or many; quantitative, qualitative, or both
The table below contains the attributes of each A, B, C, D component and provides best case examples to illustrate each concept.

<table>
<thead>
<tr>
<th>ABCD</th>
<th>Attributes</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Audience | The intended learner or end user of the instruction. | The paramedic refresher participant...  
The EMT-B student...  
The prehospital care provider attending this seminar...  
The English major...  
The Engineering student...  
The Business Accounting student... |
| Behavior | The action or the demonstration of skills or knowledge (both overt or covert) in any domain of learning:  
☐ Cognitive  
☐ Affective  
☐ Psychomotor | write a report...  
describe (enumerate) the steps...  
state the title...  
list the variables...  
draw the bird...  
recognize (point to) tactless statements...  
dissect a politician... |
| Condition | What is given or not given?  
What variables exist?  
What is the environment under which the behavior will occur?  
Or, some combination of all these condition attributes. | What is given?  
...by looking at a previously unseen photo...  
...by referring to a manual...  
...given an oxygen wrench, regulator and D tank with oxygen...  
...given the complete works of William Shakespeare...  
...given this environment: 10PM, snowing, temperature 0°C...  
...given a previously unseen matrix of inter-correlations...  
...with only a screwdriver...  
...on a fully functioning wrist computer...  
...in the presence of an irate customer...  
What is not given?  
...without reference to the manual...  
...with no supervision...  
What are the variables?  
...no matter how upset the customer becomes...  
...with a smile...  
Combination:  
...when driving in the city (what is given), under different weather conditions (variable), without a GPS (what is not given) ... |
| Degree | States the standard for acceptable performance (time, accuracy, proportion, quality, etc).  
Describes the level of competence to be reached or surpassed. | ... 9 out of 10 times.  
...within 60 second.  
...with 100% accuracy.  
...all words spelled correctly.  
...without interrupting. |

Table 1: ABCD attributes and examples. Adapted from: Adapted from (Coney, J.)
http://www2.hawaii.edu/~jconey/proj2/ABCDmodel.doc
Questions to Test Your Knowledge | A

1. Who is supposed to exhibit the performance?
   - The Audience member.
   - The Audience is always the Student, never the Teacher.
   - In business training, an Instructional Designer would write an Instructor’s Guide as a way to capture what the Teacher or Facilitator needs to do and know. The Instructor’s Guide is always kept separate from the Student’s Guide.

2. What observable/audible performance is the student supposed to exhibit?
   - The Behavior.
   - A behavior may be overt or covert; if covert describe (e.g., write) a brief, simple indicator behavior behind the covert behavior that will allow you to see/evaluate the desired behavior has occurred.
   - Usually a good rule of thumb is that if there are multiple, direct or covert behaviors, you probably need multiple outcomes (unless an extra behavior is a simple indicator behavior of a single covert behavior)
   - A behavior may be from the Cognitive, Affective, or Psychomotor Domains of learning.
   - For behaviors from the Cognitive Domain, try to have some behaviors that are above the Remember level; Give the students previously unseen instances (this “trick” works whether teaching concepts or procedures).

3. What is described for the student in the learning outcome and provided at the time of the evaluation?
   - A description of the Conditions under which the evaluation will take place.
   - That is, what will be given, what will be variable, what will not be given, etc.
   - Make sure that learning activities provide the student with an opportunity to practice the desired behaviors (results) under these same Conditions
   - That is, provide guided practice, independent practice, and formative evaluation opportunities before summative testing begins.

4. What constitutes a minimum acceptable response?
   - The Degree you specify.
   - The Degree may be time, quality, speed, accuracy, or some combination of these.
Effective Learning Outcomes Checklist | B

☐ Describe ALL instructional results you think are important to accomplish.

☐ Written from the Student’s perspective (i.e., what the Student will do or know)

☐ Observable or audible [either directly for overt actions or through an indicator behavior for covert actions like: discriminating, identifying, solving, recognizing, knowing, recalling, etc.]

☐ Measurable

☐ Unambiguous/clearly written

☐ Specific

☐ Communicates success in behavioral terms/results oriented

☐ Contains all four parts: Audience, Behavior, Condition, and Degree (if it makes sense to include them)

☐ Sometimes there will be no special conditions to include and sometimes it is impractical or useless to include a criterion (as when the criterion is obvious). But the more you say about your desired intent, the better you will communicate.

Poor Learning Outcomes Checklist | C

☐ Written from the Teacher’s perspective (i.e., what the Teacher will do or know).

☐ Uses words like understand, learn, appreciate, feel, believe, have faith in, grasp, internalize, enjoy, know, think, etc.

☐ Includes instructional procedures e.g., Given six lectures on the subject of Poetry.... The argument is what about an instructor who could accomplish the objective with only two lectures or no lectures? And what about the students who need no instruction at all? The objective should mention only outcomes so that those charged with accomplishing them will be free to use their best wisdom and experience in doing so.

☐ Includes requirements to conform to a specific form or format e.g., so many words, specific words, all in one sentence, even to include all components (ABCD) or in what order is NOT important. The function of an outcome is to communicate. If it does, rejoice. If it doesn't, fix it! Work until it communicates one of your instructional intents. Write as many outcomes as you need to describe ALL instructional results you think are important to accomplish.
Guided Practice Exercises | D

(* = indicator behaviors for covert actions)

[A] stands for Audience......one per outcome
[B] stands for Behavior......one per outcome two, if using an indicator behavior
[C] stands for Condition.... one or many
[D] stands for Degree........one or many; quantitative, qualitative, or both

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1. [C]: Given an assortment of EMS equipment to pick from, [A] the paramedic student [B] will identify all of the equipment necessary to perform rapid sequence intubation [D] without error.

2. [A] The EMT-B participant [B] will identify (*write in shorthand) [D] four warning signs of possible child abuse [C] from a family member’s interview that contains five warning signs.

3. [C]: Given a previously unseen sentence, [A] the English 10 student [B] will identify (*underline) the noun and (*circle) the verb [D] without error.

4. [C]: Given a pile of 20 dollar bills, [A] the student [B] can discriminate (*sort out) counterfeit money vs. real money [D] in 5 minutes [D] with 100% accuracy.
Independent Practice Exercises – Identify the Learning Outcome Parts | E

Note: All parts may NOT be present.

1. The engineering student will identify (*circle) transistors on a wiring diagram.

2. Without references, recall (*aloud) at least seven patient characteristics to which the therapist should respond and at least five characteristics to which the therapist should withhold response.

3. Given a list of chemical elements, the chemistry student can recall (*write) the valences of each.

4. Given a list of factors leading to significant historical events, the history student will identify (*underline) at least five factors contributing to the Crash of 1929.

5. List all the variables in the 12 equations on page 16 before the end of class.

6. Draw the bird using only the blue colored pencil.

7. In 500 words or less, describe why fractals are so beautiful.

8. Given a previously unseen learning outcome, the CBU Faculty member will circle the audience component, underline the behavior, highlight the condition, and place a rectangle around the degree without error.

Contact Annie Guetschow at her email address: Aguetsch@cbu.edu for the Practice Problem Answer Sheet for Section SIX E (Above).
PERFORMANCE ALIGNMENT AND EVALUATION | SEVEN

Performance Alignment | A

Performance Alignment is the end state when learning outcomes, instructional activities, and test questions are all united to inform, direct, and assess whether the student is able to master the learning outcomes as you intended. (“Mastery of learning outcomes” assumes a criterion-referenced test interpretation is intended).

No Alignment? If you cannot clearly see how the instructional activities and test questions you have designed align with your learning outcomes, then you must decide the following:

□ Should you rewrite the learning outcomes to meet the instructional activities and test questions?

□ Should you modify, enhance, remove, or create new instructional activities and test questions to meet the learning outcomes as stated?

Evaluation | B

Formative Evaluation (assessing as you are creating) is used during each part of the ADDIE (Analyze, Design, Develop, Implement, Evaluate) Instructional Design process to ensure that performance alignment is achieved. It is also useful in analyzing student learning and achievements and teacher effectiveness.

□ Pilot instructional activities and test content, if possible.

□ Are any practice exercises causing confusion?

□ Are any test questions causing confusion?

□ What does a test score even mean?  (See Types of Tests in the Glossary)

□ Making adjustments in early design stages is preferred and easier (on students and on you) than getting to implementation (teaching) and discovering that the activities do not help students learn or that the test questions are not separating test takers (for norm-referenced tests) or not measuring content mastery (for criterion-referenced tests), as intended.

Summative Evaluation (assessing at the end of instruction) measures the level of success or proficiency that has been obtained, usually by comparing it against some standard or benchmark (e.g., learning outcomes). Any scores used to create a student’s final grade is considered to be: Summative Evaluation. 

Note: “All assessments can be summative (i.e., have the potential to serve a summative function), but only some have the additional capability of serving formative functions” (Scriven, 1967).

ANSWERS TO SECTION TWO | B. SPECIFIC VS. GENERAL EXERCISE:

Understand logic.                  __________   Is Specific
Know your enemy.                  __________   Is Specific
Thread this needle.                __________   Is Specific
Reassemble this box.               __________   Is Specific
Think critically.                  __________   Is Specific
Smile when talking to a customer.  __________   Is Specific
Bloom’s Taxonomy is a classification system developed in 1956 by education psychologist Benjamin Bloom to categorize intellectual skills and behavior important to learning. Bloom identified six cognitive levels: knowledge, comprehension, application, analysis, synthesis, and evaluation, with sophistication growing from basic knowledge-recall skills to the highest level, evaluation. Originally developed as a method of classifying educational goals for student performance evaluation, Bloom's Taxonomy has been revised over the years and is still utilized in education today. The original intent in creating the taxonomy was to focus on three major domains of learning: cognitive, affective, and psychomotor.

The cognitive domain covered “the recall or recognition of knowledge and the development of intellectual abilities and skills;” the affective domain covered “changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment;” and the psychomotor domain encompassed “the manipulative or motor-skill area” (Coffey, 2016, n.p.).

**Cognitive Domain**

- Focuses on thinking skills.
- Bloom’s Taxonomy (1956) is a continuum of increasing cognitive complexity—from Knowledge (the lowest level) to Evaluation (formerly thought of as the most complex level). The original taxonomy had six levels and was described using nouns (shown in parenthesis in the following table). (See Table 2.)
- A revision of Bloom’s Taxonomy in 2001 retained the SAME six levels but they were re-described using verbs and gerunds (instead of nouns) and the level called Create (formerly known as Synthesis) became accepted as the highest (most complex) level in the updated taxonomy. Essentially, Create and Evaluate (formerly known as Evaluation) switched places. (See Tables 2 and 3.)
- Also in 2001, a Knowledge Dimension was added to represent the range and types of knowledge a student is expected to acquire or construct. The Knowledge Dimension is depicted as a continuum that ranges from concrete (factual) knowledge, to Conceptual knowledge, Procedural knowledge, and finally to abstract Metacognitive knowledge. (See Table 4)
- Iowa State University’s Center for Excellence in Learning and Teaching has some wonderful resources that provide an in-depth look at Bloom’s Revised Taxonomy (2001). There is an interactive Flash-based model and there are also a Responsive Design Version and a Text-only version of the same materials: [http://www.celt.iastate.edu/teaching/effective-teaching-practices/revised-blooms-taxonomy/revised-blooms-taxonomy-flash-version](http://www.celt.iastate.edu/teaching/effective-teaching-practices/revised-blooms-taxonomy/revised-blooms-taxonomy-flash-version). (See Figure 1)
<table>
<thead>
<tr>
<th>COGNITIVE DOMAIN</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Create</strong> (formerly, <strong>Synthesis</strong>)</td>
<td>Creates a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.</td>
<td>Write a company operations or process manual. Design a machine to perform a specific task. Integrate training from several sources to solve a problem. Create a process. Write an essay.</td>
</tr>
<tr>
<td><strong>Evaluate</strong> (formerly, <strong>Evaluation</strong>)</td>
<td>Make judgments about the value of ideas or materials.</td>
<td>Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.</td>
</tr>
<tr>
<td><strong>Analyze</strong> (formerly, <strong>Analysis</strong>)</td>
<td>Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.</td>
<td>Troubleshoot a piece of equipment by using logical deduction. Recognize (circle) logical fallacies in reasoning. Gather information from a department and select the required tasks for training. Question what happened. Run a test.</td>
</tr>
<tr>
<td><strong>Apply</strong> (formerly, <strong>Application</strong>)</td>
<td>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.</td>
<td>Calculate an employee’s vacation time. Use phi to calculate and provide evidence of a criterion-referenced test’s reliability using the two-test administration technique.</td>
</tr>
<tr>
<td><strong>Understand</strong> (Comprehension)</td>
<td>Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one’s own words.</td>
<td>Rewrite the principles of test writing. Explain in one’s own words the steps for performing a complex task. Translate (write out) an equation in a computer spreadsheet. Create an analogy. Tell a story in your own words.</td>
</tr>
<tr>
<td><strong>Remember</strong> (Knowledge)</td>
<td>Recall or retrieve previous learned information.</td>
<td>Recite a policy. Quote prices from memory to a customer. Recite the safety rules.</td>
</tr>
</tbody>
</table>

Table 2: Adapted from Bloom’s Revised and Original Cognitive Taxonomies (Clark, 2004, n.p.)
Table 3 (Above) The Cognitive Processes Dimension – categories, cognitive processes (and alternative names). Table adapted by Iowa State University from Anderson and Krathwohl, 2001, pp. 67–68.

Table 4: (Above) The Knowledge Dimension Types and Sub-types. Table adapted from Anderson and Krathwohl, 2001, p. 46.)
Figure 1: (above) Iowa State University’s Revised Bloom’s Taxonomy [Flash Version]. Retrieved from http://www.celt.iastate.edu/teaching/effective-teaching-practices/revised-blooms-taxonomy/revised-blooms-taxonomy-flash-version.
Figure 2: (above) St. Edwards Center for Teaching Excellence. (Yellow italics = Revised Taxonomy Titles)
**Affective Domain | B**

- Emphasizes the student’s general patterns of adjustment (personal, social, emotional)
- Composed of two different types of behaviors: reflexive (attitudes) and voluntary reactions and actions (values) (See Table 5).

<table>
<thead>
<tr>
<th>AFFECTIVE DOMAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizes values</td>
</tr>
<tr>
<td>Verbs: acts, discriminates, displays, influences, modifies, performs, qualifies, questions, revises, serves, solves, verifies.</td>
</tr>
<tr>
<td>Has a value system that controls his or her behaviors? The behavior is pervasive, consistent, predictable, and most important characteristic of the learner.</td>
</tr>
<tr>
<td><strong>Examples:</strong> Show self-reliance (problem-solve) when working independently. Cooperate in group activities. Use an objective approach (gather evidence) when problem solving. Display (in spoken and written communications) a professional commitment to ethical practice on a daily basis. Revise (articulate) how your judgment and behaviors have changed in light of new evidence. Show (listen) that you value people for what they do, not how they look.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>HIGHEST (MOST COMPLEX) AFFECTIVE DOMAIN LEVEL</th>
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</thead>
<tbody>
<tr>
<td>Organization</td>
</tr>
<tr>
<td>Verbs: compares, relates, synthesizes</td>
</tr>
<tr>
<td>Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system. The emphasis is on comparing, relating, and synthesizing values.</td>
</tr>
<tr>
<td><strong>Examples:</strong> Articulate how to balance freedom and responsibility. Describe (write) how professional ethical standards were used to resolve a conflict. Create (write) a life plan in harmony with abilities, interests, and beliefs. Prioritize time effectively (write a schedule) to meet the needs of the organization, family, and self.</td>
</tr>
</tbody>
</table>

| Valuing |
| Verbs: appreciates, cherish, treasure, demonstrates, initiates, invites, joins, justifies, proposes, respect, shares |
| The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment. Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learner’s overt behavior and are often identifiable. |
| **Examples:** Demonstrate belief in the democratic process (register to vote). Show sensitivity (articulate) how you value individual and cultural differences. Propose a plan to improve the lives of children in poverty and follow through with taking action (perform step one of your plan). Inform management on matters that one feels strongly about. |

*Table continues on next page…*
| **Responds to Phenomena** | **Verbs:** answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, presents, tells. | **Active participation on the part of the learners.**
- Attend and react to a particular phenomenon.
- Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).**

**Examples:** Participate in class discussions. Give a presentation. Question new ideals, concepts, models, etc. in order to fully understand them. Know the safety rules and practice them. Repeat the name of newly introduced people in a deliberate effort to remember their names. |

| **Receives Phenomena** | **Verbs:** acknowledges, asks, [appears] attentive, [is] courteous, [is] dutiful, follows, gives [appropriate responses], listens. | **Awareness, willingness to hear, selected attention.**

**Examples:** Listen to others with respect. Smile when introduced to a new person. Pay attention (without interruption) to a colleague whose opinion is different from yours. Respond thoughtfully when someone asks you a question. |

Table 5: Adapted from Bloom’s Taxonomy: The Affective Domain (Clark, 2004, n.p.).
### Psychomotor Domain

- **Origination**
  - Verbs: arranges, builds, combines, composes, constructs, creates, designs, initiates, makes, originates.
  - Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.
  - **Examples:** Teach yourself one-handed, pencil twirling. Create (choreograph) a new gymnastic routine.

- **Adaptation**
  - Verbs: adapts, alters, changes, rearranges, reorganizes, revises, varies
  - Skills are well developed and the individual can modify movement patterns to fit special requirements.
  - **Examples:** Dance completely in the present moment, ready for any change, resistance, suggestion or different interpretation of your lead. Perform a task with a machine that it was not originally intended to do (make sure the machine is not damaged and there is no danger).

- **Complex Overt Response (Expert)**
  - Verbs: assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
  - The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce.
  - **Examples:** Maneuver a car into a tight parallel parking spot. Operate a computer quickly and accurately. Display competence while playing the piano.

- **Mechanism (basic proficiency)**
  - Verbs: assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
  - This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.
  - **Examples:** Repair a leaking faucet. Drive a car. Draw a golf ball's likely trajectory when it is hit with a nine iron.

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*Table continues on next page...*
| Guided Response | The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.  
Examples: Solve a mathematical equation as demonstrated. Follow instructions to build a model. Respond to hand-signals of instructor while learning to operate a forklift. |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Verbs: copies, traces, follows, react, reproduce, responds</td>
<td></td>
</tr>
</tbody>
</table>
| Set | Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person’s response to different situations (sometimes called mindsets).  
**Examples**: Move into the ready position on the starting block to begin the race. Position your feet shoulder width apart. Reach for the baton. *NOTE*: This subdivision of the Psychomotor domain is closely related to the “Responding to phenomena” subdivision of the Affective domain. |
| Verbs: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers. | |
| Perception | The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.  
Examples: Identify (notate) non-verbal communication cues. Notice (say) when the water begins to boil. Adjust the height of the forks on a forklift by comparing where the forks are in relation to the pallet. |
| Verbs: chooses, describes, detects, differentiates, distinguishes, identifies. | |
| **LOWEST (LEAST COMPLEX) PSYCHOMOTOR DOMAIN LEVEL** | |

Table 6: Adapted from Bloom’s Taxonomy: The Psychomotor Domain (Clark, 2004, n.p.).
<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADDIE Instructional Design Model</strong></td>
<td>ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation. ADDIE first appeared in 1975. It was created by the Center for Educational Technology at Florida State University for the U.S. Army and then was quickly adapted by all the U.S. Armed Forces.</td>
<td>Clark, D.R. (2004). <a href="http://www.nwlink.com/~donclark/index.html">http://www.nwlink.com/~donclark/index.html</a></td>
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| **Affective Domain**        | The Affective Domain is one of three domains in Bloom's Taxonomy, with the other two being the cognitive and psychomotor (Bloom, et al., 1956). The Affective Domain (Krathwohl, Bloom, Masia, 1973) includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The five major categories are listed from the simplest behavior (found on bottom of bulleted list) to the most complex:  
  - Internalizes values (most complex)  
  - Organization  
  - Valuing  
  - Responds to Phenomena  
  - Receives Phenomena (least complex)  
| **Audience**                | Audience is the “A” part of the A, B, C, D Learning Outcomes model. The Audience is the intended learner or end user of the instruction.  
| **Behavior**                | Behavior is the “B” part of the A, B, C, D Learning Outcomes model. The Behavior is the action or demonstration of skills or knowledge (both overt or covert) by an audience member in any domain of learning:  
  - Cognitive  
  - Affective  
  - Psychomotor  
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<td>Bloom’s Taxonomy</td>
<td>Bloom’s Taxonomy was created in 1948 by psychologist Benjamin Bloom and several colleagues. Originally developed as a method of classifying educational goals for student performance evaluation, Bloom’s Taxonomy has been revised over the years and is still utilized in education today. The original intent in creating the taxonomy was to focus on three major domains of learning: cognitive, affective, and psychomotor. The cognitive domain covered “the recall or recognition of knowledge and the development of intellectual abilities and skills”; the affective domain covered “changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment”; and the psychomotor domain encompassed “the manipulative or motor-skill area.” See also: Cognitive Domain, Affective Domain, and Psychomotor Domain.</td>
<td>Coffey, H. (2016). Bloom’s Taxonomy. Retrieved from: <a href="http://www.learnnc.org/lp/pages/4719">http://www.learnnc.org/lp/pages/4719</a>.</td>
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<td>Cognitive Domain</td>
<td>The cognitive domain involves knowledge and the development of intellectual skills (Bloom, 1956). This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories of cognitive processes, starting from the simplest to the most complex:   <img src="image" alt="Diagram of Bloom’s Taxonomy" />   In the 1990s, one of Bloom’s students, Lorin Anderson, revised the original taxonomy. In the amended version of Bloom’s Taxonomy, the names of the major cognitive process categories were changed to indicate action because thinking implies active engagements. Instead of listing knowledge as a part of the taxonomy, the category is divided into different types of knowledge: factual, conceptual, procedural, and metacognitive. [See Table 4 and Figure 1 in this document]. This newer taxonomy also moves the evaluation stage down a level and the highest element becomes “creating.” See also: Affective Domain, Bloom’s Taxonomy, and Psychomotor Domain.</td>
<td>Coffey, H. (2016). Bloom’s Taxonomy. Retrieved from: <a href="http://www.learnnc.org/lp/pages/4719">http://www.learnnc.org/lp/pages/4719</a>.</td>
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<td><strong>Condition</strong></td>
<td>Condition is the “C” part of the A, B, C, D Learning Outcomes model. The Condition describes the circumstances under which the behavior will occur – especially during guided practice, independent practice, and evaluation. Condition attributes may include a description of: • What is given or not given • What variables exist • What the environment, under which the behavior will occur, is like • Or, some combination of all these attributes See also: Variables.</td>
<td>Coney, J. (2016). The A\B\C model for writing objectives. Retrieved from: <a href="http://www.mdfaconline.org/presentations/A%5CB%5CCmodel.doc">www.mdfaconline.org/presentations/A\B\Cmodel.doc</a></td>
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<td><strong>Covert Behaviors</strong></td>
<td>A Covert Behavior is an invisible intellectual ability or skill that is not a directly observable or audible action, i.e., it is a cognitive, internal or mental skill/ability and you cannot match test items to something that is invisible. For example, these are covert behaviors (not exhaustive): • Discriminate • Identify • Solve • Recognize • Know • Recall • Describe To make a Covert Behavior observable, describe (write) a brief indicator behavior behind the covert behavior using parentheses, that will allow you to see/hear/evaluate the desired behavior has occurred. Usually a good rule of thumb is that if there are multiple, overt or covert behaviors in your learning outcome, you probably need to break it up into multiple learning outcomes (unless the extra behavior is a simple indicator behavior that makes a single covert behavior observable or audible). See also: Behavior and Learning Outcome.</td>
<td>Mager, R. F. (1997). Preparing instructional objectives: A critical tool in the development of effective instruction (3rd ed.). Atlanta, GA: Center for Effective Performance.</td>
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<td><strong>Criterion-referenced Tests</strong></td>
<td>“In contrast to NRTs [Norm-Referenced Tests], the criterion-referenced test (CRT) defines the performance of each test taker without regard to the performance of others. Unlike the NRT, where success is defined in terms of being ahead of someone else, the CRT interpretation defines success as being able to perform a specific task or set of competencies. There is no limit to the number of people who can succeed on a criterion-referenced test, unlike the NRT…. criterion-referenced tests should be used whenever you are concerned with assessing a person’s ability to demonstrate a specific skill.” (p. 28-29).</td>
<td>Shrock, S. A., &amp; Coscarelli, W. C. C. (2007). Criterion-referenced test development: Technical and legal guidelines for corporate training. San Francisco, CA: Pfeiffer</td>
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<td><strong>Degree</strong></td>
<td>Degree is the “D” part of the A, B, C, D Learning Outcomes model. The Degree designates the standard for acceptable performance (time, accuracy, proportion, quality, etc.) and indicates the level of competence to be reached or surpassed.</td>
<td>Coney, J. (2016). The A8CD model for writing objectives. Retrieved from: <a href="http://www.mdfaconline.org/presentations/A8CDmodel.doc">www.mdfaconline.org/presentations/A8CDmodel.doc</a></td>
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<td><strong>Demonstrations</strong></td>
<td>Demonstrations usually start out by identifying the desired learning outcome. They involve teaching by explaining, modeling, or showing examples that clarify/reveal the criterial attributes of a concept or the procedural steps in a procedural lesson. For concepts, it includes providing examples and near-in, non-examples that clarify the concept by revealing critical, noncritical, and shared attributes. For procedures, it includes providing a step-by-step process, method, or approach for the students to use and then modeling using those steps to solve real problems. It includes asking questions, providing a written, bulletproof definition or rule that contains the concept’s criterial attributes or the procedural steps, and having students engage with the content in a meaningful way that mirrors the conditions spelled out in your learning outcome.</td>
<td>Hollingsworth, J., &amp; Ybarra, S. (2009). Explicit direct instruction (EDI) : The power of the well-crafted, well-taught lesson. Thousand Oaks, Calif.: Corwiess. <a href="http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781452206981">http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781452206981</a></td>
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<td><strong>Formative Evaluation</strong></td>
<td>Formative evaluation (evaluating while creating) is a reiterative method for judging the worth of a program, a chapter of instruction, a lesson, or even a student’s ability to comprehend lesson content while the program activities are in progress. It can be conducted during any phase of the ADDIE process (stands for: Analyze, Design, Develop, Implement, and Evaluate). Designers, learners, instructors, and managers monitor how well the instructional goals and outcomes are being met. The main purpose is to catch deficiencies ASAP so that learners are able to master the required skills and knowledge. Formative Evaluation during the “Implementation” part of the ADDIE process includes those judgments and adjustments you make “on the fly,” while teaching, when you can see that your students are just not “getting it.” Formative evaluation during the “Design” and “Evaluation” parts of the ADDIE process compare instructional activities (including demonstrations, guided practice, and independent practice activities) and test questions to your written learning outcomes to determine if the instructional activities actually enable and assessments actually evaluate whether students are able to meet/master the learning outcomes. Formative Evaluation during the “Analyze” phase may be to validate whether the planned content adequately covers the domain, as intended.</td>
<td>Clark, D.R. (2004). <a href="http://www.nwlink.com/~donclark/index.html">http://www.nwlink.com/~donclark/index.html</a></td>
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| Guided Practice             | Guided Practice is part of a lesson where the instructor works with students to rehearse lesson content and correct misconceptions. It is applied Formative Evaluation in action. Examples Using the Four Knowledge Dimension Types outlined in Table 4:  

**Guided Practice for a Factual Lesson**  
Work with students to drill terminology, knowledge of specific details, or elements that students are expected to remember.  

**Guided Practice for a Conceptual Lesson**  
Work with students to show them previously unseen instances of the concept (First, best case examples, then near-in non-examples) and have them classify the instances as part of or not part of the concept, while checking to ensure they remember the attributes of the concept.  

**Guided Practice for a Procedural Lesson**  
Work problems with students at the same time, step-by-step, while checking that they execute each step correctly.  

**Guided Practice for a Metacognitive Lesson**  
Work with students to check their ability to self-monitor and adapt to changing circumstances, to set goals and plan to meet them, to practice reflecting on their ability to self-regulate. It is also teaching students that their ability to learn is a skill that can be developed over time rather than a fixed trait.  

See also: Demonstration and Independent Practice.  
| Independent Practice       | Independent Practice is having students SUCCESSFULLY practice exactly what they were just taught under the same conditions that will constrain them when they are evaluated. Independent Practice is **not** for students to teach themselves. Its purpose is to provide repetitions to transfer the newly taught information into long-term memory so students will remember, and to develop fluidity and automaticity so students can work quickly and accurately.  

Independent Practice will only improve learning if students already know how to complete the problems, identify the concepts, etc.  

Independent Practice can be an assignment given to students to work on in class or it can be a homework assignment. It can even be small group work where groups of students practice and apply the concepts and skills they were just taught, that they now know how to do, without the teacher’s assistance.  

See also: Demonstration and Guided Practice.  
| Instructional Process      | What an instructor does to help a student learn.  

See also: Instructional Result.  
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<td>Indicator Behavior</td>
<td>An Indicator Behavior is one that will tell us directly if a covert behavior is happening. It is simple, direct, and always something that every student (generally) knows how to do. For example, these are indicator behaviors (not exhaustive): Circle • Dissect (arguably, not everyone knows how to dissect) • Draw • Drive (arguably, not everyone knows how to drive) • Paint • Point to • Say • Underline • Write See also Behavior and Covert Behavior.</td>
<td>Mager, R. F. (1997). Preparing instructional objectives: A critical tool in the development of effective instruction (3rd ed.). Atlanta, GA: Center for Effective Performance.</td>
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<td>Learning Outcome</td>
<td>A collection of words, pictures, or diagrams intended to let others know what you intend for your students to achieve. It is related to intended results rather than the process for achieving those results. It is specific and measurable, rather than broad and intangible. It is concerned with what the students need to know, or do, or feel, not with what the teacher needs to know or do, or feel. The A, B, C, D Model is a memory aid to help you think through the important parts of a good learning outcome. But, you do not have to conform to this specific format or even include all these components (A, B, C, D) or write them in this order. The purpose of a learning outcome is to communicate. If it does, rejoice. If it doesn’t, fix it. Make sure each learning outcome communicates a single desired instructional results. Write as many learning outcomes as you need to describe ALL instructional results you think are important to accomplish. Usually a good rule of thumb is that if there are multiple, overt or covert behaviors in your learning outcome, you probably need to break it up into multiple learning outcomes (unless the extra behavior is a simple indicator behavior that makes a single covert behavior observable or audible). “Student Learning Outcomes typically describe results of teaching or out-of-class experiences that facilitate learning.”</td>
<td>Mager, R. F. (1997). Preparing instructional objectives: A critical tool in the development of effective instruction (3rd ed.). Atlanta, GA: Center for Effective Performance. Bresciani, M. J. (2006). Outcomes-based academic and co-curricular program review: A compilation of institutional good practices (1st ed.). Sterling, Va.: Stylus. <a href="http://catdir.loc.gov/catdir/toc/ecip0610/2006009490.html">http://catdir.loc.gov/catdir/toc/ecip0610/2006009490.html</a> (p. 30)</td>
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<td><strong>Measurable</strong></td>
<td>A learning outcome is considered measurable when it describes a tangible result. For example, a learning outcome that describes an intended result that you can see or hear is measurable.</td>
<td>Mager, R. F. (1997). Preparing instructional objectives: A critical tool in the development of effective instruction (3rd ed.). Atlanta, GA: Center for Effective Performance.</td>
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<td>See also Behavior, Overt Behavior, and Covert Behavior.</td>
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<td>For example, these are overt behaviors (not exhaustive):</td>
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<td>• Draw</td>
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<td>• State</td>
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<td>• Circle</td>
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<td>See also: Behavior, Covert Behavior, and Indicator Behavior.</td>
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<td><strong>Norm-referenced Tests</strong></td>
<td>A norm-referenced test (NRT) interpretation defines the performance of test-takers in relation to one another. If you wanted to rank people to select the top performers, your ideal frequency distribution would look like… [a bell curve or the normal distribution].</td>
<td>Shrock, S. A., &amp; Coscarelli, W. C. C. (2007). Criterion-referenced test development: Technical and legal guidelines for corporate training. San Francisco, CA: Pfeiffer</td>
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<td>See also: Criterion-referenced Tests and Types of Tests.</td>
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<td><strong>Performance Alignment</strong></td>
<td>The end state that occurs when learning outcomes, instructional activities, (including demonstrations, guided practice, and independent practice activities) and test questions are all coordinated to inform, direct, and assess whether the student is able to master the learning outcomes as you intended. (Assuming a criterion-referenced test interpretation is intended).</td>
<td><a href="https://www.cmu.edu/teaching/assessment/basics/alignment.html">https://www.cmu.edu/teaching/assessment/basics/alignment.html</a></td>
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<td><a href="https://www.cmu.edu/teaching/assessment/basics/alignment.html">https://www.cmu.edu/teaching/assessment/basics/alignment.html</a></td>
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<td>“The SACS regional accreditor requires that ‘the institution identifies expected outcomes for its educational programs and its administrative and educational support services; assesses whether it achieves these outcomes; and provides evidence of improvement based on analysis of those results’” (SACS, 2004).” (p. 30)</td>
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<td>See also: Learning Outcome.</td>
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| **Psychomotor Domain** | The psychomotor domain (Simpson, 1972) includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution. Thus, psychomotor skills rage from manual tasks, such as digging a ditch or washing a car, to more complex tasks, such as operating a complex piece of machinery or dancing. The seven major categories are listed from the simplest behavior (found on bottom of bulleted list) to the most complex:  
- Origination (most complex)  
- Adaptation  
- Complex Overt Response (Expert)  
- Mechanism (Basic Proficiency)  
- Guided Response  
- Set  
| | See also: Affective Domain, Bloom’s Taxonomy, and Cognitive Domain. | |
| **Summative Evaluation** | Summative Evaluation (evaluating after instruction) is a method of assessing whether or not a student has achieved the learning outcome. Per Carnegie Melon, “The goal of summative assessment is to measure the level of success or proficiency that has been obtained at the end of an instructional unit, by comparing it against some standard or benchmark [e.g., your learning outcome]. [Other] examples:  
- Assigning a grade to a final exam  
- Critique of a Senior recital  
- University Faculty Course Evaluations”  

**Note:** All assessments can be summative (i.e., have the potential to serve a summative function), but only some have the additional capability of serving formative functions. - Scriven (1967) | Carnegie Melon’s Eberly Center for Teaching Excellence http://www.cmu.edu/teaching/assessment/howto/basics/formative-summative.html |
<p>| | Various instruments may be used to collect the data, including: questionnaires, surveys, interviews, observations, project work, and testing. The model or methodology used to gather the data should be a specified step-by-step procedure. It should be carefully designed and executed to ensure the data is accurate and valid. | Clark, D.R. (2004). <a href="http://www.nwlink.com/~donclark/index.html">http://www.nwlink.com/~donclark/index.html</a> |</p>
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<td><strong>Types of Tests</strong></td>
<td>“There are two major philosophical differences in the interpretation of test scores: criterion-referenced versus norm-referenced interpretation. While some tests can be interpreted both ways, this is usually not the case. Tests should be constructed in order to facilitate either their criterion-referenced or their norm-referenced interpretation. Basically, norm-referenced tests need to be composed of items that will separate the scores of test-takers from one another, while criterion-referenced tests need to be composed of items based on specific objectives [read outcomes], or competency statements.” (p. 25) See also: Criterion-referenced Tests and Norm-referenced Tests.</td>
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<td><strong>Variable</strong></td>
<td>In the context of writing learning outcomes, a “variable” is described as an attribute of the concept Condition. As such, use it when you want to emphasize a changeable quantity or quality within the condition under which the learning will occur that is of significant enough importance to write it down. For example: Given specimens of trees, including twigs in the winter state as well as with leaves, Botany students will identify tree genus and species with 100% accuracy. See also, Condition.</td>
<td>Guetschow, A. (2017).</td>
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REFERENCES


Carnegie Melon's Eberly Center for Teaching Excellence:
http://www.cmu.edu/teaching/assessment/howto/basics/formative-summative.html


