BLOOM BEYOND BLOOM: USING THE REVISED TAXONOMY TO DEVELOP EXPERIENTIAL LEARNING STRATEGIES

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ABSTRACT

Why does or should experiential learning work? The authors suggest that it provides a highly cost-effective tool for acquiring dynamic knowledge, the knowledge that allows people to manipulate and interact with an object system, representing the key elements of situations they must deal with in actual work situations. The paper anchors this concept in the classic framework of Bloom's Taxonomy of Educational Objectives (cognitive domain). It then updates the framework in light of Bloom's recently revised framework, describing how this new taxonomy can be used to develop educational objectives for experiential learning.

INTRODUCTION

> "If there is an immortal hypothesis about the nature of education, it must be this: If a child is to be educated, then his mind must be trained to reason. Throughout the centuries philosophers and educators have frankly and freely assented to the validity of the proposition that education is the development of the intellect" (Brauner and Burns, 1965, p. 27).

New managers fresh from academic degrees come fundamentally equipped with inert factual knowledge (i.e., definitions, principles, and concepts) about the operations of a business. Common curriculum requirements provide students with a good understanding of the formal techniques associated with marketing, accounting and general business practices. Although most students have extensive personal experience as consumers in business, they typically do not have a great deal of understanding in the real-life application of management nor the dynamics of a business operation.

Most business programs have courses in strategic management and some require work experience by their students in an effort to provide them with a holistic perspective of the business world. However, these courses and experiences are often inadequate in preparing new managers to deal effectively with many of the situations that they will encounter on the job. This point is elucidated by Cone (1996), who states:

> "We teach management skills in a classroom setting, but managers practice their skills while they are dealing with the chaos and pressure of managing a shift …No wonder we get glowing reports about trainees who later turn out to be incompetent managers" (p. 34).

The skills that are needed to understand the dynamic component of a business are typically learned through a brief training period, where the trainee works alongside hourly employees or shadows a manager. It has been argued that shadowing is not an effective method of training, but is used prevalently (Jaszay, 1996). Simply stated, managers tend to develop mental models about the dynamics of an operation through the actions of their mentor manager. The new manager's "situated learning" (developing a knowledge structure through the utilization of tasks) and subsequent "transfer of schemas" (applying a knowledge structure to a particular situation) tends to be developed based on the mentor's actions, whether or not these actions are effective or even congruent with corporate or owner values (Driscoll, 1994, pp. 144-145).

Several problems arise from the practice of using mentor managers as a means of exposing students to the dynamics of a business. In an operating environment, mentor managers typically work under a lot of pressure and often have minimal time for effective training. Graham (1995, p. 4) notes that the use of managers as trainers, "is not always effective because of a lack of standardization in the information passed on by the training manager. It is also not cost efficient because salaries are being paid for two managers to do the job of one."

THE PROBLEM OF DYNAMIC KNOWLEDGE

We refer to the management-related schema and the learning required to modify them in ever-changing situations as dynamic knowledge. Stated more formally, it is the knowledge that allows people to manipulate elements of -- and interact with -- an object system, an actual place of work or other setting where people must make problem-solving. The question, of course, is how to create *dynamic knowledge*?

The predominant view among those who conduct research in and/or use the tools of experiential learning is that experiential techniques provide a relatively cost-effective way of addressing the need for dynamic knowledge. Experiential learning involves immersing learners in an environment in which they actively participate in acquiring knowledge.

The theory that experiential learning can be an instructive tool for increasing learners' dynamic knowledge and subsequent judgmental ability tends to be relatively new, having emerged in the 20th century, with a dramatic increase in popularity during the second half of the century. However, the concepts that underlie this theory have been around for centuries and provide an historical foundation. Many philosophers have pondered the existence of a line of demarcation between rules and judgment – while a learner's acquisition of rules can be through declarative means, judgment must be learned through experience.

The belief that education includes active participation by the learner and that knowledge is not merely a set of rules dates back to Plato's dialogs from ancient Greece (Koller and Koller, 1998). In Meno, Plato describes a dialog between Socrates and a pupil. Meno asks Socrates if virtue can be taught, can come through practice, or arises only from natural aptitude. The dialog then proceeds to discuss Meno's quest for a definition of virtue and Socrates' guidance of the student towards his understanding of the naiveté of his question and hopeful answer.

Kant, one of the great modern philosophers of our time, was also interested in how knowledge is acquired. He investigated the differences between judgment and rules in his Magnum Opus -- "Critique of Pure Reason" -- in 1781. His writings illuminated the subtle differences between rules and judgment:

> "…We find that whereas understanding is capable of being taught and equipped by rules, the power of judgment is a particular talent that cannot be taught at all but can only be practiced…For although the school can offer to a limited understanding…an abundance of rules borrowed from the insight of others, yet the ability to employ these rules correctly must belong to the learner himself; and in the absence of such a natural gift no rule that one might prescribe to him for this aim is safe from misuse. Hence a physician, a judge, or a statesman may have in his mind many fine pathological, juridical, or political rules even to the degree where he can become a thorough teacher of them himself, and will yet easily blunder in applying them. He may blunder either because he is able to have insight into the universal *in abstracto* but is unable to distinguish whether a case *in concreto* belongs under it; or again he may blunder because he has not been sufficiently trained for this judgment through examples and actual tasks. Indeed the fact that examples sharpen one's power of judgment is their single and great benefit. For as regards the correctness of precision of the insight of understanding, examples contrariwise commonly impair these, because only seldom do they adequately fulfill the rule's condition" (Kant, 1781/1996, pp. 206-207).

Dewey, a prolific author on topics such as psychology, philosophy, ethics, art, and politics, also had a substantial impact on modern education. His writings on education in the late 1800's and early 1900's molded many of the curricular activities of today. Many of his theories and principles are as contemporary today as the day that they were written.

In Dewey's "My Pedagogic Creed," -- originally published in 1897 (Archambault 1964, p. 435) -- he professes his beliefs on the nature of educational method:

> "Ideas (intellectual and rational processes) also result from action and devolve for the sake of the better control of action. What we term reason is primarily the law of orderly or effective action. To attempt to develop the reasoning powers, the powers of judgment, without reference to the selection and arrangement of means in action, is the fundamental fallacy in our present methods of dealing with this matter. As a result we present the child with arbitrary symbols. Symbols are a necessity in mental development, but they have their place as tools for economizing effort; presented by themselves they are a mass of meaningless and arbitrary ideas imposed from without."

Dewey also believed that "schooling is a deliberately contrived and structured affair designed to reduce the waste and confusion of random experience and the general socialization process" (Axtelle and Burnett, 1970, p. 260). In 1910, Dewey further stated:

> "Science has been taught too much as an accumulation of ready-made material with which students are to be made familiar, not enough as a method of thinking, an attitude of mind, after the pattern of which mental habits are to be transformed" (Archambault, 1964, p. 183).

Whitehead (1929, pp. 1-2) believed that schools of learning are overrun with inert ideas -- ideas "that are merely received into the mind without being utilized, or tested, or thrown into fresh combinations." He believed that theories and ideas should always be placed in application within the curriculum and that "education is the acquisition of the art of the utilization of knowledge" (Whitehead, 1929, p. 6). He stated that "pupils have got to be made to feel that they are studying something, and are not merely executing intellectual minuets" (Whitehead, 1929, p. 15).

In 1965, Brauner and Burns (p. 54) discussed the modern tradition of education, which described the mind as individual -- brain functions -- and social terms -- "development and execution of a plan of action." They believed that these qualities of the mind should be developed "by analyzing and reconstructing experience, and that these activities, scientifically conceived and artfully carried out, will help develop an intellectual temperament geared to the solution of the total range of human problems" (Brauner and Burns, 1965, p. 54). Further, they stated that "In this process, information … will be gained and utilized where relevant in problem-solving situations; but its value depends on its their use and application, for the end of education is not merely the acquisition of information, but more importantly its application so as to yield man an increasing control over behavior" (Brauner and Burns, 1965, p. 54).

Modern philosophers still debate the discrepancies between rules and judgment by introducing them in new contexts, such as technology. To see this, the reader needs to look no further than the current debate over functionalism: Does an algorithm govern our minds, where all thinking is computation (a set of rules)? Or is there some other cognitive function or process in our mind that allows a decision to be made (judgment) (Dennett, 1995; Penrose, 1994; Putnam, 1988; Radnitzky and Bartley, 1987)?

This last debate has strong implications regarding choosing a method of training and educating both management and employees and provides insight into why experiential learning should be an effective instructional methodology. If managers and educators can better understand their own epistemology, they can better understand how they should teach and train.

HOW EXPERIENTIAL LEARNING WORKS: BLOOM'S TAXONOMY

Our task in this section will be to discuss the role Bloom's Taxonomy of educational objectives (cognitive domain) has played as a theory based for explaining how experiential learning works, and by extension, for developing normative theory to guide the process of developing experiential exercises.

In 1979, Gentry, McCain and Burns suggested that Bloom's (1956) classic Taxonomy of Educational Objectives might be used as a framework for understanding how experiential learning works, conceptualizing objectives for experiential learning, providing a basis for both instructional design and research. In 1985, Butler, Markulis, and Strang reiterated their suggestion, drawing on a review of research published in ABSEL Proceedings to point out that prior work tended to lack a coherent theoretical base. They contended that Bloom's Taxonomy would provide such a base.

The base is described briefly in Table 1. The Taxonomy consists of a hierarchical set of intellectual building blocks, ranging from simple memorization at the bottom, and progressing with increasing levels of abstraction. As one progresses up the hierarchy, the intellectual task increases in difficulty as the learner is called upon to discern the similarities and differences among increasingly abstract concepts, organizing them for specific purposes.

The argument for experiential learning is that it confronts students with patterns that represent the essence of a real, and somewhat prototypic, situation. Insofar as the exercise has educational validity, the students will recognize the desired pattern from amid the "noise" of extraneous stimuli, and manipulate it successfully (Feinstein and Cannon, 2002). While the task varies with the nature of the exercise, experiential learning offers enormous potential for confronting students with highly complex and dynamic situations. They call for the application of general principles students might have learned in lower-level classes. At an even higher level of learning, they must analyze what is going on in the game or exercise, synthesize solutions to address the situation, and evaluate their relative merits.

Ronchetto and Johnston (1993) draw on Gentry, Stoltman, and Mehlhoff's (1992), suggesting that one cannot simply speak of experiential learning in general, but rather, the effectiveness of a particularly learning approach will depend on the educational objectives and (as suggested by Ronchetto and Johnston) the basic cognitive style of the students. As with so many previous studies, they draw on Bloom's Taxonomy for the basic underlying conceptualization of objectives.

Notwithstanding the popularity of the Bloom Taxonomy, it is not the only approach. Burns and Burns (1990) review a host of different frameworks for evaluating educational objectives, suggesting that Guilford's (1977) structure-of-intellect (SI) model. Gentry, Stoltman, and Mehlhoff (1992) draw on the work of Wagner and Sternberg (1985) to speculate that the effectiveness of experiential exercises can only be measured accurately when the measures include tacit learning. Schumann, Anderson, Scott, and Lawton (2001) suggest a model formulated by Kirkpatrick (1998), in which the effectiveness of a learning experience is evaluated according to (1) the reactions of the students, (2) the amount of learning achieved by the students, (3) the degree to which the behavior of students in other settings reflects what they have learned, and (4) the extent to which results are improved.

In many ways, both the popularity of Bloom's Taxonomy and the dissatisfaction leading to proposed alternatives stem from the same issue: Human competence is complex and multi-faceted. In order to address it educationally, we need a way of breaking it down into understandable components. However, in doing so, we often miss important aspects of what makes people effective or not in a given (in our case, business) situation. Bloom's Taxonomy is popular because it is both simple and it concepts are amazingly robust in their ability to explain complex behavior. It is inadequate, because it is only one perspective on a phenomenon that occurs in nature, and is

TABLE 1: Bloom's Taxonomy of Cognitive Objectives, Arranged from the Highest to Lowest Level of Learning

Level of Learning	Description	Example
Evaluation	The ability to judge the merit of ideas for given purposes.	Determine what strategy is likely to be most successful for Company X.
Synthesis	The ability to develop new ideas from apparently unrelated parts.	Formulate a new strategy to capitalize on the merger of Company X's superior technology and Company Y's superior sales force.
Analysis	The ability to break ideas down into their parts and logical premises.	Ascertain the reason for falling sales and profitability in Territory A.
Application	The ability to use abstract ideas in concrete situations.	Explain what consumer orientation means in the context of Product J's marketing program.
Comprehension	The ability to understand and make intellectual use of knowledge.	Understand the difference between a strategy of relationship marketing and a system of customer relationship management.
Knowledge	The ability to remember ideas such as facts, concepts and theories.	Remember the key elements of Company X's code of ethical marketing conduct.

inherently so complex that no single framework could capture is every aspect.

We can live with these inadequacies. However, as time goes on, we would expect to find that new perspectives focus our attention on aspects of competence that might have been missed, or at least, undervalued in our previous view. So it is with Bloom's Taxonomy.

Of particular interest is the long-standing distinction between process and content. Process addresses how one solves problems, while content consists of the knowledge required to make these processes meaningful. Gentry, Stoltman and Curtis (1992) suggest that advocates of experiential learning tend to focus on process at the expense of content. They argue that this is counterproductive, and that a better approach would be to focus on how to integrate the two into more powerful educational designs. Ullmann (1993) echoes their argument, applying it to education in Hungry.

Note in Table 1 that Bloom's Taxonomy features a hierarchy of objectives, where the lower levels tend to be more knowledge/content-related, and the higher levels more oriented toward cognitive skills/processes. The problem addressed by Gentry, Stoltman, and Curtis (1992) is that proponents of experiential learning tend to address the higher levels of the hierarchy, arguing that these higher levels of intellectual performance do not lend themselves to conventional learning environments, whereas the lower "content" levels do. But the distinction is naïve. Gentry, Stoltman, and Curtis point out that the effectiveness of an experiential exercise depends on a huge amount of knowledge, involving everything from culture to business practices. This tacit knowledge often goes unrecognized in the process of curriculum design (Gentry, Stoltman, and Mehlhoff 1992).

In order to fully appreciate the problem, imagine how you solve creative (never-before-encountered) business problems. You typically sort through your experience, looking for patterns – perhaps similar situations, or perhaps more abstract problem-solving approaches. You then apply the closest template, modifying it based on additional patterns you have encountered in other situations, constructing a totally new solution. In essence, you are transferring what you have learned in one situation to yet another. These processes are easily mapped onto the Bloomian categories of application, analysis, synthesis, and evaluation from Table 1.

The knowledge transfer – the problem-solving through application, analysis, synthesis, and evaluation – is a process, but what you are transferring is knowledge, which is to say, content! And, when you think about it, the nature of the process itself – how to actually go about figuring out what transfers and what doesn't is knowledge as well. Some of the knowledge is very basic – facts or terminology. But some – for instance, knowledge of how to organize lower levels of knowledge and apply it to the problem-solving process – is very sophisticated indeed. In this sense, the original Taxonomy was misleading.

THE REVISED TAXONOMY

With this introduction, let us consider the revision of Bloom's Taxonomy (Anderson and Krathwohl, 2001). Actually, the revision was not done by Bloom any more than was the original. The original Taxonomy was the product of a committee, of which Bloom was simply the leader. The revision was also done by a committee, of which Bloom was not even a member. However, it represents a continuation of the efforts of Bloom's original committee.

Significantly, in light of our previous discussion, the new Taxonomy now addresses two dimensions of learning. These are represented in Table 2. The first is the *cognitive process dimension*. The second addresses different levels of *knowledge*, a content dimension. The fact that the Table is structured in the form of a matrix suggests that the two dimensions interact with each other. That is, rather than forming a single hierarchy, each objective specifies the application of a cognitive process to a particular kind of knowledge. Our task here will be twofold: First, we will define the various concepts. Second, we will explain how Table 2 can be used to formulate learning strategies for experiential exercises.

THE COGNITIVE PROCESS DIMENSION

The concepts comprising the *cognitive process dimension* are very reminiscent of the original Taxonomy (Table 1). The differences are that the lower-level objectives, which tended to be knowledge-oriented, are related to the processes by which they are related to the processes by which they are accomplished. Thus, rather than speaking of *knowledge*, we speak of *remembering* knowledge. Instead of speaking of *comprehension*, we speak of *understanding*, which is how we comprehend.

The key to the new Taxonomy is the recognition that there is an immense gulf between remembering or understanding facts and conventions versus more complex knowledge structures. Scientists spend enormous amounts of time trying to understand and remember complex or abstract theories, and one of the marks of their intellectual achievement is the fact that they have done so. This recognition was missing in the original Taxonomy.

Given the similarity of the *cognitive process dimension* to the original Taxonomy, we can rely on Table 1 to convey the basic concepts. The concepts from the original Taxonomy map onto the *cognitive process dimension* as follows:

Note that *create* has superseded evaluate as the most advanced element of the *cognitive process dimension*. In fact, one of the changes in the revised Taxonomy is that the various levels are allowed to be overlapping, rather than forcing them to be a rigorous hierarchy. However, where synthesis is a process of combining ideas, to create implies intent, which, in turn, implies the ability to evaluate the relative merits of the thing one is creating This would suggest that creating is more complex than evaluating.

THE KNOWLEDGE DIMENSION

Table 3 summarizes the four major categories within the *knowledge dimension*, along with their subtypes. The subtypes are important, because they provide specific guidance as to when one might target a given type of knowledge component.

TABLE 2: The Structure of the Revised Technology

The Knowledge Dimension	***The Cognitive Process Dimension***				
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate
A. Factual knowledge					
B. Conceptual knowledge					
C. Procedural knowledge					
D. Meta-cognitive Knowledge					

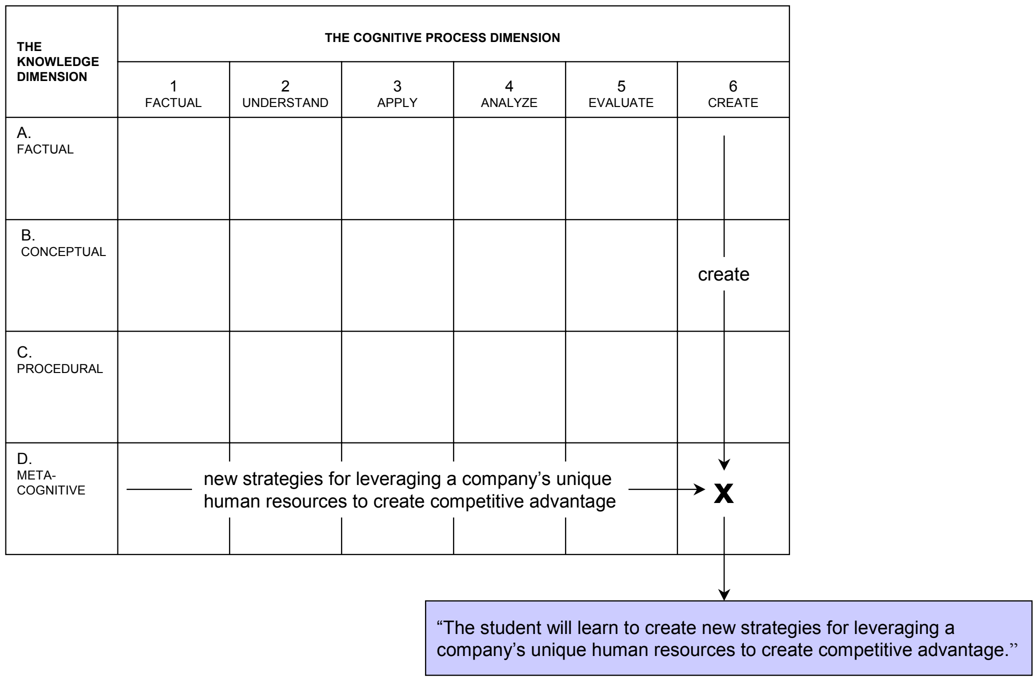
Source: Lorin W. Anderson and David R. Krathwohl. *A Taxonomy for Learning, Teaching, and Assessing*. New York: Longman, 2001, p. 28.

TABLE 3: The Structure of the Knowledge Dimension

Definitions	*Examples*
Factual knowledge. The basic elements students must know to be acquainted with a discipline or solve problems in it.	
✓ Knowledge of terminology	Technical vocabulary, such as supply, demand, markets, profit.
✓ Knowledge of specific details and elements	Facts such as the size of major markets, SIC classifications, regulatory agencies
Conceptual knowledge. The interrelationships among the basic elements with a larger structure that enable them to function together.	
✓ Knowledge of classifications and categories	Classes of activities within the marketing mix, general types of business enterprises
✓ Knowledge of principles and generalizations	Law of supply and demand, principle of net present value
✓ Knowledge of theories, models, and structures	Theory of reasoned action, typical structure of a multinational corporation
Procedural knowledge. How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.	
✓ Knowledge of subject-specific skills and algorithms	How to calculate hurdle rates, how to post journal entries to an accounting ledger
✓ Knowledge of subject-specific techniques and methods	Interviewing techniques, scientific method, how to conduct a SWOT analysis
✓ Knowledge of criteria for determining when to use appropriate procedures	When to use selective distribution, when to use participative management
Metacognitive knowledge. Knowledge of cognition in general as well as awareness and knowledge of one's own cognition.	
✓ Strategic knowledge	Use of flexible manufacturing as a business strategy, using just-in-time inventory to reduce inventory costs
✓ Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge	Knowledge of the business models used by key competitors, how to implement a program of global outsourcing
✓ Self-knowledge	Knowledge that empathic listening is a personal strength, that precise ordering of interdependent tasks is a weakness.

Adapted from Lorin W. Anderson and David R. Krathwohl. *A Taxonomy for Learning, Teaching, and Assessing*. New York: Longman, 2001, p. 29.

FIGURE 1: Applying the Framework



Drawing on our earlier discussion of *dynamic knowledge*, they provide a much more concrete idea of what *dynamic knowledge* might entail, where experiential learning might provide particularly useful, even for lower-level cognitive processes, such as remembering and understanding. As one moves from *factual knowledge* to *metacognitive knowledge*, knowledge structures become increasingly abstract and difficult work with. It is here that experience becomes essential to the learning process.

Create	→	*Synthesis*
Evaluation	→	*Evaluate*
Analysis	→	*Analyze*
Application	→	*Apply*
Comprehension	→	*Understand*
Knowledge	→	*Remember*

APPLYING THE FRAMEWORK

One of the differences between the revised versus the original Taxonomy is the fact that the revised Taxonomy was designed to focus on practical applicability to curriculum planning. The mechanism is an ingenious application of syntactic logic. Figure 1 illustrates how this works.

Educational objectives are ultimately expressed in the form of natural language. Conveniently, elements of the *cognitive process dimension* take the form of verbs, while elements of the *knowledge dimension* are nouns. Grammatically, the learner is the subject, cognitive process the predicate, and knowledge the direct object. Thus, a high-level (create/metacognitive) objective might be, "the student will learn to create new strategies for leveraging a company's unique human resources to create competitive advantage."

The key to the planning process is simply one of expanding the lexicon for each element of the matrix. For instance, Table 4 contains a list of possible "verbs" that might be used to implement each element of the *cognitive process dimension*. As the vocabulary expands, we get a richer sense of what kinds of experience we might want to target with our educational activities.

SUMMARY AND CONCLUSIONS

The purpose of this paper has been to discuss how the revised version of Bloom's classic Taxonomy of educational objectives might be used to structure experiential learning exercises. We have argued that experiential learning is particularly powerful for creating dynamic knowledge, or knowledge that is flexible enough to allow people to use abstractions to manipulate and interact with situations they have never before encountered. This, of course, is what business is all about. By separating knowledge from cognitive process, the revised Taxonomy provides a much more theoretically sensible framework for working with high-levels of learning, such as those involving dynamic knowledge.

Conveniently, the revised Taxonomy also provides a very operational approach to formulating educational objectives. It addresses them in natural language, using *cognitive process* to supply the predicate and *knowledge* structures to supply the direct object of student learning activities. This is particularly useful, because it provides a framework for researchers to develop an expanding "vocabulary" from which objectives might be formed, within each of the general categories in both the *knowledge* and *cognitive process domains*.

TABLE 4: Expanding the Cognitive Process Dimension

Subcategories of Cognitive Process	***Further Expansions of Subcategories***
Remember. Retrieve relevant knowledge from long-term memory.	
✓ Recognizing	✓ Identifying
✓ Recalling	✓ Retrieving
Understand. Construct meaning from instructional messages, including oral, written, and graphic communication.	
✓ Interpreting	✓ Clarifying ✓ Paraphrasing ✓ Representing ✓ Translating
✓ Exemplifying	✓ Illustrating ✓ Instantiating
✓ Classifying	✓ Categorizing ✓ Subsuming
✓ Summarizing	✓ Abstracting ✓ Generalizing
✓ Inferring	✓ Concluding ✓ Extrapolating ✓ Interpolating ✓ Predicting
✓ Comparing	✓ Contrasting ✓ Mapping ✓ Matching
✓ Explaining	✓ Constructing models
Apply. Carry out or use a procedure in a given situation.	
✓ Executing	✓ Carrying out
✓ Implementing	✓ Using
Analyze. Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose.	
✓ Differentiating	✓ Discriminating ✓ Distinguishing ✓ Focusing ✓ Selecting
✓ Organizing	✓ Finding coherence ✓ Integrating ✓ Outlining ✓ Parsing ✓ Structuring
✓ Attributing	✓ Deconstructing
Evaluate. Make judgments based on criteria and standards.	
✓ Checking	✓ Coordinating ✓ Detecting ✓ Monitoring ✓ Testing
✓ Critiquing	✓ Judging
Create. Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure.	
✓ Generating	✓ Hypothesizing
✓ Planning	✓ Designing
✓ Producing	✓ Constructing

Adapted from Lorin W. Anderson and David R. Krathwohl. *A Taxonomy for Learning, Teaching, and Assessing*. New York: Longman, 2001, pp. 67-8.

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