CONSTRUCTIVISM & STUDENT CENTERED LEARNING

9. BLOOM'S TAXONOMY

9.1. History of Bloom's Taxonomy

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. Despite the creators' intent to address all three domains, Bloom's Taxonomy applies only to acquiring knowledge in the cognitive domain, which involves intellectual skill development.

The original Bloom's Taxonomy contained six developmental categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. The first step in the taxonomy focused on knowledge acquisition and at this level, students recall, memorize, list, and repeat information. In the second tier, comprehension, students classify, describe, discuss, identify, and explain information. Next with application students demonstrate, interpret, and write about what they've learned and solve problems. In the subsequent step, analysis, students compare, contrast, distinguish, and examine what they've learned with other information, and they have the opportunity to question and test this knowledge. Then, with synthesis, students argue, defend, support, and evaluate their opinions on this information. Finally, in the original model of Bloom's Taxonomy, students create a new project, product, or point of view with evaluation.

Original Bloom's Taxonomy

In 1956, Benjamin Bloom with other collaborators published a framework for categorizing educational goals called, *Taxonomy of Educational Objectives*. Familiarly known as Bloom's Taxonomy, this framework has been applied by generations of K-12 teachers and college instructors in their teaching. The framework elaborated by Bloom and his collaborators consisted of six major categories: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The categories after knowledge were presented as skills and abilities, with the understanding that knowledge was the necessary precondition for putting these skills and abilities into practice. While each category contained subcategories, all lying along a continuum from simple to complex and concrete to abstract, the taxonomy is popularly remembered according to the six main categories. 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. This newer taxonomy also moves the evaluation stage down a level and the highest element becomes creating.

The revised taxonomy

So, this taxonomy was created in order to promote higher forms of thinking in education, such as analyzing and evaluating, rather than just remembering facts also called rote learning. The basic three types of learning identified were three domains of educational activities or learning:

- **Cognitive: Mental skills (Knowledge)**
- **Affective: Growth in feelings or emotional areas (Attitude or self)**
- **Psychomotor: Manual or physical skills (Skills)**

Domains can also be thought of as categories. Trainers often refer to these three categories as KSA (Knowledge, Skills, and Attitude). This taxonomy of learning behaviors can be thought of as the goals of the learning process. That is, after a learning episode, the learner should have acquired new skills, knowledge, and/or attitudes. The three domains can be divided into subdivisions, starting from the simplest behavior to the most complex. The divisions outlined are not absolutes and there are other systems or hierarchies that have been devised in the educational and training world. However, Bloom's taxonomy is easily understood and is probably the most widely applied one in use today.

9.2. The Original Taxonomy (1956)

Here are the authors' brief explanations of these main categories in from the appendix of *Taxonomy of Educational Objectives:*

- **Knowledge** "involves the recall of specifics and universals, the recall of methods and processes, or the recall of a pattern, structure, or setting."
- **Comprehension** "refers to a type of understanding or apprehension such that the individual knows what is being communicated and can make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications."
- **Application** refers to the "use of abstractions in particular and concrete situations."
- **Analysis** represents the "breakdown of a communication into its constituent elements or parts such that the relative hierarchy of ideas is made clear and/or the relations between ideas expressed are made explicit."
- **Synthesis** involves the "putting together of elements and parts so as to form a whole."

- **Evaluation** engenders "judgments about the value of material and methods for given purposes."

9.3. The Revised Taxonomy (2001)

In 2001, a group of cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists published a revision of Bloom's Taxonomy with the title *A Taxonomy for Teaching, Learning, and Assessment*. This title draws attention away from the somewhat static notion of educational objectives (in Bloom's original title) and points to a more dynamic conception of classification. The authors of the revised taxonomy underscore this dynamism, using verbs and gerunds to label their categories and subcategories (rather than the nouns of the original taxonomy). These action words describe the cognitive processes by which thinkers encounter and work with knowledge:

- **Remember**
  - Recognizing
  - Recalling
- **Understand**
  - Interpreting
  - Exemplifying
  - Classifying
  - Summarizing
  - Inferring
  - Comparing
  - Explaining
- **Apply**
  - Executing
  - Implementing
- **Analyze**
  - Differentiating
  - Organizing
  - Attributing
- **Evaluate**
  - Checking
  - Critiquing
- **Create**
  - Generating

    - Planning
    - Producing

In the revised taxonomy, knowledge is at the basis of these six cognitive processes, but its authors created a separate taxonomy of the types of knowledge used in cognition:

- **Factual Knowledge**
    - Knowledge of terminology
    - Knowledge of specific details and elements
- **Conceptual Knowledge**
    - Knowledge of classifications and categories
    - Knowledge of principles and generalizations
    - Knowledge of theories, models, and structures
- **Procedural Knowledge**
    - Knowledge of subject-specific skills and algorithms
    - Knowledge of subject-specific techniques and methods
    - Knowledge of criteria for determining when to use appropriate procedures
- **Metacognitive Knowledge**
    - Strategic Knowledge
    - Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge
    - Self-knowledge

9.4. Bloom's Taxonomy in the Classroom

The authors of the revised taxonomy suggest a multi-layered approach to classroom use, to which the author of this teaching guide has added some clarifying points:

1. Objectives (learning goals) are important to establish in a pedagogical interchange so that teachers and students alike understand the purpose of that interchange.
2. Teachers can benefit from using frameworks to organize objectives.
3. Organizing objectives helps to clarify objectives for themselves and for students. Having an organized set of objectives helps teachers to plan and deliver appropriate instruction; design valid assessment tasks and strategies; and ensure that instruction and assessment are aligned with the objectives.

Bloom's Taxonomy can be used across grade levels and content areas. By using Bloom's Taxonomy in the classroom, teachers can assess students on multiple learning outcomes that are aligned to local, state, and national standards and objectives. Within each level of the taxonomy, there are various tasks that move students through the thought process. It is suggested that in order for teachers to develop lesson plans that integrate Bloom's Taxonomy, they write their lessons in the language that focuses on each level. As a resource, the United States Geological Survey provides a list of verbs for each level of Bloom's Taxonomy for teachers to use when developing lesson plans. Although the list is designed for environmental science teachers, the examples will work for any discipline.