

## Understanding the New Version of Bloom's Taxonomy -

**A succinct discussion of the revisions of Bloom's classic cognitive taxonomy by Krathwohl and Anderson, et al. and how to use them effectively**

Originally published in ED 721 (2001) course handbook, and at:  
<http://www4.uwsp.edu/education/lwilson/curric/newtaxonomy.htm> (2005), revised 2013

### Background:

**(Note: There is a link to a PDF version of this page at the bottom and also an example of how I used it. If you are using either of these beyond personal use, please follow the instructions on my [usage page](#). Thanks.)**

Here in the United States, from the late 1950s into the early 1970s, there were attempts to dissect and classify the varied domains of human learning - cognitive (knowing, or head), affective (feelings, or heart) and psychomotor (doing, or kinesthetic, tactile, haptic or hand/body). The resulting efforts yielded a series of taxonomies for each area. (A taxonomy is really just a word for a form of classification.) The aforementioned taxonomies deal with the varied aspects of human learning and were arranged hierarchically, proceeding from the simplest functions to those that are more complex. In 2000-01 one of the original authors, David Krathwohl, and a student of Bloom's, Lorin Anderson, spearheaded an effort to revise the original cognitive taxonomy. Here is an overview of the changes.

While all of the taxonomies above have been defined and used for many years, there came about at the beginning of the 21st century in a new version of the cognitive taxonomy, known commonly before as Bloom's Taxonomy. You can also search the Web for various references on the different taxonomies. There are many valuable discussions on the development of these hierarchies, as well as examples of their usefulness and applications in teaching.

### The Cognitive Domain:

The following chart includes the two primary existing taxonomies of cognition. In the table below, the one on the left, entitled **Bloom's**, is based on the original work of Benjamin Bloom and others as they attempted in 1956 to define the functions of thought, coming to know, or cognition. This taxonomy is almost 60 years old. The taxonomy on the right is the more recent adaptation and is the redefined work of Bloom in 2000-01. That one is labeled **Anderson and Krathwohl**. The group redefining Bloom's original concepts, worked from 1995-2000. This group was assembled by Anderson and Krathwohl and included people with expertise in the areas of cognitive psychology, curriculum and instruction, and educational testing, measurement, and assessment. The new adaptation also took into consideration many of Bloom's own concerns and criticisms of his original taxonomy.

As you will see the primary differences are not in the listings or rewordings from nouns to verbs, or in the renaming of some of the components, or even in the re-positioning of the last two categories. The major differences lie in the more useful and comprehensive additions of how the taxonomy intersects and acts upon **different types and levels of knowledge -- factual, conceptual, procedural and metacognitive**. This melding can be charted to see how one is teaching at both knowledge and cognitive process levels. Please remember the chart goes from simple to more complex and challenging types of thinking.

## Taxonomies of the Cognitive Domain

Bloom's Taxonomy 1956	Anderson and Krathwohl's Taxonomy 2001			
<p><b>1. Knowledge:</b> Remembering or retrieving previously learned material. Examples of verbs that relate to this function are:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">know identify relate list</td> <td style="padding: 5px;">define recall memorize repeat</td> <td style="padding: 5px;">record name recognize acquire</td> </tr> </table>	know identify relate list	define recall memorize repeat	record name recognize acquire	<p><b>1. Remembering:</b> Recognizing or recalling knowledge from memory. Remembering is when memory is used to produce definitions, facts, or lists, or recite or retrieve material.</p>
know identify relate list	define recall memorize repeat	record name recognize acquire		
<p><b>2. Comprehension:</b> The ability to grasp or construct meaning from material. Examples of verbs that relate to this function are:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">restate locate report recognize explain express</td> <td style="padding: 5px;">identify discuss discuss review infer</td> <td style="padding: 5px;">illustrate interpret draw represent differentiate conclude</td> </tr> </table>	restate locate report recognize explain express	identify discuss discuss review infer	illustrate interpret draw represent differentiate conclude	<p><b>2. Understanding:</b> Constructing meaning from different types of functions be they written or graphic messages activities like interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.</p>
restate locate report recognize explain express	identify discuss discuss review infer	illustrate interpret draw represent differentiate conclude		
<p><b>3. Application:</b> The ability to use learned material, or to implement material in new and concrete situations. Examples of verbs that relate to this function are:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">apply relate develop translate use operate</td> <td style="padding: 5px;">organize employ restructure interpret demonstrate illustrate</td> <td style="padding: 5px;">practice calculate show exhibit dramatize</td> </tr> </table>	apply relate develop translate use operate	organize employ restructure interpret demonstrate illustrate	practice calculate show exhibit dramatize	<p><b>3. Applying:</b> Carrying out or using a procedure through executing, or implementing. Applying related and refers to situations where learned material is used through products like models, presentations, interviews or simulations.</p>
apply relate develop translate use operate	organize employ restructure interpret demonstrate illustrate	practice calculate show exhibit dramatize		
<p><b>4. Analysis:</b> 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:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">analyze compare probe inquire examine contrast categorize</td> <td style="padding: 5px;">differentiate contrast investigate detect survey classify deduce</td> <td style="padding: 5px;">experiment scrutinize discover inspect dissect discriminate separate</td> </tr> </table>	analyze compare probe inquire examine contrast categorize	differentiate contrast investigate detect survey classify deduce	experiment scrutinize discover inspect dissect discriminate separate	<p><b>4. Analyzing:</b> Breaking material or concepts into parts, determining how the parts relate or interrelate to one another or 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.</p>
analyze compare probe inquire examine contrast categorize	differentiate contrast investigate detect survey classify deduce	experiment scrutinize discover inspect dissect discriminate separate		
<p><b>5. Synthesis:</b> The ability to put parts together to form a coherent or unique new whole. Examples of verbs that relate to this function are:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">compose produce design assemble create prepare predict modify tell</td> <td style="padding: 5px;">plan invent formulate collect set up generalize document combine relate</td> <td style="padding: 5px;">propose develop arrange construct organize originate derive write propose</td> </tr> </table>	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	<p><b>5. Evaluating:</b> 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 evaluation comes before creating as it is often a necessary part of the precursory behavior before creating something.</p>
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		
<p><b>6. Evaluation:</b> The ability to judge, check, and even critique the</p>	<p><b>6. Creating:</b> Putting elements together to form a coherent or</p>			

value of material for a given purpose. Examples of verbs that relate to this function are:

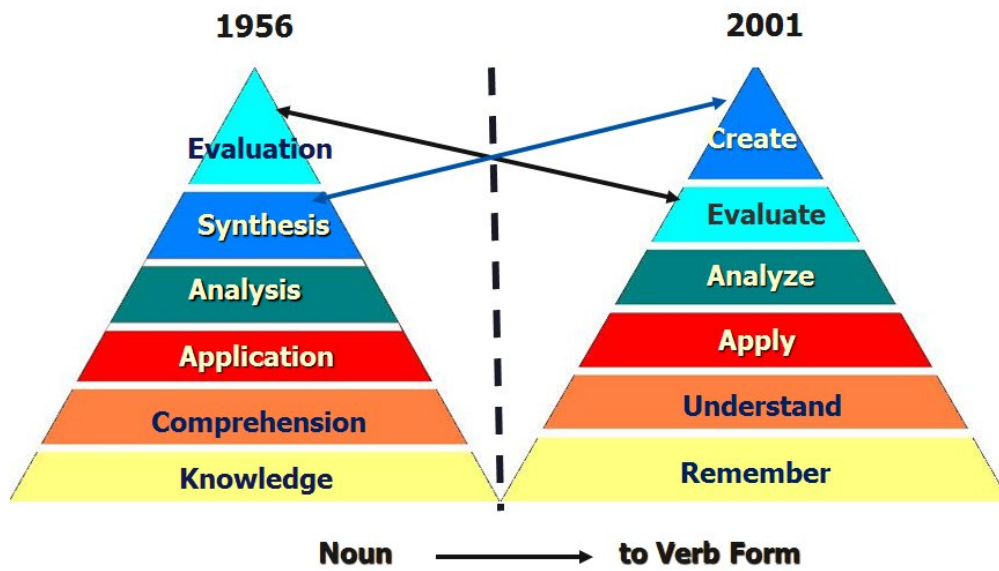
judge  
 assess  
 compare  
 evaluate  
 conclude  
 measure  
 deduce

argue  
 decide  
 choose  
 rate  
 select  
 estimate

validate  
 consider  
 appraise  
 value  
 criticize  
 infer

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 a new form or product. This process is the most difficult mental function in the new taxonomy.

Table 1.1 – Bloom vs. Anderson/Krathwohl



(Diagram 1.1, Wilson,

Leslie O. 2001)

**Note:** After creating the cognitive taxonomy one of the weaknesses noted by Bloom himself was that there was a fundamental difference between his “knowledge” category and the other 5 levels of his model as those levels dealt with intellectual abilities and skills in relation to interactions with **types of knowledge**. Bloom was very aware that there was an acute difference between knowledge and the mental and intellectual operations performed on, or with, that knowledge. He identified specific types of knowledge as:

- Terminology
- Specific facts
- Conventions
- Trends and sequences
- Classifications and categories
- Criteria
- Methodology
- Principles and generalizations
- Theories and structures

**Levels of Knowledge** - The first three of these levels were identified in the original work, but rarely discussed or introduced when initially discussing uses for the taxonomy. Metacognition was added in the revised version.

- **Factual Knowledge** - The basic elements students must know to be acquainted with a discipline or solve problems.
- **Conceptual Knowledge** – The interrelationships among the basic elements within a larger structure that enable them to function together.
- **Procedural Knowledge** - How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.
- **Metacognitive Knowledge** – Knowledge of cognition in general, as well as awareness and knowledge of one’s own cognition. (29)

(Summarized from: Anderson, L. W. & Krathwohl, D.R., et al (2001) *A taxonomy for learning, teaching and assessing: A revision of Bloom’s taxonomy of educational objectives*. New York: Longman.)

One of the things that clearly differentiates the new model from that of the 1956 original is that it lays out components nicely so they can be considered and used. Cognitive processes, as related to chosen instructional tasks, can be easily documented and tracked. This feature has the potential to make teacher assessment, teacher self-assessment, and student assessment easier or clearer as usage patterns emerge. (See PDF link below for a sample.)

As stated before, perhaps surprisingly, these levels of knowledge were indicated in Bloom's original work - **factual, conceptual, and procedural** - but these were never fully understood or used by teachers because most of what educators were given in training consisted of a simple chart with the listing of levels and related accompanying verbs. The full breadth of *Handbook I*, and its recommendations on types of knowledge, were rarely discussed in any instructive or useful way. Another rather gross lapse in common teacher training over the past 50+ years is teachers-in-training are rarely made aware of any of the criticisms leveled against Bloom’s original model. Please note that in the updated version the term "**metacognitive**" has been added to the array of knowledge types. For readers not familiar with this term, it means thinking about ones thinking in a purposeful way so that one knows about cognition and also knows how to regulate one’s cognition.

The Knowledge Dimensions	Cognitive Processes					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Factual						
Conceptual						
Procedural						
Metacognitive						

**Knowledge Dimensions Defined:**

**Factual Knowledge** is knowledge that is basic to specific disciplines. This dimension refers to essential facts, terminology, details or elements students must know or be familiar with in order to understand a discipline or solve a problem in it.

**Conceptual Knowledge** is knowledge of classifications, principles, generalizations, theories, models, or structures pertinent to a particular disciplinary area.

**Procedural Knowledge** refers to information or knowledge that helps students to do something specific to a discipline, subject, or area of study. It also refers to methods of inquiry, very specific or finite skills, algorithms, techniques, and particular methodologies.

**Metacognitive Knowledge** is the awareness of one's own cognition and particular cognitive processes. It is strategic or reflective knowledge about how to go about solving problems, cognitive tasks, to include contextual and conditional knowledge and knowledge of self.

**\*A comprehensive example from the book is provided with publisher permission at <http://www.scribd.com/doc/933640/Bloom-Revised>**

**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)

Bloom, B.S. and Krathwohl, D. R. (1956) Taxonomy of Educational Objectives: The Classification of Educational Goals, by a committee of college and university examiners. Handbook I: Cognitive Domain. NY, NY: Longmans, Green

**PDF [Understanding the New Revisions of Bloom](#)**

**PDF [Example of using revised taxonomy](#)**

The Anderson/Krathwohl text has numerous examples of how these concepts can be used for K-12 teachers.

The Anderson/Krathwohl text has numerous examples of how these concepts can be used for K-12 teachers. Since I have used this material in my teaching (a special topics graduate course on taxonomies and their uses entitled *Beyond Bloom's*), and have also presented on this topic in several national conferences, **I have artifacts and examples of how these revisions can be used effectively in college teaching. While I have a link above to an artifact, to be fully understood you might need to view the original assignment and the supportive documents. I would be happy to provide those and discuss them more fully. I am always happy to share information with other educators.**

**[Contact Leslie](#)**