The Three domains of learning: Cognitive, Affective, and Psychomotor/Kinesthetic

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What are the differences between the cognitive, affective, and psychomotor taxonomies?

There are three main domains of learning and all teachers should know about them and use them to construct lessons. These domains are cognitive (thinking), affective (emotion/feeling), and psychomotor (physical/kinesthetic). Each domain on this page has a taxonomy associated with it. Taxonomy is simply a word for a classification. All of the taxonomies below are arranged so that they proceed from the simplest to more complex levels.

The domains of learning were first developed and described between 1956-1972. The ones discussed here are usually attributed to their primary author, even though the actual development may have had more authors in its formal, complete citation (see full citations below). Some web references attribute all of the domains to Benjamin Bloom which is simply not true. While Bloom was involved in describing both the cognitive and the affective domains, he appeared as first author on the cognitive domain. As a result this bore his name for years and was commonly known among educators as *Bloom's Taxonomy* even though his colleague David Krathwohl also a partner on the 1956 publication. When publishing the description of the affective domain in 1964 Krathwohl was named as first author, but Bloom also worked on developing this work. Krathwohl's involvement in the development of the cognitive domain will be become important when you look at the authors of the 2001 revisions to this taxonomy.

- Benjamin Bloom (Cognitive Domain),
- David Krathwohl (Affective Domain), and
- Anita Harrow (Psychomotor Domain).

Many veteran teachers are totally unaware that the cognitive/thinking domain had major revisions in 2000/01. Here I have included both the original cognitive domain, and I have also attached it to the newly revised version so that users can see the differences. The **newer version of Bloom's Taxonomy** of Learning has a number of added features that can be very useful to educators as they try to construct optimal learning experiences. I hope readers will explore the differences and additions through the links provided on this page.

Also, when possible, I believe teachers should attempt to construct more **holistic lessons** by using **all 3 domains** in constructing learning tasks. This diversity helps to create more well-rounded learning experiences and meets a number of learning styles and learning modalities. Using more diversity in delivering lessons also helps students create more neural networks and pathways thus aiding recall.

The Original Cognitive or Thinking Domain -

Based on the 1956 work, *The Handbook I-Cognitive Domain*, behavioral objectives that dealt with cognition could be divided into subsets. These subsets were arranged into a taxonomy and listed according to the cognitive difficulty -- simpler to more complex forms. In 2000-01 revisions to the

cognitive taxonomy were spearheaded by one of Bloom's former students, Lorin Anderson, and Bloom's original partner in defining and publishing the cognitive domain, David Krathwohl. Please see my page entitled **Anderson and Krathwohl - Bloom's Taxonomy Revised** for further details.

Remember while it is good to understand the history of the older version of this domain, **the newer version has a number of strong advantages that make it a better choice for planning instruction today.** One of the major changes that occurred between the old and the newer updated version is that **the two highest forms of cognition have been reversed.** In the older version the listing from simple to most complex functions was ordered as *knowledge, comprehension, application, analysis, synthesis, and evaluation*. In the newer version the steps change to verbs and are arranged as *knowing, understanding, applying, analyzing, evaluating*, and the last and highest function*, creating.*

Taxonomies of the Cognitive Domain

<table>
<tr><th>Bloom's Taxonomy 1956</th><th>Anderson and Krathwohl's Taxonomy 2001</th></tr>
<tr><td>1. Knowledge: Remembering or retrieving previously learned material. Examples of verbs that relate to this function are:
<table><tr><td>know identify relate list</td><td>define recall memorize repeat</td><td>record name recognize acquire</td></tr></table></td><td>1. Remembering: Recognizing or recalling knowledge from memory. Remembering is when memory is used to produce or retrieve definitions, facts, or lists, or to recite previously learned information.</td></tr>
<tr><td>2. Comprehension: The ability to grasp or construct meaning from material. Examples of verbs that relate to this function are:
<table><tr><td>restate locate report recognize explain express</td><td>identify discuss describe discuss review infer</td><td>illustrate interpret draw represent differentiate conclude</td></tr></table></td><td>2. Understanding: Constructing meaning from different types of functions be they written or graphic messages, or activities like interpreting, exemplifying, classifying, summarizing, inferring, comparing, or explaining.</td></tr>
<tr><td>3. Application: The ability to use learned material, or to implement material in new and concrete situations. Examples of verbs that relate to this function are:
<table><tr><td>apply relate develop translate use operate</td><td>organize employ restructure interpret demonstrate illustrate</td><td>practice calculate show exhibit dramatize</td></tr></table></td><td>3. Applying: Carrying out or using a procedure through executing, or implementing. Applying relates to or refers to situations where learned material is used through products like models, presentations, interviews or simulations.</td></tr>
<tr><td>4. Analysis: The ability to break down or distinguish the parts of material into its components so that its organizational structure may be better understood.Examples of verbs that relate to this function are:
<table><tr><td>analyze compare probe inquire examine contrast categorize</td><td>differentiate contrast investigate detect survey classify deduce</td><td>experiment scrutinize discover inspect dissect discriminate separate</td></tr></table></td><td>4. Analyzing: Breaking materials or concepts into parts, determining how the parts relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in this function are differentiating, organizing, and attributing, as well as being able to distinguish between the components or parts. When one is analyzing, he/she can illustrate this mental function by creating spreadsheets, surveys, charts, or diagrams, or graphic representations.</td></tr>
</table>

5. Synthesis: The ability to put parts together to form a coherent or unique new whole. Examples of verbs that relate to this function are: compose produce design assemble create prepare predict modify tell / plan invent formulate collect set up generalize document combine relate / propose develop arrange construct organize originate derive write propose	**5. Evaluating:** Making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy, *evaluating* comes before creating as it is often a necessary part of the precursory behavior before one creates something.
6. Evaluation: The ability to judge, check, and even critique the value of material for a given purpose. Examples of verbs that relate to this function are: judge assess compare evaluate conclude measure deduce / argue decide choose rate select estimate / validate consider appraise value criticize infer	**6. Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. Creating requires users to put parts together in a new way, or synthesize parts into something new and different thus creating a new form or product. This process is the most difficult mental function in the new taxonomy.

Table 1.1 – (Wilson, L.O. 2001) - Bloom vs. Anderson/Krathwohl revisions

Additional Resources: A wonderfully succinct and comprehensive overview of both taxonomies is provided by Mary Forehand at the University of Georgia in a Wikipedia type format, see **Bloom's taxonomy**. Plus, there are many different types of graphics cleverly depicting the new versions that can be printed and readily used as everyday references during instructional planning. In a search engine like Google enter "revised Bloom's taxonomy" and view the "images" portion of the search to find many different types of colorful and useful graphics on this topic.

The Affective or Feeling Domain:

Like cognitive objectives, affective objectives can also be divided into a hierarchy (according to Krathwohl). This area is concerned with feelings or emotions. Again, the taxonomy is arranged from simpler feelings to those that are more complex. This domain was first described in 1964 and as noted before is attributed to David Krathwohl as the primary author.

1. **Receiving**

This refers to the learner's sensitivity to the existence of stimuli - awareness, willingness to receive, or selected attention.

feel sense capture experience	pursue attend perceive

2. **Responding**

This refers to the learners' active attention to stimuli and his/her motivation to learn - acquiescence, willing responses, or feelings of satisfaction.

conform allow cooperate	contribute enjoy satisfy

3. **Valuing**

This refers to the learner's beliefs and attitudes of worth - acceptance, preference, or commitment. An acceptance, preference, or commitment to a value.

believe seek justify	respect search persuade

4. **Organization**

This refers to the learner's internalization of values and beliefs involving (1) the conceptualization of values; and (2) the organization of a value system. As values or beliefs become internalized, the leaner organizes them according to priority.

examine clarify systematize	create integrate

5. **Characterization** - the Internalization of values

This refers to the learner's highest of internalization and relates to behavior that reflects (1) a generalized set of values; and (2) a characterization or a philosophy about life. At this level the learner is capable of practicing and acting on their values or beliefs.

internalize review conclude	resolve judge

Based on:

Krathwohl, D.R., Bloom,B.S. and Masia, B. B. (1964).*Taxonomy of educational objectives, Book II. Affective domain.* New York, NY. David McKay Company, Inc.

Note: As with all of the taxonomies, in labeling objectives using this domain **there has to be a very clear instructional intention for growth in this area specified in the learning objective(s)**. Folks in the sciences and in math often avoid including affective objectives stating that their areas are not emotional. However, any group work or cooperative exercise where *deportment, or collaborative or cooperative skills* are discussed, used, and emphasized qualifies as having the potential for affective growth. Additionally, if students are asked to challenge themselves with independently taking risks to develop and present a hypothesis and/or persuade others on drawn conclusions, or actively take an intellectual risk whereby they increase in self-confidence, these types of exercises also have the potential to be affective as well as a cognitive. Also, in areas of potential debate, where data allows students to draw conclusions about controversial topics or express opinions and feelings on those topics, this too can be tweaked so there is intentional affective growth. **Since emotion draws both attention and channels strong residual memory**, it behooves all dedicated and artful educators to include affective objectives, no matter what their discipline or area of study.

The Psychomotor or Kinesthetic Domain

Psychomotor objectives are those specific to discreet physical functions, reflex actions and interpretive movements. Traditionally, these types of objectives are concerned with the physically encoding of information, with movement and/or with activities where the gross and fine muscles are used for expressing or interpreting information or concepts. This area also refers to natural, autonomic responses or reflexes.

It is interesting to note that while the cognitive taxonomy was described in 1956, and the affective in 1964, the psychomotor domain were not fully described until the 1970s. And while I have chosen to use the work of Anita Harrow here, there are actually two other psychomotor taxonomies to choose from -- one from E. J. Simpson (1972) and the other from R.H. Dave (1970). See full citations and hyperlink below.

As stated earlier, to avoid confusion, if the activity is simply something that is physical which supports another area -- affective or cognitive -- term the objective physical rather than psychomotor. Again, this goes to instructional intent. A primary example of something physical which supports specific cognitive development and skills might be looking through a microscope, and then identifying and drawing cells. Here the instructional intent of this common scientific activity is not to develop specific skilled proficiency in microscope viewing or in reproducing cells through drawing. Usually the key intent in this activity is that a physical action supports or is a vehicle for cognitive growth and furthering recognition skills. The learner is using the physical action to achieve the cognitive objectives -- identify, recognize, and differentiate varied types of cells.

If you are using a physical activity to support a cognitive or affective function, simply label it as something physical (labeling the objective as kinesthetic, haptic, or tactile is also acceptable) and avoid the term *psychomotor.* Rather labeling something psychomotor means there is a very clear educational intention for growth to occur in the psychomotor/kinesthetic domain.

Certainly more complex learning objectives can be written so that they that meld 2 or 3 domains. For instance, students can gain appreciation (an affective objective) for the culture or country of origin through conducting investigations or listening to stories while learning the dances from other countries. Learning dance steps would fall under "skilled movements" in the psychomotor domain.

(Terms in this area based on Anita Harrow's taxonomy).

Reflex movements

Objectives at this level include reflexes that involve one segmental or reflexes of the spine and movements that may involve more than one segmented portion of the spine as intersegmental reflexes (e.g., involuntary muscle contraction). These movements are involuntary being either present at birth or emerging through maturation.

Fundamental movements

Objectives in this area refer to skills or movements or behaviors related to walking, running, jumping, pushing, pulling and manipulating. They are often components for more complex actions.

Perceptual abilities

Objectives in this area should address skills related to kinesthetic (bodily movements), visual, auditory, tactile (touch), or coordination abilities as they are related to the ability to take in information from the environment and react.

Physical abilities

Objectives in this area should be related to endurance, flexibility, agility, strength, reaction-response time or dexterity.

Skilled movements

Objectives in this area refer to skills and movements that must be learned for games, sports, dances, performances, or for the arts.

Nondiscursive communication

Objectives in this area refer to expressive movements through posture, gestures, facial expressions, and/or creative movements like those in mime or ballet. These movements refer to interpretative movements that communicate meaning without the aid of verbal commands or help.

Note: As we learn more about how the brain learns and retains information, today's educators are realizing that targeted physical movement has the potential to enhance memory and recall and can aid in accelerating longterm memory. Intentionally adding movement to enhance learning is often called "*embodied learning*." With the aid of technology this field is growing rapidly.

Additional resources:

1. **The Waag Society**

2. **SmallLAB Learning**

3. **Why Embodied Learning?**

4. **Description of all 3 psychomotor taxonomies**

****Remember that the trick in effectively planning lessons -- there has to be the intention for growth specifically in the selected domain area! Learning takes place in ALL 3 domains and wise teachers combine domains so that lessons and learning are more holistic and multidimensional.**

The following **page** and **PPT AGO2** illustrate how you can use all three domains to create more holistic learning experiences.

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Sources:

Anderson, L. W. and Krathwohl, D. R., et al (Eds.) (2001) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Allyn & Bacon. Boston, MA (Pearson Education Group)

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