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Designing & Assessing Educational Objectives

Applying the
New Taxonomy



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A New Perspective on Educational Objectives

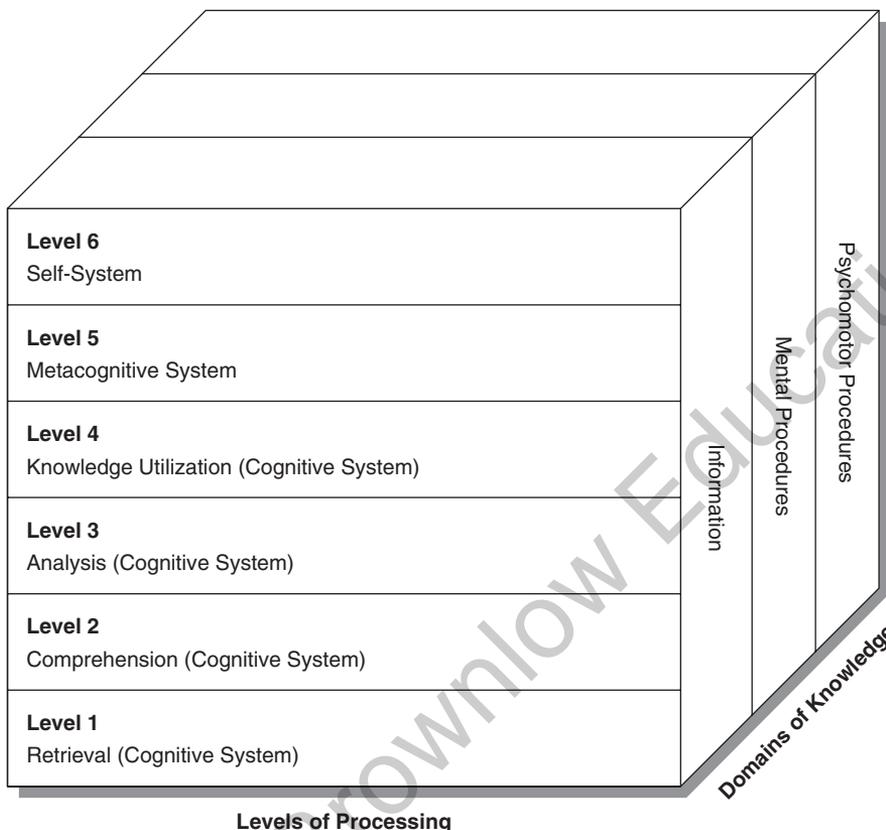
This handbook is a guide to the design and assessment of educational objectives. It is a practical application of *The New Taxonomy of Educational Objectives* (Marzano & Kendall, 2007). While the New Taxonomy has a number of potential uses, here we focus on designing and assessing educational objectives. As indicated by its title, The New Taxonomy is designed as a replacement for Bloom et al.'s taxonomy, published in 1956 (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956). Although that work was powerful and enduring, it had some flaws and inconsistencies that can now be reconciled, given the sixty-plus years of research and theory since its publication (for a detailed discussion, see Marzano & Kendall, 2007).

Bloom's taxonomy made a major contribution to the science of designing educational objectives. Indeed, prior to its publication, there was not much agreement as to the nature of objectives. Bloom adopted Ralph Tyler's (Airasian, 1994) notion that an educational objective should contain a clear reference to a specific type of knowledge as well as the behaviors that would signal understanding or skill related to that knowledge.

Like Bloom's taxonomy and others based on it (e.g., Anderson et al., 2001), the New Taxonomy has a specific syntax for educational objectives. We use the following stem for all objectives: *The student (or students) will be able to . . .* plus a verb phrase and an object. The verb phrase states the mental process that is to be employed while completing the objective, and the object is the knowledge that is the focus of the objective.

The New Taxonomy can be represented as depicted in Figure 1.1. The rows on the left-hand side of Figure 1.1 represent three systems of thought and in the case of the cognitive system, four subcomponents of that system. The columns on the right-hand side of Figure 1.1 depict three different types or domains of knowl-

Figure 1.1 The New Taxonomy



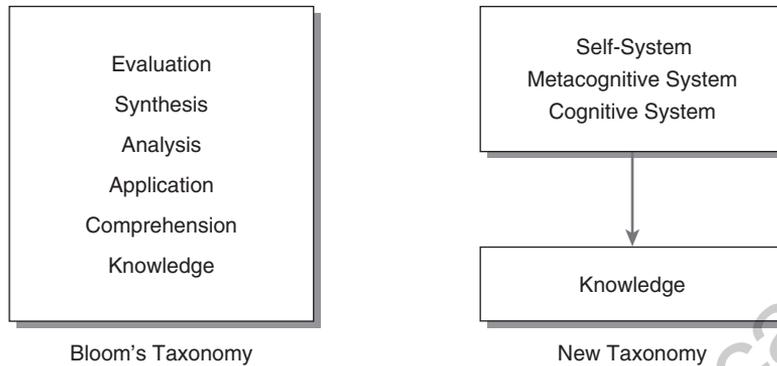
Source: Marzano & Kendall (2007)

edge: information, mental procedures, and psychomotor procedures. In effect, the New Taxonomy is two-dimensional. One dimension addresses three domains of knowledge; the other addresses levels of mental processing.

One of the defining differences between Bloom’s taxonomy and the New Taxonomy is that the New Taxonomy separates various types of knowledge from the mental processes that operate on them. This is depicted in Figure 1.2.

As shown in Figure 1.2, Bloom included knowledge as a component of his taxonomy. About this, Bloom and his colleagues (1956) noted,

By knowledge, we mean that the student can give evidence that he remembers either by recalling or by recognizing some idea or phenomenon with which he has had experience in the educational process. For our taxonomy purposes, we are defining knowledge as little more than the remembering of the idea or phenomenon in a form very close to that in which it was originally encountered. (pp. 28–29)

Figure 1.2 Knowledge as Addressed in the Two Taxonomies

Source: Marzano & Kendall (2007)

On the other hand, Bloom identified specific types of knowledge within the knowledge category. These included

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

Thus within his knowledge category, Bloom included various forms of knowledge as well as the ability to recall and recognize that knowledge. This mixing of types of knowledge with the various mental operations that act on knowledge is one of the major weaknesses of Bloom's Taxonomy since it confuses the object of an action with the action itself. The New Taxonomy avoids this confusion by postulating three domains of knowledge that are operated on by the three systems of thought and their component elements. It is the systems of thought that have the hierarchical structure that constitutes the New Taxonomy.

We consider the specifics of the New Taxonomy in Chapter 2. Here we briefly introduce the framework to demonstrate the nature and format of the educational objectives that can be designed and assessed using it. To illustrate, consider Figure 1.3.

Figure 1.3 General Form of Educational Objectives for Each Level of the New Taxonomy

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 6: Self-System Thinking	Examining Importance	The student will be able to identify how important the information, mental procedure, or psychomotor procedure is to him or her and the reasoning underlying this perception.
	Examining Efficacy	The student will be able to identify beliefs about his or her ability to improve competence or understanding relative to the information, mental procedure, or psychomotor procedure and the reasoning underlying this perception.
	Examining Emotional Response	The student will be able to identify his or her emotional responses to the information, mental procedure, or psychomotor procedure and the reasons for these responses.
	Examining Motivation	The student will be able to identify his or her overall level of motivation to improve competence or understanding relative to the information, mental procedure, or psychomotor procedure and the reasons for this level of motivation.
Level 5: Metacognition	Specifying Goals	The student will be able to establish a goal relative to the information, mental procedure, or psychomotor procedure and a plan for accomplishing that goal.
	Process Monitoring	The student will be able to monitor progress toward the accomplishment of a specific goal relative to the information, mental procedure, or psychomotor procedure.
	Monitoring Clarity	The student will be able to determine the extent to which he or she has clarity about the information, mental procedure, or psychomotor procedure.
	Monitoring Accuracy	The student will be able to determine the extent to which he or she is accurate about the information, mental procedure, or psychomotor procedure.
Level 4: Knowledge Utilization	Decision Making	The student will be able to use the information, mental procedure, or psychomotor procedure to make decisions in general or make decisions about the use of the information, mental procedure, or psychomotor procedure.
	Problem Solving	The student will be able to use the information, mental procedure, or psychomotor procedure to solve problems in general or solve problems about the information, mental procedure, or psychomotor procedure.
	Experimenting	The student will be able to use the information, mental procedure, or psychomotor procedure to generate and test hypotheses in general or generate and test hypotheses about the information, mental procedure, or psychomotor procedure.

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
	Investigating	The student will be able to use the information, mental procedure, or psychomotor procedure to conduct investigations in general or conduct investigations about the information, mental procedure, or psychomotor procedure.
Level 3: Analysis	Matching	The student will be able to identify important similarities and differences relative to the information, mental procedure, or psychomotor procedure.
	Classifying	The student will be able to identify superordinate and subordinate categories relative to the information, mental procedure, or psychomotor procedure.
	Analyzing Errors	The student will be able to identify errors in the presentation or use of the information, mental procedure, or psychomotor procedure.
	Generalizing	The student will be able to construct new generalizations or principles based on the information, mental procedure, or psychomotor procedure.
	Specifying	The student will be able to identify logical consequences of the information, mental procedure, or psychomotor procedure.
Level 2: Comprehension	Integrating	The student will be able to identify the basic structure of the information, mental procedure, or psychomotor procedure and the critical as opposed to noncritical characteristics.
	Symbolizing	The student will be able to construct an accurate symbolic representation of the information, mental procedure, or psychomotor procedure differentiating critical and noncritical elements.
Level 1: Retrieval	Recognizing	The student will be able to validate correct statements about features of information, but not necessarily understand the structure of the knowledge or differentiate critical and noncritical components.
	Recalling	The student will be able to produce features of information, but not necessarily understand the structure of the knowledge or differentiate critical and noncritical components.
	Executing	The student will be able to perform a procedure without significant error, but not necessarily understand how and why the procedure works.

Source: Marzano & Kendall (2007)

The rows of Figure 1.3 represent the various levels of the New Taxonomy. The third column of Figure 1.3 portrays a generic form of the objectives that might be generated for each level of the New Taxonomy. Subsequent chapters provide specific examples of educational objectives, along with tasks that might be used to assess those objectives, for each level of the New Taxonomy across the three domains of knowledge. To obtain a sense of the objectives that might be generated and assessed using the New Taxonomy it is useful to start with retrieval objectives—the bottom of the New Taxonomy.

Retrieval objectives involve the recognition, recall, and execution of basic information and procedures. These are very common in education and were addressed in Bloom’s “knowledge” level.

Comprehension objectives involve identifying and symbolizing the critical features of knowledge. These too are quite common among educational objectives. *Comprehension* in the New Taxonomy is similar to *comprehension* in Bloom’s taxonomy; however, Bloom’s taxonomy does not contain a process akin to *symbolizing knowledge*.

Analysis objectives involve reasoned extensions of knowledge. They are sometimes referred to as *higher order* in that they require students to make inferences that go beyond what was directly taught. The New Taxonomy involves five types of analysis processes: matching, classifying, analyzing errors, generating, and specifying. *Matching* in the New Taxonomy is similar to what Bloom refers to as *analysis of relationships* within Level 4.0 (analysis) of his taxonomy. *Classifying* in the New Taxonomy is similar to what Bloom refers to as *identifying a set of abstract relations* within Level 5.0 (synthesis) of his taxonomy. *Analyzing errors* in the New Taxonomy is similar to what is referred to as *judging internal evidence* within Level 6.0 (evaluation) of Bloom’s taxonomy. It is also similar to *analysis of organizing principles* within Level 4.0 (analysis) of Bloom’s taxonomy. *Generalizing and specifying* in the New Taxonomy are embedded in many components from Levels 4, 5, and 6 of Bloom’s taxonomy.

Knowledge utilization objectives are employed when knowledge is used to accomplish a specific task. Such objectives are frequently a part of what some educators refer to as *authentic tasks*. The New Taxonomy includes four knowledge utilization processes: decision making, problem solving, experimenting, and investigating. The overall category of knowledge utilization is most closely related to *synthesis* (Level 5.0) in Bloom’s taxonomy.

Metacognitive objectives address setting and monitoring goals. Although the importance of these behaviors is recognized by educators, it is rare that specific objectives are written that involve metacognition. The New Taxonomy includes four types of metacognitive processes: specifying goals, process monitoring, monitoring clarity, and monitoring accuracy. No obvious corollary can be found in Bloom’s taxonomy.

Self-system objectives address attitudes, beliefs, and behaviors that control motivation. As is the case with metacognition, self-system processes seem to be valued by educators but are rarely addressed in terms of explicit objectives. The New Taxonomy includes four types of self-system processes: examining importance, examining efficacy, examining emotional response, and examining overall motivation. No obvious corollary can be found in Bloom's taxonomy.

CONCLUSIONS

As illustrated in very general terms in Figure 1.3, the New Taxonomy can be used to generate and assess a wide range of objectives covering three domains of knowledge (information, mental procedures, and psychomotor procedures) and three categories of processes (cognitive, metacognitive, and self-system). This is not to say that schools and districts should include objectives for all six levels of the New Taxonomy at all grade levels. As we demonstrate in Chapter 9, we recommend that metacognitive and self-system thinking be considered a complementary and supportive curriculum to the first four levels of the New Taxonomy (retrieval, comprehension, analysis, and knowledge utilization), which are considered more traditionally academic in nature.

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