

## Bloom's Taxonomy of Educational Objectives

The development and use of instructional objectives is discussed in detail in chapter 15. At the present time it is sufficient to state that instructional objectives are concrete statements of the goals toward which instruction is directed. They play an important role in the process of learning and instruction.

When developing instructional objectives, providing instruction, and evaluating student performance, it is important to keep in mind that there are different levels or outcomes of learning. Distinguishing among different levels and outcomes of learning is important. If teachers are unaware of different levels of learning, they are likely to focus on one level to the detriment of others. For example, a teacher may teach a vast amount of factual information but never get around to teaching students to apply and synthesize this information. Or a teacher may teach higher level thinking skills without realizing that these skills require the prior learning of basic skills that must be integrated into these higher order skills.

In addition, it is not unusual to see a teacher who wants her students to learn higher order thinking skills give examinations that require only lower level skills. Under such circumstances, the students are likely to put their efforts into the lower order skills. Skills at different levels must be taught (and tested) in different ways; and therefore it is important for teachers and other instructional designers to take into account the different levels and outcomes of instruction.

Bloom's (1956) *Taxonomy of Educational Objectives* is the most renowned description of the levels of cognitive performance. The levels of the *Taxonomy* and examples of activities at each level are given in Table 3.3. The levels of this taxonomy are considered to be hierarchical. That is, learners must master lower level objectives first before they can build on them to reach higher level objectives.

Table 3.3

## **Bloom's Taxonomy of Educational Objectives**

### **Cognitive Domain**

#### 1. Knowledge (Remembering previously learned material)

Educational Psychology: Give the definition of punishment.

Mathematics: State the formula for the area of a circle.

English / Language Arts: Recite a poem.

#### 2. Comprehension (Grasping the meaning of material)

Educational Psychology: Paraphrase in your own words the definition of punishment; answer questions about the meaning of punishment.

Mathematics: Given the mathematical formula for the area of a circle, paraphrase it using your own words.

English / Language Arts: Explain what a poem means.

#### 3. Application (Using information in concrete situations)

Educational Psychology: Given an anecdote describing a teaching situation, identify examples of punishment.

Mathematics: Compute the area of actual circles.

English / Language Arts: Identify examples of metaphors in a poem.

#### 4. Analysis (Breaking down material into parts)

Educational Psychology: Given an anecdote describing a teaching situation, identify the psychological strategies intentionally or accidentally employed.

Mathematics: Given a math word problem, determine the strategies that would be necessary to solve it.

English / Language Arts: Given a poem, identify the specific poetic strategies employed in it.

#### 5. Synthesis (Putting parts together into a whole)

Educational Psychology: Apply the strategies learned in educational psychology in an organized manner to solve an educational problem.

Mathematics: Apply and integrate several different strategies to solve a mathematical problem.

English / Language Arts: Write an essay or a poem.

#### 6. Evaluation (Judging the value of a product for a given purpose, using definite criteria)

Educational Psychology: Observe another teacher (or yourself) and determine the quality of the teaching performance in terms of the teacher's appropriate application of principles of educational psychology.

Mathematics: When you have finished solving a problem (or when a peer has done so) determine the degree to which that problem was solved as efficiently as possible.

English / Language Arts: Analyze your own or a peer's essay in terms of the principles of composition discussed during the semester.

**Knowledge** (recalling information) represents the lowest level in Bloom's taxonomy. It is "low" only in the sense that it comes first - it provides the basis for all "higher" cognitive activity. Only after a learner is able to recall information is it possible to move on to **comprehension** (giving meaning to information). The third level is **application**, which refers to using knowledge or principles in new or real-life situations. The learner at this level solves practical problems by applying information comprehended at the previous level. The fourth level is **analysis** - breaking down complex information into simpler parts. The simpler parts, of course, were learned at earlier levels of the taxonomy. The fifth level, **synthesis**, consists of creating something that did not exist before by integrating information that had been learned at lower levels of the hierarchy. **Evaluation** is the highest level of Bloom's hierarchy. It consists of making judgments based on previous levels of learning to compare a product of some kind against a designated standard.

Teachers often use the term **application** inaccurately. They assume anytime students use the information in any way whatsoever that this represents the **application** level of Bloom's taxonomy. This is not correct.

A child who "uses" his memorization of the multiplication tables to write down "15" next to "5 times 3 equals" is working at the **knowledge** level, not the application level.

A child who studies Spanish and then converses with a native Mexican is almost certainly at the **synthesis** level, not at the application level. If the child made a deliberate attempt to get his past tense right, this would be an example of **application**. However, in conversing he would almost certainly be creating something new that did not exist before by integrating information that had been learned at lower levels of the hierarchy.

Bloom's use of the term **application** differs from our normal conversational use of the term. When working at any of the *four highest levels of the taxonomy*, we "apply" what we have learned. At the **application** level, we "just apply." At the higher levels, we "apply and do something else."

The main value of the *Taxonomy* is twofold: (1) it can stimulate teachers to help students acquire skills at all of these various levels, laying the proper foundation for higher levels by first assuring mastery of lower-level objectives; and (2) it provides a basis for developing measurement strategies to assess student performance at all these levels of learning.

There is not room in this book to discuss in detail each of the levels of Bloom's *Taxonomy*. A careful reading of Table 3.3 will help readers review or understand the important distinctions among these levels of educational outcomes. Review Quiz 4 will help you determine whether you understand these distinctions. Additional information can be found in the Workbook and in (Give citations here.). Gage and Berliner (1984) have expanded upon the *Taxonomy* with their concept of a behavior content matrix (Figure 3.4). Across the top are listed the topics covered in a unit of instruction. Down the side are listed the levels of the *Taxonomy*. By writing objectives at the appropriate intersection points, the teacher is able to develop both objectives and assessment strategies that cover the full range of expectations within each topic. Since not all topics lend themselves to objectives at every level of the *Taxonomy*, some of the cells in this matrix are blank; when higher level objectives occur with nothing at the lower level, the lower-level objectives would have to be learned in a different context.

Insert Figure 3.4 about here.

(Not ready yet.)

#### **Review Quiz 4 - Bloom's Taxonomy**

Match each objective below with the level of Bloom's Taxonomy that it describes.

- a. Knowledge
- b. Comprehension
- c. Application
- d. Analysis
- e. Synthesis
- f. Evaluation

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1. \_\_\_\_\_ The student should be able to list in order the levels of Bloom's Taxonomy.
  2. \_\_\_\_\_ Given a general educational goal, the student should be able to state it as an objective at the appropriate level of Bloom's Taxonomy.
  3. \_\_\_\_\_ The student should be able to explain the meaning of each of the levels of Bloom's Taxonomy.

4. \_\_\_\_\_ The student should be able to write lessons plans that state clear objectives, contain appropriate activities for attaining these objectives, and include methods for evaluating student performance.
5. \_\_\_\_\_ Given a teacher's lesson plan, the student should be able to identify the principles of instructional design that the teacher incorporated into that lesson and ways in which these principles contribute to the effectiveness of the lesson.
6. \_\_\_\_\_ Given a teacher's well-constructed lesson plan, the student should be able to determine how effective the lesson is likely to be by identifying the principles of instructional design employed in the lesson and how well they are likely to contribute to attaining the stated objectives.

**A Hard Question:**

7. Here is a question from an educational psychology test:

"The computer program responds, 'Wrong. But you're getting close!' when the child gives an incorrect answer during a computer drill. What phase of learning is the computer program helping the learner perform when it delivers this message?"

- a. Selective perception
- b. Encoding
- c. Responding
- d. Feedback
- e. Cueing Retrieval

According to Bloom's Taxonomy, what level of performance does this objective measure?

## Online Links

### **Bloom's Taxonomy**

#### **[Bloom's Taxonomy](#) by Edward Vockell**

This web site gives a detailed presentation of the various levels of Bloom's Taxonomy. Its goal is to enable readers to make clear distinctions among the various levels of cognitive objectives.

#### **Bloom's Taxonomy and Critical Thinking**

<http://www.kcmetro.cc.mo.us/longview/ctac/blooms.htm>

This site lists key words and questions that can be used to state objectives and to measure performance at various levels of Bloom's taxonomy. Of course, if you want a more comprehensive list of terms and questions, you can look in Bloom's Taxonomy itself (Bloom, B.S., Englehart, M.B., Furst, E.J., Hill, W.H., and Krathwohl, D.R. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: The Cognitive Domain*. New York: Longman).

#### **Bloom's Taxonomy**

<http://www.coun.uvic.ca/learn/program/hndouts/bloom.html>

This is simply another professor's handout that diagram's the levels of Bloom's Taxonomy very clearly and concisely.

#### **Bloom et al.'s Taxonomy of the Cognitive Domain**

<http://www.valdosta.edu/~whuitt/psy702/cogsys/bloom.html>

This web page diagrams the levels of Bloom's Taxonomy very clearly and concisely and carries one example throughout all the levels.

## **Task Oriented Question Construction Wheel Based on Bloom's Taxonomy**

<http://www.stedwards.edu/cte/bwheel.htm>

This web page uses a wheel as a visual scheme to diagram the levels of Bloom's Taxonomy and relates them to key words and to materials that can be used to measure the various levels of performance.

## **Bloom's Taxonomy's Model Questions and Key Words**

<http://www.utexas.edu/student/lsc/handouts/1414.html>

This web page offers a simple list of key words that can be used in questions to measure performance at the various levels of Bloom's Taxonomy.

## **Bloom's Taxonomy of Academic Behaviors**

<http://www.west.asu.edu/westvu/spe311/blooms.html>

This web page offers a nicely formatted list of key words and assessment formats that can be used to measure performance at the various levels of Bloom's Taxonomy.