

## ◆◆ Chapter 31

# *Bloom's Taxonomy and Critical Thinking Instruction: Recall is not Knowledge*

### *Abstract*

*In this brief article, Richard Paul analyses and critiques Bloom's Taxonomy from the perspective of the critical thinking movement. He points out Bloom's achievements in Cognitive Domains and Affective Domains: the analysis of cognitive processes of thought and their interrelationships; the emphasis on the need for these processes (including critical thinking skills and abilities) to be explicitly and mindfully taught and used; the emphasis on critical thinking values, such as openmindedness and faith in reason.*

*Dr. Paul then argues that Bloom's approach suffers from the following two flaws: 1) the attempt to be "value neutral" is impossible and incompatible with the values presupposed in critical thinking education and 2) Bloom confuses recall with knowledge.*

*As a result of the way the taxonomy is explained, many teachers identify learning to think critically with merely learning how to ask and answer questions in all of Bloom's categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. Teachers typically take the categories to express objectives which they should teach to in strict order: first give the students "knowledge", then show them how to comprehend it, then how to apply it, etc. Paul, while recognizing that Bloom's distinctions themselves are important, argues that the common understanding of their link to critical thinking is largely misconceived. Teaching critical thinking is not a simple matter of asking questions from each of Bloom's categories; moreover, the categories themselves are not independent but interdependent. Paul shows, for example, how knowledge is not something that can be given to a student before he or she comprehends it. He explains how the critical thinking movement has properly emphasized that getting knowledge is in fact a complex achievement involving thought, and so should be understood as the product of rational thought processes, rather than as recall. This insight needs to be brought into the heart of instruction.*

**I**t would be difficult to find a more influential work in education today than *The Taxonomy of Educational Objectives* (Bloom, et al. 1979). Developed by a committee of college and university examiners from 1949 to 1954 and published as two handbooks — *Cognitive Domain* and *Affective Domain* — its objectives were manifold. Handbook I, *Cognitive Domain*, for instance, lists four encompassing objectives.

1. To "provide for classification of the goals of our educational system ... to be of general help to all teachers, administrators, professional specialists, and research workers who deal with curricular and evaluation problems ... to help them discuss these problems with greater precision ...".

2. To "be a source of constructive help ... in building a curriculum ...".
3. To "help one gain a perspective on the emphasis given to certain behaviors ...".
4. To "specify objectives so that it becomes easier to plan learning experience and prepare evaluation devices ...". (pp. 1-2)

The authors also note that the categories of the Taxonomy below can be used "as a framework for viewing the educational process and analyzing its workings" and even for "analyzing teachers' success in classroom teaching." (p. 3)

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

The Taxonomy of Educational Objectives: Cognitive Domain

#### 1.00 *Knowledge*

- 1.10 Knowledge of Specifics
- 1.11 Knowledge of Terminology
- 1.12 Knowledge of Specific Facts
- 1.20 Knowledge of Ways and Means of Dealing with Specifics
- 1.21 Knowledge of Conventions
- 1.22 Knowledge of Trends and Sequences
- 1.23 Knowledge of Classifications and Categories
- 1.24 Knowledge of Criteria
- 1.25 Knowledge of Methodology
- 1.30 Knowledge of the Universals and Abstractions in a Field
- 1.31 Knowledge of Principles and Generalizations
- 1.32 Knowledge of Theories and Structures

#### 2.00 *Comprehension*

- 2.10 Translation
- 2.20 Interpretation
- 2.30 Extrapolation

#### 3.00 *Application*

The use of abstractions in particular and concrete situations. The abstractions may be in the form of general ideas, rules of procedures, or generalized methods. The abstractions may also be technological principles, ideas, and theories which must be remembered and applied.

#### 4.00 *Analysis*

- 4.10 Analysis of Elements
- 4.20 Analysis of Relationships
- 4.30 Analysis of Organizational Principles

#### 5.00 *Synthesis*

- 5.10 Production of a Unique Communication
- 5.20 Production of a Plan, or Proposed Set of Operations
- 5.30 Derivation of a Set of Abstract Relations

#### 6.00 *Evaluation*

- 6.10 Judgments in Terms of Internal Evidence
- 6.20 Judgments in Terms of External Criteria

(From the *Taxonomy of Educational Objectives*, Bloom et al. 1974 p. 201)

A generation of teachers have now come of age not only familiar with and acceptant of the general categories of the Taxonomy, but also persuaded that the Taxonomy's identified higher-order skills of analysis, synthesis, and evaluation are essential to education at all levels. For these teachers, critical thinking is essential because higher-order skills are essential. To learn how to think critically, in this view, is to learn how to ask and answer questions of analysis, synthesis, and evaluation. To help teachers incorporate critical thinking in the classroom is to help them ask questions that call for analysis, synthesis, and evaluation. In this view, then, learning to teach critical thinking is quite straightforward. The teacher's thinking does not need to be significantly altered, and no fundamental shifts in educational philosophy are required. The Taxonomy and the ability to generate a full variety of question types are all that an intelligent teacher really needs to teach critical thinking skills.

This view is seriously misleading. According to most advocates of critical thinking, no neat set of recipes can foster critical thinking in students. The single most useful thing a teacher can do is to take at least one well-designed college course in critical thinking, in which the *teacher's own* thinking skills are analyzed and nurtured in numerous ways. In other words, teachers need a solid foundation in critical thinking skills before they can teach them.

What follows is a succinct analysis and critique of Bloom's Taxonomy, from the perspective of the values and epistemological presuppositions of the critical thinking movement. I hope it will contribute to a deeper understanding of the nature and demands of critical thinking instruction.

### ◆ *A One-Way Hierarchy*

Though not designed to further critical thinking instruction as such, *Cognitive Domain* contains a wealth of information of use in such instruction. Reading it in its entirety is most rewarding, particularly the sections on analysis, synthesis, and evaluation. These sections disclose that most of the cognitive processes characterized as essential to higher-order questions in fact presuppose use of basic critical thinking concepts: assumption, fact, concept, value, conclusion, premise, evidence, relevant, irrelevant, consistent, inconsistent, implication, fallacy, argument, inference, point of view, bias, prejudice, authority, hypothesis, and so forth. This is clear, for example, in the explanation of analysis:

Skill in analysis may be found as an objective of any field of study. It is frequently expressed as one of their important objectives by teachers of science, social studies, philosophy, and the arts. They wish, for example, to develop in students the ability to distinguish fact from hypothesis in a communication, to identify conclusions and supporting statements, to distinguish relevant from extraneous material, to note how one idea relates to another, to see what unstated assumptions are involved in what is said, to distinguish dominant from subordinate ideas or themes in poetry or music, to find evidence of the author's techniques and purposes .... (*Cognitive Domain*, p. 144)

In other words, if the ability to analyze usually requires students to do such things as distinguish facts from hypotheses, conclusions from evidence, relevant from irrelevant material, note relationships between concepts, and probe and detect unstated assumptions, then it seems essential that students become not only familiar with these words (by teachers introducing them frequently into classroom discussion) but also comfortable with using them as they think their way through analytic problems. This need becomes more evident if we recognize that by analysis, synthesis, and evaluation, the authors of the Taxonomy have in mind only their *explicit* (not subconscious) uses. They rightly emphasize what has become a virtual platitude in cognitive psychology — that students (and experts) who do the best analyses, syntheses, and evaluations tend to do them mindfully with a clear sense of their component elements. So, if the concepts of critical thinking are presupposed in mindful analysis, synthesis, and evaluation, we can best heighten that mindfulness by raising those component concepts to a conscious level.

Although *Affective Domain* implies that it is *value neutral*, many of the examples of higher-order valuing illustrate values intrinsic to education conceived on a critical thinking paradigm, wherein a student:

Deliberately examines a variety of viewpoints on controversial issues with a view to forming opinions about them.

[Develops] faith in the power of reason in methods of experimental discussion.

Weighs alternative social policies and practices against the standards of the public welfare rather than the advantage of specialized and narrow interest groups.

[Achieves] readiness to revise judgments and to change behavior in the light of evidence.

Judges problems and issues in terms of situations, issues, purposes, and consequences involved rather than in terms of fixed, dogmatic precepts or emotionally wishful thinking.

Develops a consistent philosophy of life. (pp. 181–185)

Along with the usefulness of Bloom's Cognitive and Affective Taxonomies, we must bear in mind their limitations for critical thinking curriculum construction. To some extent, the Taxonomies represent an attempt to achieve the impossible: a perfectly neutral classification of cognitive and affective processes that makes no educational value judgments and favors no educational philosophy over any other — one that could be used by any culture, nation, or system whatsoever, independent of its specific values or world view:

... to avoid partiality to one view of education as opposed to another, we have attempted to make the taxonomy neutral by avoiding terms which implicitly convey value judgments and by making the taxonomy as conclusive as possible. This means that the kinds of behavioral changes emphasized by *any* institution, educational unit, or educational philosophy can be represented in the classification. Another way of saying this is that any objective which describes an intended behavior should be classifiable in this system. (*Cognitive Domain*, p. 14)

This approach to knowledge, cognition, and education is partly irreconcilable with a commitment to critical thinking skills, abilities, and dispositions:

To a large extent, knowledge as taught in American schools depends upon some external authority: some expert or group of experts is the arbitrator of knowledge. (*Cognitive Domain*, p. 31)

... the scheme does provide levels for the extreme inculcation of a prescribed set of values if this is the philosophy of the culture. (*Affective Domain*, p. 43)

It is possible to imagine a society or culture which is relatively fixed. Such a society represents a closed system in which it is possible to predict in advance both the kinds of problems individuals will encounter and the solutions which are appropriate to those problems. Where such predictions can be made in advance, it is possible to organize the educational experience so as to give each individual the particular knowledge and specific methods needed for solving the problems he will encounter. (*Cognitive Domain*, p. 39-40)

But precisely because of this attempt at neutrality the category of "knowledge" is analyzed in such a restricted way and the relationship of the categories is assumed to be hierarchical in only one direction. For instance, according to Bloom's Taxonomy, "comprehension" presupposes "knowledge", but "knowledge" does not presuppose "comprehension". The second of these conceptual decisions would be questioned by those who hold that the basic skills and dispositions of critical thinking must be brought into schooling from the start, and that for any learning to occur, they must be intrinsic to every element of it.

#### ◆ *Knowledge as Achievement*

The critical thinking movement has its roots in the practice and vision of Socrates, who discovered by a probing method of questioning that few people could rationally justify their confident claims to knowledge. Confused meanings, inadequate evidence, or self-contradictory beliefs often lurked beneath smooth but largely empty rhetoric. This led to a basic insight into the problem of human irrationality and to a view of knowledge and learning which holds that to believe or assent without reason, judgment, or understanding is to be prejudiced. This belief is central to the critical thinking movement. This view also holds the corollary principle that critical reflection by each learner is an essential precondition of knowledge. Put another way, those who advocate critical thinking instruction hold that knowledge is not something that can be *given* by one person to another. It cannot simply be memorized out of a book or taken whole cloth from the mind of another. Knowledge, rightly understood, is a distinctive construction by the learner, something that issues out of a *rational* use of mental processes.

To expect students to assent before they have developed the capacity to do so rationally is to indoctrinate rather than to educate them and to foster habits of thought antithetical to the educative process. Peter Kneedler (1985) observed "an unfortunate tendency to teach facts in isolation from

the thinking skills” — to *give* students knowledge and some time later expect them to *think* about it. Knowledge, in any defensible sense, is an *achievement* requiring a mind slow rather than quick to believe — which waits for, expects, and weighs evidence before agreeing. The sooner a mind begins to develop rational scruples, in this view, the better.

As Quine and Ullian (1970) put it:

... knowledge is in some ways like a good golf score: each is substantially the fruit of something else, and there are no magic shortcuts to either one. To improve your golf score you work at perfecting the various strokes; for knowledge you work at garnering and sifting evidence and sharpening your reasoning skills ... knowledge is no more guaranteed than is a lowered golf score, but there is no better way. (p. 12)

We don't actually know whether students have achieved some knowledge until we have determined whether their beliefs represent something they actually know (have rationally assented to) or merely something they have memorized to repeat on a test. Dewey, as the authors of the Taxonomy recognize, illustrated this point with the following story in which he asked a class:

“What would you find if you dug a hole in the earth?” Getting no response, he repeated the question: again he obtained nothing but silence. The teacher chided Dr. Dewey, “You're asking the wrong question.” Turning to the class, she asked, “What is the state of the center of the earth?” The class replied in unison, “Igneous fusion.”

The writers of the Taxonomy attempt to side-step this problem by defining “knowledge” as “what is currently known or accepted by the experts or specialists in a field, whether or not such knowledge, in a philosophical sense, corresponds to ‘reality’”. (*Cognitive Domain*, p. 32)

The writers of the Taxonomy erroneously assume that the only issue here is the relative *value* of the knowledge, not whether statements merely memorized should be called knowledge at all:

In these latter conceptions [those which link knowledge to understanding and rational assent] it is implicitly assumed that knowledge is of little value if it cannot be utilized in new situations or in a form very different from that in which it was originally encountered. The denotations of these latter concepts would usually be close to what have been defined as “abilities and skills” in the Taxonomy. (*Cognitive Domain*, p. 29)

This inadvertently begs the question whether blindly memorized true belief can properly be called knowledge at all — and hence whether inculcation and indoctrination into true belief can properly be called education. If knowledge of any kind is to some extent a skilled, rational achievement, then we should not confuse knowledge and education with belief inculcation and indoctrination, just as we should not confuse learning more with acquiring knowledge (we *learn*, are not born with bias, prejudices, and misconceptions, for example). This point, crucial for the critical thinking movement, was well formulated by John Henry Newman (1852):

... knowledge is not a mere extrinsic or accidental advantage ... which may be got up from a book, and easily forgotten again, ... which we can borrow for the occasion, and carry about in our hand ... [it is] something intellectual ... which reasons upon what it sees ... the action of a formative power ... making the objects of our knowledge subjectively our own.

The *reductio ad absurdum* of the view that knowledge can be distinguished from comprehension and rational assent is suggested by William Graham Sumner (1906), one of the founding fathers of anthropology, commenting on the failure of the schools of his day:

The examination papers show the pet ideas of the examiners .... An orthodoxy is produced in regard to all the great doctrines. It consists in the most worn and commonplace opinions .... It is intensely provincial and philistine ... [containing] broad fallacies, half-truths, and glib generalizations ... children [are] taught just that one thing which is "right" in the view and interest of those in control and nothing else.

Clearly, Sumner maintained that provincial, fallacious, or misleading beliefs should not be viewed as knowledge at all, however widely they are treated as such, and that inculcating them is not education, however widely described as such.

#### ◆ *Rational Learning*

To sum up, the authors of the Taxonomy organized cognitive processes into a one-way hierarchy, leading readers to conclude that knowledge is always a simpler behavior than comprehension, comprehension a simpler behavior than application, application a simpler behavior than analysis, and so forth through synthesis and evaluation. However, this view is misleading in at least one important sense: achieving knowledge *always* presupposes at least minimal comprehension, application, analysis, synthesis, and evaluation. This counter-insight is essential for well-planned and realistic curriculum designed to foster critical thinking skills, abilities, and dispositions, and it cannot be achieved without the development of the teacher's critical thinking.

From the very start, for any learning, we should expect and encourage those rational scruples realistically within the range of student grasp, a strategy that requires critical insight into the evidentiary foundation of everything we teach. We should scrutinize our instructional strategies lest we inadvertently nurture student *irrationality*, as we do when we encourage students to believe what, from the perspective of their own thought, they have no good reason to believe. If we want rational learning (and again, *not all learning is rational*), then the process leading to belief is more important than belief itself. Everything we believe we have in some sense *judged* to be credible. If students believe something just because we or the text assert it, they learn to accept blindly.

Right-answer inculcation is not a preliminary step to critical thought. It nurtures irrational belief and unnecessarily generates a mindset that must be broken down for rational learning and knowledge acquisition to begin. The structure of our lifelong learning generally arises from our early cognitive habits. If they are irrational, then they are likely to remain so. There are twin obstacles to the development of rational learning: 1) being told and expecting to be told what to believe (belief inculcation); and 2) being told and expecting to be told precisely what to do (the over-proceduralization of thought). Together they fatally undermine independence of thought and comprehension.

Bloom's Taxonomy, all of the above notwithstanding, is a remarkable tour de force, a ground-breaking work filled with seminal insights into cognitive processes and their interrelations. Nevertheless, the attempt to remain neutral with respect to all educational values and philosophical issues is a one-sided hierarchical analysis of cognitive processes that limits our insight into the nature of critical thinking. (To minimize misunderstanding, let me express in another way one basic sense in which I consider it misleading to call Bloom's Taxonomy "neutral". By labeling the first category "knowledge" rather than "rote recall", the Taxonomy legitimates calling the product of rote recall "knowledge". Such labeling is educationally tendentious and therefore not neutral.) Successful critical thinking instruction requires that:

- teachers have a full range of insights into cognitive processes and their complex interrelationships.
- Bloom's hierarchy become two-sided.
- teachers see that rational learning is *process-* rather than *product-*oriented — a process that brings comprehension, analysis, synthesis, and evaluation into every act of the mind that involves the acceptance, however provisional, of beliefs or claims to truth, and that thereby fosters *rational* habits of thought and *rational* learning:

... the teacher's primary job is that of making clear the bases upon which he weighs the facts, the methods by which he separates facts from fancies, and the way in which he discovers and selects his ultimate norms .... This concept of teaching ... requires that the purported facts be accompanied by the reasons why they are considered the facts. Thereby the teacher exposes his methods of reasoning to test and change. If the facts are in dispute ... then the reasons why others do not consider them to be facts must also be presented, thus bringing alternative ways of thinking and believing into dialogue with each other.

— Emerson Shideler

### ◆ References

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